HANDBOOK
ON
RURAL LAND READJUSTMENT
AND LAND CONSOLIDATION
IN GERMANY

Joachim Thomas

Thomas, Joachim
Handbook on rural land readjustment and land consolidation in Germany
/ Thomas, Joachim. – Nishyn: editor Lysenko M.M., - 431 p.
UDK 332.339(075.8)

Authorised translation: Robin Stocks
Robin Stocks (Words-Worth Stocks & Stocks GbR)

This handbook was prepared and published for printing with the support of the Federal Ministry of Food and Agriculture (BMEL).

Bibliographic information from the German National Library
The German National Library lists this publication in the German National Bibliography; Detailed bibliographic data is available on the Internet at http://dnb.dnb.de.

This book presents the current state of the art in rural land readjustment and land consolidation in Germany from a methodological, legal and engineering point of view. It was compiled in connection with the German-Ukrainian Agricultural Policy Dialogue (APD) and, in consultation with Ukrainian experts, has been aligned to the needs and knowledge level of the international expert community. This purpose is also served by a comprehensive glossary near the front of the book. The presentation reflects the continued relevance of land readjustment instruments for social, economic and infrastructure development in Germany. Accordingly, the methodological and practical explanations should be helpful in shaping and implementing sustainable land policies. The book is conceived as a textbook for bachelor's, master's and doctoral students of geodesy and of agricultural, social and administrative sciences and as a reference for practitioners.

ISBN 978-617-640-631-0

for Ursula,Barbara and Stefan

with gratitude

About the Project "German-Ukrainian Agricultural Policy Dialogue (APD)"

The project "German-Ukrainian Agricultural Policy Dialogue (APD)" has been funded with the support of the Federal Ministry of Food and Agriculture (BMEL) since 2006 and implemented on its behalf through the mandate GFA Consulting Group GmbH.

The beneficiary of the project is the Ministry of Agrarian Policy and Food of Ukraine.

Component 1 of the APD (Agricultural Policy Dialogue) is carried out by the working group consisting of IAK Agrar Consulting GmbH, the Leibniz Institute for Agricultural Development in Transition Economies (IAMO) and GOPA AFC GmbH.

The land law advice is provided as part of the APD as component 2 (the Land Component) and is implemented by BVVG German AgriForest Privatisation Agency.

Since 2006, the Land Component has been making important contributions to current key land policy issues through demand-oriented advice. Taking into account German and international experience and the EU Association Agreement, Ukraine's land policy should make a greater contribution to increasing the competitiveness of agriculture and forestry and contribute to the development of effective and transparent land management.

Disclaimer

This paper is published under the responsibility of the Land Component under the umbrella of the German-Ukrainian Agricultural Policy Dialogue (APD) and included a proven German expert in land consolidation. The author is solely responsible for the technical information in this article. Any points of view and results, conclusions, suggestions or recommendations mentioned therein belong to the authors and do not necessarily coincide with APD's opinion.

Preface

Handbook on Rural Land Readjustment and Land Consolidation in Germany

More than half a century has gone by since publication of the last comprehensive treatment of land consolidation in Germany (H. Gamperl 1967, *Handbuch der Vermessungskunde, Band 4b*, 10th edition, J.B.Metzler'sche Verlagsbuchhandlung Stuttgart). The task profile of land consolidation for rural development has changed considerably since then, not only because of changes in surveying methods and technology, but above all with regard to socioeconomic, environmental and land policy objectives.

Instruments of rural land readjustment are no longer used solely to improve the structure of agriculture, but to enhance general public service provision in rural regions. German reunification required further additions to the land readjustment toolbox.

Many publications have been produced over the years to help practitioners and students of land consolidation with the challenges created by the various changes. Those publications include the output of the Federal-Länder Working Group on Land Development (ARGE Landentwicklung), articles in national journals and relevant publication series, land consolidation law reports, papers on land management and land development and, since 2010, the yearbook series *Das deutsche Vermessungs- und Geoinformationswesen* ('German Surveying and Geoinformation'). So why this Handbook on Rural Land Readjustment and Land Consolidation?

Interest in up-to-date information on German land consolidation is frequently expressed in international professional exchange, especially in international development cooperation with the former socialist countries of Central and Eastern Europe. In the wake of land reforms implemented since the 1990s and the still incomplete process of transforming from socialist planned economies to an economic and social order based on individual freedom, these countries are now looking to embrace coherent land policies and sustainable development of rural regions. In the course of open global professional exchange, a number of countries have identified the German land readjustment instruments as being worthy of replication, not least because of their continued relevance in spatial and sectoral planning and for economic and infrastructure development in Germany.

In connection with the German-Ukrainian Agricultural Policy Dialogue (APD), BVVG – the state-owned agency in charge of administering and privatising state-owned farm and forest land in eastern Germany – took up the idea of a comprehensive presentation in book form covering the German approach for rural development. The plan was to compile a handbook presenting the German land consolidation 'brand' and providing guidance for countries that are still on the way to harnessing rural land readjustment instruments for rural development. Accordingly, the author would like to take this opportunity to commend Katja Dells, Head of the International Consulting

Department at BVVG, and Christoph Gilgen, Policy Officer at the Federal Ministry of Food and Agriculture (BMEL) for the exceptional and far-sighted decision in favour of this project, and to express his gratitude for the trust placed in him.

Content planning was carried out jointly with Ukrainian experts and revised time and again in the course of writing. This reflects the aim of supporting land policy activities underway in Ukraine to adapt land tenure to present-day societal needs. Special thanks are due here to Professor Taras Ievsiukov, Dean of the Faculty of Land Management at the National University of Life and Environmental Sciences of Ukraine in Kyiv, and to Andriy Martyn, Professor of Land-Use Planning and Advisor in the Reforms Delivery Office of the Cabinet of Ministers of Ukraine, both of whom, through their comments and discussion contributions with an outside perspective, helped considerably in tailoring the handbook to its target audience. The outcome is a reference book that, in the opinion of all involved, deserves to be made available to an international readership. It is due to the dedicated and motivating efforts of Audrius Paura (International Consulting Department at BVVG) during the practical part of the work that the handbook was able to be completed in the allotted timeframe.

The basic structure of this book follows the objectives described above. After a brief historical survey of the genesis of the rural development instruments used in Germany today, the second chapter goes over the general principles of modern-day land readjustment and land consolidation and sets out the standards expected today from the public administration in matters involving land ownership. The legal basis is only addressed to the extent considered essential to understanding contemporary land readjustment. Looking at the origins of today's land readjustment instruments, readers in countries still in the process of transition will be able to see that the current land tenure system in Eastern Europe following the land reforms of the 1990s differs little from the situation that led to the birth of statutory land readjustment instruments in Western Europe. This also applies to the instruments under the Agricultural Adjustment Act introduced following German reunification in 1990.

The third chapter covers the technical and administrative workflow in a standard land consolidation, in the form that has proved efficient and expedient over more than 100 years of land consolidation activity in Germany. It was decided to base this practical section on the standard land consolidation procedure because all other land readjustment instruments described in this handbook are, at least in principle, derived methodologically from that procedure. The detailed description of the practical side also aims to show how results-oriented collaboration between the various professions involved is essential to the successful completion of a modern land consolidation project.

Chapter four examines the main stages of the procedure with regard to their methodological foundations and how they interconnect with other areas of law and other professions. This includes, for example, the preparation of reorganisation procedures in practice, technical and land improvement principles for planning and implementing land consolidations, and compliance with environmental requirements. In addition, the chapter shows how 'soft' topics arise time and again in the technical and administrative process – matters such as public consultation, communication among stakeholders in the

administrative procedure, discursive participation and dialogue planning, sensitivities of affected parties and also empathy on the part of project staff. Far from being 'optional extras', these aspects are crucial in the author's experience to the success of rural development measures on the basis of rural land readjustment.

Finally, the fifth chapter provides examples of how land policy challenges can be addressed with the land readjustment instruments available in Germany, both to the benefit of the landowners involved and in the public interest. Thanks go here to Hubertus Bertling, former Ministerial Head of Division, for his contribution to the planning and content of this handbook. On the basis of his experience in the practical implementation of land consolidation in the State of Saxony-Anhalt in general, and in particular in reorganisation procedures in eastern Germany as a result of reunification, he provided valuable suggestions and illustrative examples for the implementation of specific transformation-related land readjustment tasks.

The final chapter on the significance of land consolidation and land development in the international context enables readers to see how their respective national land policy conditions fit in with the broader perspective. The glossary near the front of this book also serves to explain terms that may be assumed familiar in Germany but can cause difficulties when transferred to another language due to a lack of synonyms or equivalents.

On the above basis, this handbook reflects the current state of the art in rural land readjustment in Germany (and its German edition may also serve as a ready reference for German students and practitioners). For international readers, the presentation of the methodological approaches and legal framework is not meant as a 'blueprint' for future legislative initiatives. Instead, it aims to show the mechanisms through which land readjustment instruments operate. Nor does this handbook claim to reflect the great and growing diversity with which land readjustment and land development administrations in the various German states today go about their statutory responsibilities. The selected examples serve to describe methodological approaches for resolving each land use conflict. This also applies where reference is made to the mostly state-specific sub-legislative administrative regulations for detailed implementation of the law. The interested reader will find pointers to more detailed and supplementary treatment of the subject-matter in the comprehensive list of sources.

It remains to be hoped that this handbook will provide inspiration for the German-Ukrainian Agricultural Policy Dialogue and for similar processes in Eastern Europe and Asia, and that it will also prompt critical reflection on the foundations of rural land readjustment and land consolidation in Germany.

Bonn, summer 2023

Professor Dr.-Ing. Joachim Thomas
Former Ministerial Head of Division
Author

CONTENTS

List of abbreviations

AEP	*Agrarstrukturelle Entwicklungsplanung* (agricultural structure development plan)
are	Unit of area equal to 100 m²
ARGE	*Arbeitsgemeinschaft* (working group)
BAnz.	*Bundesanzeiger* (Federal Gazette)
BauGB	*Baugesetzbuch* (Federal Building Code)
Bd.	*Band* (volume)
BezReg	*Bezirksregierung* (district government)
BGB	*Bürgerliches Gesetzbuch* (German Civil Code)
BGBl.	*Bundesgesetzblatt* (Federal Law Gazette)
BMEL	*Bundesministerium für Ernährung und Landwirtschaft* (Federal Ministry of Food and Agriculture)
BNatSchG	*Bundesnaturschutzgesetz* (Federal Nature Conservation Act)
BodSchätzG	*Bodenschätzungsgesetz* (Soil Appraisal Act)
BVerfG	*Bundesverfassungsgericht* (Federal Constitutional Court)
BVerwG	*Bundesverwaltungsgericht* (Federal Administrative Court)
BWVO	*Besitzwechselverordnung* (Ownership Transfer Regulations)
CAP	Common Agricultural Policy
cm	Centimetre (unit of length)
CN	Code number
CSF	Common Strategic Framework
° C	Degrees Celsius
DLR	*Dienstleistungszentrum Ländlicher Raum* (Rural Service Centre)
EC	European Community
EEC	European Economic Community
EGBGB	*Einführungsgesetz zum Bürgerlichen Gesetzbuch* (Introductory Act to the German Civil Code)
EIA	Environmental impacts assessment
EU	European Union
€	Euro (currency)
et seq.	*Et sequentes* (and the following pages)
Fig.	Figure
FGSV	*Forschungsgesellschaft für Straßen und Verkehrswesen* (Road and Transportation Research Association)
FlurbG	*Flurbereinigungsgesetz* (Land Consolidation Act)
FRG	Federal Republic of Germany
GBl.	*Gesetzblatt* (Law Gazette)
GBO	*Grundbuchordnung* (Land Register Code)
GDR	German Democratic Republic

GG	*Grundgesetz der Bundesrepublik Deutschland* (Basic Law of the Federal Republic of Germany)
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German development agency)
GPS	Global positioning system
GV.	*Gesetz- und Verordnungsblatt* (Law Gazette)
GVBl.	*Gesetz- und Verordnungsblatt* (Law Gazette)
ha	Hectare (unit of area; 1 hectare = 100 ares)
Ed.	Editor(s)
ICE	Intercity Express
ILE	*Integrierte ländliche Entwicklung* (Integrated Rural Development)
ILEK	*Integriertes ländliches Entwicklungsconcept* (Integrated Rural Development Concept)
IRDC	Integrated Rural Development Concept
IT	Information technology
km	Kilometre (unit of length)
LPG	*Landwirtschaftliche Produktionsgenossenschaft* (collective farm)
LPGG	*Gesetz über die landwirtschaftliche Produktionsgenossenschaft* (Collective Farms Act)
LPlG	*Landesplanungsgesetz* (Territorial Planning Act)
LwAnpG	*Landwirtschaftsanpassungsgesetz* (Agricultural Adjustment Act)
m	Metre (unit of length)
m²	Square metre (unit of area)
m³	Cubic metre (unit of volume)
MBl.	*Ministerialblatt* (Ministerial Gazette)
MUNLV	*Ministerium für Umwelt, Naturschutz und Landwirtschaft* (Ministry for Environment, Agriculture, Conservation and Consumer Protection)
NGO	Non-governmental organisation
Nr.	*Nummer* (number)
NRW	North Rhine-Westphalia
OJ	Official Journal of the European Union
RdErl.	*Runderlass* (circular decree)
Ref. no.	Reference number
REK	*Regionales Entwicklungskonzept* (Regional Development Concept)
RGBl.	*Reichsgesetzblatt* (Reich Law Gazette)
ROG	*Raumordnungsgesetz* (Spatial Planning Act)
RUO	*Reichsumlegungsordnung* (Reich Land Reallocation Code)

TÖB	*Träger öffentlicher Belange* (bodies representing public interests)
SachenRÄndG	*Sachenrechtsänderungsgesetz* (Property Law Adjustment Act)
SchuldRÄndG	*Schuldrechtsänderungsgesetz* (Law of Obligations Adjustment Act)
SMBl.	*Sammelministerialblatt* (Ministerial Gazette)
StBA	*Statistisches Bundesamt* (Federal Statistical Office)
StVZO	*Straßenverkehrs-Zulassungsordnung* (German Road Traffic Registration Regulations)
UmwRG	*Umwelt-Rechtsbehelfsgesetz* (Environmental Appeals Act)
UVPG	*Gesetz über die Umweltverträglichkeitsprüfung* (Environmental Impact Assessments Act)
VEG	*Volkseigenes Gut* (state-owned farm)
VermG	*Vermögensgesetz* (Act Regulating Unresolved Property Claims)
VO	*Verordnung* (statutory instrument, ordinance, regulation)
VOB	*Verdingungsordnung für das Bauwesen* (German Construction Contract Procedures)
VU	Value unit
VwGO	*Verwaltungsgerichtsordnung* (Code of Administrative Court Procedure)
WT	Wind turbine
WEG	*Wohnungseigentumsgesetz* (Apartment Ownership Act)
WFD	Water Framework Directive
ZGB	*Zivilgesetzbuch* (Civil Code of the German Democratic Republic)

GLOSSARY

***Abmarkung* – demarkation, marking out**

Demarkation refers to marking out a parcel boundary on the ground to legal effect with permanent boundary markers such as boundary stones or metal rods.

***Absteckung* – delineation, setting out**

Delineation refers to setting out geometrically defined points or lines on the ground using field surveying techniques. The purpose is to visualise the location of points and lines on the ground or so that construction can be carried out where planned.

***Allgemeine Landeskultur* – general use and development of the land**

Allgemeine Landeskultur is a hard-to-translate concept that has additionally shifted in meaning over recent decades. In earlier times it related to measures directed at ensuring the long-term fertility and productivity of farmland, primarily through water resources engineering and land development engineering. Today, it additionally takes in the functions of farmland relating to maintenance of the natural balance. *Landeskultur* can consequently be rendered as the use and development of the land, and encompasses all economic and ecological aspects underlying efforts benefiting the countryside under agricultural and forestry cultivation and stewardship. In other words, it denotes the development, management and preservation of the cultural landscape having due regard to ecological and economic requirements.

***Aufmessung* – measuring out, surveying**

In cadastral surveying, points (such as boundary points) or objects (such as shorelines of water bodies or high-voltage pylons) are measured out to determine their spatial position. In English, this is also one, narrow meaning of the term 'surveying'. Points that have previously been set out and demarkated are measured out for verification.

***Beschleunigte Zusammenlegung* – accelerated consolidation**

In order to ensure that an improvement of production and working conditions in agriculture and forestry is realised as quickly as possible, reorganisation of rural land tenure may be restricted to an accelerated consolidation. A number of stages in a standard land consolidation can then be left out. Accelerated consolidation may also be carried out for necessary nature conservation or landscape preservation measures.

***Bewirtschafterkarte* – land user map**

Especially in eastern Germany, leased areas are sometimes exchanged among tenants on the basis of contractual agreements or informal agreements. This results in a situation where the land that farmers cultivate is not always the farmland they have actually leased. As well as ownership and tenure, it is therefore also necessary to distinguish who actually farms each piece of land, and this is shown in the land user map.

***Bodenordnung* – land tenure system; land readjustment**

The German term *Bodenordnung* has two different meanings:

Firstly, it denotes the land tenure system: all legal, technical, descriptive and record-keeping matters relating to land use and to ownership and tenure within the remit

of public authorities. These matters follow from relevant provisions in the constitution and in public and private-law legislation. This is the 'static' meaning of *Bodenordnung*.

The second meaning of *Bodenordnung* is land readjustment: the reorganisation of land tenure by private parties or the state. This can take place by voluntary agreement (such as by sale, exchange or lease) or by statutory action by the state. Private parties make use of the provisions of private law for the purpose. State bodies are allowed to exercise influence on land use and land tenure solely on the basis of sectoral legislation, as statutory land readjustment procedures always encroach on constitutionally guaranteed property rights. This is the 'dynamic' meaning of the term *Bodenordnung*. It includes, for example, the rural land readjustment procedures that are the subject matter of this handbook, urban development land readjustment procedures, compulsory purchase proceedings and all varieties of land reform.

***Bodenordnungsverfahren* – land readjustment procedure**
Land readjustment procedures are:

Statutory administrative procedures
provided for in enacted law
conducted by a public authority
for the reorganisation of land tenure
for a specific purpose.

Typical examples of statutory land readjustment procedures include land consolidation, land reorganisation, urban redevelopment, building land reallocation and compulsory purchase proceedings.

This general definition of land readjustment also includes state interventions in the form of land reforms. Each of these forms of land readjustment has its own legal basis.

***Flurbereinigung* – land consolidation**
Land consolidation, as denoted by the German term *Flurbereinigung*, is the rearrangement of rural land holdings in accordance with the Land Consolidation Act (*Flurbereinigungsgesetz*) with a view to improving the production and working conditions in agriculture and forestry and to promoting the general use and development of the land. Land consolidation is carried out within a specific area designated the land consolidation area (*Flurbereinigungsgebiet*) with the involvement of all landowners concerned, the bodies representing public interests (*Träger öffentlicher Belange*) and the farmers' association.

***Flurneuordnung* – land reorganisation**
Land reorganisation, as denoted by the German term *Flurneuordnung*, relates to the determination and reorganisation of the ownership situation under the Agricultural Adjustment Act (*Landwirtschaftsanpassungsgesetz*). By reason of the departure of members of a collective farm or registered cooperative or the establishment of individual farms, or in order to restore the unity of ownership of land and buildings, the ownership of plots of land may be reorganised at the request of a party involved, taking into account the interests of all parties involved. The reorganisation of ownership is carried out by means of a voluntary land exchange or a procedure ordered by the competent authority (referred to as the reorganisation authority). The Agricultural Adjustment Act applies solely to the territory of the former German Democratic Republic.

***Flurstück* – parcel**

'Parcel' is a cadastral term. A parcel is the smallest unit of the spatially delimited parts of the earth's surface listed in the cadastral register.

***Freiwilliger Landtausch* – voluntary land exchange**

A voluntary land exchange, also known elsewhere as a land swap, can be carried out (in Germany) either on a private-law basis or on a public-law basis (the Land Consolidation Act).

If it is done on a private-law basis, the intention of the parties to exchange property, together with all other agreements (such as on equalisation payments for differences between the properties or on who pays notarial and land registry fees) must be documented in a contractual agreement and the agreement must be notarialised. The new ownership status enters into force when the agreement is recorded in the land register.

In an exchange on a public-law basis, the land consolidation authority is involved: Voluntary land exchange may be carried out as a quick and simple method to reshape rural land parcels aiming at an improvement of the agrarian structure. It may also be carried out for nature conservation or landscape preservation reasons. In these cases, it is a procedure directed by the land consolidation authority in which rural land is exchanged with the consent of the holders of the rights to the land. The provisions of the Land Consolidation Act apply analogously to a voluntary land exchange. The parties have to submit an application for a voluntary land exchange to the land consolidation authority. The application will be turned down if the applicants are unable to credibly demonstrate that the land exchange is practicable.

***Gewanne* – former strip field, field block**

The term *Gewanne* goes back to the open field system of farming and relates to a field block that was once an open field divided into strips cultivated by individual farmers. It is indicated in the cadastral register with a *Gewannenbezeichnung* or field block name, such as *"Am Köppekreuz"*. However, the field block name is not used as an identifier in the cadastral register, where the identifiers are *Gemeinde* (municipality), *Gemarkung* (cadastral district), *Flur* (cadastral district subdivision) and *Flurstück* (parcel).

***Grundstück* – plot of land**

A plot of land (*Grundstück*) is a spatially delimited part of the earth's surface that is listed with a serial number in the inventory (*Bestandsverzeichnis*) part of the land register (*Grundbuch*). A plot of land in this legal sense of the term may consist of several parcels (*Flurstücke*).

***Integriertes ländliches Enwicklungskonzept (ILEK)* – Integrated Rural Development Concept (IRDC)**

An Integrated Rural Development Concept (IRDC) is a conceptual plan for rural development compiled with the aim of promoting the development of a rural region in terms of living, working, recreation and nature conservation. A key feature of the approach is the fullest possible coverage of all relevant action areas. Working closely with the local population, the aim is to identify what makes the region special, unlock inherent regional potential and establish regional networks.

***Landabzug* – land deduction**

Land deduction is a percentage deduction of land from participants in a land consolidation for a project of public interest. The aim is to meet any shortfall of land needed for a public infrastructure project while spreading the burden across all participants in the land consolidation procedure. The land deduction is determined by the land consolidation authority according to the ratio of the value of a participant's original plot(s) to the value of all plots in the land consolidation area and is specified in the land consolidation plan. The monetary compensation for the land deduction is based on the market value of the original plots of land.

***Landbeitrag* – land contribution**

The land needed for construction of common and public facilities in a land consolidation is provided by the participants as an unpaid land contribution according to the ratio of the value of a participant's original plots to the value of all plots in the land consolidation area. It is determined by the land consolidation authority and specified in the land consolidation plan.

***Landentwicklung* – land development**

The term *Landentwicklung* or 'land development' is defined in the German Land Consolidation Act and encompasses all 'land-related' and land use-related measures that have the overall aim of improving living and working conditions in rural regions; it includes the planning, preparation and implementation of all measures for maintaining and enhancing the residential, economic and recreational function of rural areas in order to advance and improve living conditions outside of urban centres. Land readjustment is not therefore limited to land used for agriculture or forestry, but takes in all land covered by a readjustment.

***Ländliche Entwicklung* – rural development**

Rural development comprises all other measures that go beyond land development, such as providing rural regions with suitable transport infrastructure and with basic service amenities and other services, promoting agriculture-related crafts and trades, broadband provision and local heating supply measures, and promoting tourism.

***Landesentwicklung* – territorial development**

The term *Landesentwicklung* or 'territorial development' is mostly used synonymously with territorial planning, meaning overall spatial planning for an entire state. This applies at a larger spatial scale and has the purpose of creating a coherent and coordinated development plan for the state including all rural and urban regions, thus providing the legal framework for all subordinate planning levels. Territorial development follows a sectorally and spatially integrated approach with a view to optimum regional development across the whole state and is implemented by state institutions in state development programmes and state development plans.

***Landeskultur* – use and development of the land**

Landeskultur denotes the development, management and preservation of the cultural landscape having due regard to ecological and economic requirements.

***Landespflege* – landscape architecture**

The meaning of the German term *'Landespflege'* has shifted over time and in its modern connotation is mostly equated with 'landscape architecture' in a broad sense of the term. The aim of *Landespflege* is to ensure an environment that is both human and natural and to balance a state's natural potential with the needs of society. Among other

things, it spans the fields of nature conservation, landscape management and green space planning (source: Buchwald; Lendholt; Preising 1964).

***Landschaftspflege* – landscape management, landscape preservation**

Landscape management or landscape preservation encompasses all measures concerning the diversity, uniqueness and scenic beauty of the landscape and the sustainable use of natural assets. In addition to active efforts to shape and preserve the landscape, it also includes passive conservation measures that in some cases relate solely to permitting natural succession.

***Landmanagement* – land management**

Land management is understood internationally – as defined by the United Nations Economic Commission for Europe (UNECE) and the Fédération Internationale des Géomètres (FIG) – as meaning all activities initiated in interaction between public and private stakeholders to manage the complex system of land use. The term covers all conditions and activities for the documentation, valuation, management and development of land resources.

***Landwirtschaftliche Produktionsgenossenschaft (LPG)* – collective farm (LPG) in the former German Democratic Republic**

Landwirtschaftliche Produktionsgenossenschaft (LPG) was the name given to the collectivisation – in early 1952 at first voluntary in some cases and then later mandatory – of farmers, their means of production and other workers in collective farms for communal agricultural production in the former German Democratic Republic (GDR).

LEADER

LEADER – the English acronym of the French programme name Liaison Entre Actions de Développement de L'Économie Rurale ("Links between actions for the development of the rural economy") – is a programme of measures under which the European Union has funded innovative activities in rural regions since 1991. Local action groups propose local development approaches. The aim is to help Europe's rural regions develop under their own momentum. Due to its successful deployment (initially as a Community initiative from 1991 to 2005), the LEADER approach was integrated in 2006 into mainstream European Union funding as an independent funding priority.

Natura 2000

Natura 2000 is a coordinated network of protected areas in the European Union, established since 1992 under the Habitats Directive (Directive 92/43/EEC). Its purpose is the international protection of endangered wild native flora and fauna species and of their natural habitats. The protected area network also includes sites designated under the Birds Directive (Directive 79/409/EEC).

***Regelflurbereinigung* – standard land consolidation**

The word 'standard' in 'standard land consolidation' reflects the fact that the provisions of sections 1 and 37 of the Land Consolidation Act constitute the core of the Act and thus represent the statutory standard for the conduct of integrated land consolidation.

***Separation* – separation of common property**

Separation was an 18th and 19th century precursor of today's land consolidation in Germany. By reallocating farmland previously held in common, it brought about large-scale changes in land use that, in addition to agrarian reform, also triggered far-reaching

social changes. The separation of common property fundamentally altered the landscape, as it abolished the three-field system of farming and created today's geometric arable field shapes. Other German terms for the same process were *Markenteilung* and *Gemeinheitsteilung*.

Common property and differing land use rights were an obstacle to more intensive farming. Transfer to private ownership brought productivity gains, as had been seen above all with the enclosure movement in 17th and 18th century England. The first similar measures to separate out common property in German states began in the late 18th century. However, comprehensive separation only got underway from the mid-1820s onwards.

In material terms, *Separation* was a form of privatisation of property comparable with the 1990s land reforms in Central and Eastern Europe.

***Teilnehmergemeinschaft* – body of participants**

The body of participants comprises the landowners and holders of heritable building rights in a land consolidation area and is established as a body corporate by operation of law on adoption of the land consolidation decision. The constituent organs of the body of participants are the participants' assembly, the board of the body of participants and the chairperson of the board.

***Umlegung* – land reallocation**

Land reallocation is a precursor of land consolidation. *Umlegung* was the term used to describe land reorganisation activity under the Prussian Land Reallocation Act (*Preußisches Umlegungsgesetz*) of 1920, the subsequent Land Reallocation Act of 1936 and the Reich Land Reallocation Code *(Reichsumlegungsordnung*) of 1937. The term was replaced by the term 'land consolidation' (*Flurbereinigung*) in the Land Consolidation Act (*Flurbereinigungsgesetz*) of 1953. Land reallocation already came very close to modern-day land consolidation in terms of the set of objectives pursued.

***Unternehmensflurbereinigung* – land consolidation for projects of public interest**

Land consolidation for projects of public interest is a land readjustment procedure for reorganising rural land ownership that can be deployed subject to statutory requirements to assist the implementation of public infrastructure projects requiring large areas of land.

***Vereinfachte Flurbereinigung* – simplified land consolidation**

Simplified land consolidation differs little from standard land consolidation with regard to the objectives pursued. Under section 86 (2) and (3) of the Land Consolidation Act, a simplified procedure is possible where the planned measures relate as a rule to resolving individual structural problems or individual problems relating to the use and development of the land. This enables simplifications in terms of formal requirements and procedure.

***Vermessung* – surveying**

Surveying essentially takes in all geodetic work. In a narrower sense, it refers to quantitative and qualitative measurement of objects on, above or below the earth's surface. Various branches of surveying are distinguished according to object and purpose, such as engineering surveying, land surveying, cadastral surveying, photogrammetric surveying or photogrammetry, mining surveying, hydrographic

surveying, satellite surveying and astronomical surveying. Quantitative surveying is generally performed using geometric parameters such as distance, angle, height or coordinates. Qualitative surveying consists of describing an object in more detail using additional data. Cadastral surveying additionally involves determining boundaries, obtaining official recognition of boundaries by neighbours and public authentication of the entire process.

***Zusammenlegung* – physical combination of plots; historical form of land readjustment**

Zusammenlegung is another term encountered in the historical context in relation to land consolidation. Today it is used to mean physically combining different plots of land belonging to a single landowner in a land consolidation. For a period of 50 years in the past, however, *Zusammenlegung* was also a form of land readjustment procedure in Germany that was carried out on the basis of a Prussian act of 1872 extending the common property separation decree of 1821 to the consolidation of land not held in common. In the implementation of *Separation* – the separation of common property and its transfer to private ownership – it was observed that further improvements in farmers' working and production conditions could be obtained by additionally permitting the consolidation of land not held in common. As a result of this, land readjustment procedures conducted between 1872 and 1920 are referred to in documents as *Zusammenlegung X* (where X is a place name), rather than, for example, *Flurbereinigung X* for a present-day land consolidation.

1 The historical context of land consolidation

1.1 The origins of land consolidation in Germany

From the separation of common property to integrated rural development

Rural reorganisation as a function of the state has its true origins in the social upheavals across the whole of Western Europe on the eve of the French Revolution. At the end of the 18th century, the feudal system dating from the Middle Ages was in the process of unravelling. The overlordship of the ruling class was subsequently abolished in comprehensive agrarian reforms as property rights were converted into individually alienable land ownership. In addition, in many parts of Germany, the need to reorganise rural land ownership had its roots in a land tenure system which was fragmented and subject to numerous compulsory cultivation and tilling rules, and which had arisen as a result of customary inheritance practices or the agrarian reforms. While the law concerning the reorganisation of rural land ownership evolved quite differently in the various regions of Germany – a comprehensive review of this process, both in the territories of former Prussia and in what are now today's German states, is provided in Weiss/Gante 2004 – all such developments were guided by the aspiration of turning the peasant population into free and self-determined citizens and of improving working and production conditions in agriculture.

The origins of land consolidation in Germany go back to the separation of common property. In the course of the Prussian agrarian reforms of the 18th and 19th centuries, an Edict Concerning the Regulation of Relationships between Manorial Lordships and Subject Farmers of 14 September 1811 (*Edikt, der Regulierung der gutsherrlichen und bäuerlichen Verhältnisse betreffend*, referred to in the literature as the Prussian Regulation Edict) established a category of public bodies bearing the title Royal Prussian General Commissions (*Königlich Preussische Generalcommissarien*). The main task of these commissions was to bring about the settlement of feudal land obligations by setting the compensation to be rendered to a manorial lord for "the conversion of farms not held as personal property into freehold property". This edict applied to the eastern part of Prussia – Brandenburg, Prussian Silesia, East Prussia together with the Memel Territory to the north, Pomerania, West Prussia and the Department of Frankfurt. The Magdeburg and Münster general commissions covering the western part of Prussia were established later, by an act dated 25 September 1820.

By paramount instruction of 17 October 1811 for the eastern part of Prussia and by the *Gemeinheitsteilungsordnung* or Common Property Separation Code of 7 June 1821 for the western part, the general commissions were assigned the additional task of dividing up the communally owned 'commons' (*Gemeinheiten* or *Allmenden*) and 'common marches' (*gemeine Marken*), thus inaugurating the separation of common property (*Gemeinheitsteilung* or *Separation*).

This was based on the understanding, as expressed by Frederick the Great and undisputed among experts of the time, that "all that is called commons is harmful to the common good" (*"alles, was man Gemeinheiten nennt, dem allgemeinen Besten*

schade"). It was hoped that the separation of common property would replicate the great successes of the enclosures undertaken in England since 1689 (Meitzen 1868, p. 391-408). The commons were common property of peasant communities, in some cases interspersed with plots of land belonging to the feudal lord of the manor. Cultivation of the commons was regulated by intricate rules governing use and entitlement. Besides arable land, the commons also included pastures and woodland. Most importantly, a lack of separate access ways to users' respective lots meant that users of the commons were subject to *Flurzwang*, a compulsory, uniform crop rotation and tilling system. At the time, there were already free peasants in the territories under French administration. Peasants in the northern and eastern parts of the country were still subservient to a lord of the manor.

The separation of common property reached its zenith following Prussian agrarian reform legislation of the early 19th century; with regard to its objectives, the administrative procedure for the separation of common property and the organisation of the mandated authorities, this legislation was based on proposals compiled from 1809 onwards by Albrecht Thaer, advisory state councillor in the Prussian Ministry of the Interior (Meitzen 1868, p. 398). In the course of separation, land that was previously used in common and in accordance with sometimes complex rules was divided among villagers. For many peasants, the allocation of lots in the separation of common property – the transfer of a share in the commons to freely alienable sole ownership – provided a welcome opportunity to bolster their newly won independent livelihoods. Frequently, the process also put an end to feudal land obligations towards the former lord of the manor, who was compensated for this with land or money. The merging of plots of land that is a core element of modern land consolidation played only a minor role in the separation of common property undertaken in the first half of the 19th century. While the lots allocated to individual participants normally had to be within a single piece of property, permission could be sought for them to be consolidated with areas that were not subject to separation (an arrangement known as *Spezialseparation*). However, land consolidation was not allowed outside of a separation of common property.

A turning point in Prussia was marked by an act of 2 April 1872 extending the common property separation decree of 7 June 1821 to the consolidation of land not held in common. This made it possible to carry out a land reallocation (*Umlegung)* or land consolidation (*Zusammenlegung*, in northern Germany *Verkoppelung*) in order to remedy fragmentation of ownership if more than half of the landowners (by area) applied for this to be done.

The Reallocation Code (*Umlegungsordnung*) of 21 September 1920 legislated separately on land reallocation for the whole of Prussia for the first time without it being based on law on the separation of common property. Public interests in land reallocation gained in importance; land reallocations could now be commenced not only on application but also *ex officio* unless objections were raised by three-quarters of the parties involved (by area and by net real property tax revenue). It became possible to include the built-up area of a village in a land reallocation (with the consent of a majority of owners) and to carry out land reallocations to rectify constraints on the use and development of the land due to roads and similar public infrastructure.

The possibility for land reallocations to be prevented by a given majority of affected parties was subsequently eliminated in public infrastructure legislation for certain

major infrastructure projects (such as dams and trunk roads) and then abolished altogether under an act of 21 April 1934 (Weiss 1982).

Land consolidation in southern Germany has its origins in what was called *Vereinödung*, the relocation of farmsteads away from the main settlement area of villages. The aim was to clear the way for free-standing farmsteads (*Einöden*, hence *Vereinödung*) while also consolidating the land. Initially voluntary, and driven solely by the persuasive success of the results achieved, the movement was first given a legal basis in a decree of the Imperial Abbey of Kempten, the *Vereinödungsverordnung* of 27 July 1791. This was successfully applied in Allgäu and Upper Swabia for nearly a hundred years. However, other reform activities launched by the same sovereign on the basis of various edicts, regulations and decrees through to 1861 were less successful (Strössner 1986).

The success story of rural development in Bavaria began with an Act Concerning Land Consolidation of 29 May 1886, in which land consolidation is defined as an undertaking "with the purpose of improving the use of the land by combining plots of land or by the rearrangement of farm tracks". This was succeeded by the Bavarian Land Consolidation Act of 6 August 1922, which stipulated that land consolidation should be carried out under the auspices of 'land consolidation cooperatives', which the Federal German Land Consolidation Act (*Flurbereinigungsgesetz*, abbreviated FlurbG), first enacted in 1953 (FlurbG 1976), provides for in a special clause for Bavaria to this day.

In regions of the former states of Baden, Württemberg and Hohenzollern where equal-shares inheritance was practised, an extensive 'field consolidation' programme began in the mid-19th century for the purpose of "gradually surveying all properties" and "the creation, relocation or elimination of farm tracks, also relating to the relocation or consolidation of plots of land" (Eilfort 1985). Agricultural structure improvement measures were thus combined here with cadastral resurveying.

In the Grand Duchy of Hesse, too, the beginnings of land consolidation were closely linked with cadastral surveys done universally in the first half of the 19th century as the basis for taxing land ownership. As early as 1824, a ministerial instruction proposed that regular cadastral strip fields should be formed in the course of cadastral surveys and that steps should be taken to create an orderly network of farm tracks. This proposal came to nothing, however, as a corresponding instruction dated 5 December 1834 made implementation of the measures conditional on unanimous consent of the parties involved. The first breakthrough only came with an act dated 24 December 1854 concerning land consolidation, the divisibility of parcels of land and the creation of farm tracks; the close association between land consolidation and cadastral resurveying remains in place to this day (Batz 1990).

On the basis of the Land Reallocation Act (*Umlegungsgesetz*) of 26 June 1936, the law on land reallocation was comprehensively reformed for what was then the entire German Reich by the Reich Land Reallocation Code (*Reichsumlegungsordnung*, abbreviated RUO) of 16 June 1937. This created a uniform legal framework for the reorganisation of rural land ownership for the whole of Germany. In addition to private interests in land consolidation, importance was now also accorded to public interests in rural land reorganisation. Land reallocations could now be commenced not only on application by landowners, but also *ex officio* unless objections were raised by three-quarters of the parties involved. The Reich Land Reallocation Code established the body of participants (*Teilnehmergemeinschaft*) with the status of a body corporate. This

comprises all landowners (natural and legal persons) in the land reallocation area. The express aim of the Land Reallocation Act was “to improve, universally and as rapidly as possible, the food and self-sufficiency situation of the German people by means of a planned field consolidation to be carried out throughout the Reich”. To this end, the purpose of reorganisation was extended in the Reich Land Reallocation Code to include production-enhancing measures such as soil improvement, wasteland cultivation and the creation of settlers’ holdings (*Siedlerstellen*) while also giving greater powers to the authorities and accelerating the procedure – in some cases at the expense of protecting the legal rights of the parties involved.

In its (procedure-oriented) structure and granularity, the Reich Land Reallocation Code already conformed to a great extent with today’s Land Consolidation Act. It applied only for a short time during the Third Reich, and the Second World War largely put an end to land reallocation activities. The good draftsmanship of the Reich Land Reallocation Code is nevertheless reflected in the fact that – with the exception of individual provisions shaped by National Socialist ideology – it remained in force in most German states from the end of the War to the entry into force of the Land Consolidation Act on 1 January 1954. This is because its goal of increasing agricultural production was more relevant than ever given the economic hardship in the devastated war zones, the refugee influx from and also the loss of agricultural lands in German eastern territories.

The new constitutional situation of the Federal Republic of Germany as a federal state from 1949 was not reflected in land consolidation law until the Land Consolidation Act of 14 July 1953, which entered into force on 1 January 1954. This was followed by implementing acts adopted by the German states (*Länder*). Further details are provided in Steuer (1967). Major elements of the 1953 Land Consolidation Act remain in force to this day, although it has been revised – notably by the Land Consolidation Act of 16 March 1976 – to accommodate modern developments in administrative law and changing agricultural policy objectives, and to give greater account to public interests, in particular regarding environment protection. The goal of increasing agricultural production gave way to the goal of increasing productivity; the purpose of reorganisation was extended to include environmental concerns, and a transition was effected from sector-oriented to integrated land consolidation that gives overall account to socioeconomic and economic interdependencies in rural reorganisation measures for the purposes of land development. This is the approach that is followed to this day, and it has led to the high level of public acceptance that is now once again accorded to land consolidation. The breadth with which the states discharge this statutory mandate is presented in the sections that follow.

German reunification in 1990 presented an additional challenge for land consolidation law. It was necessary to lay the legal basis for transferring the socialist ownership and agricultural system that applied in the territory of the German Democratic Republic (GDR) from 1949 to 1990 to the market-oriented system established in western Germany on the basis of freedom to arrange one’s own affairs. More on that in sections 1.2 and 1.3.

In a revision of the Basic Law (*Grundgesetz*) of the Federal Republic of Germany as of 28 August 2006, responsibility for legislating on land consolidation was transferred from federal level to the *Länder*. This has so far had no substantive impact on the implementation of land consolidation in Germany, as none of the German states has seen any need to amend the successful Land Consolidation Act.

The history of rural land readjustment in Germany thus traces a path from the establishment of free-standing farmsteads in southern regions and the separation of common property with the demise of the feudal system, via field consolidation, land reallocation and land consolidation as used within the Land Consolidation Act, all the way through to land development in the sense of integrated rural reorganisation.

1.2 The determination and reorganisation of land ownership after 1990 in eastern Germany

The accession of the German Democratic Republic (East Germany) to the Federal Republic of Germany (West Germany) created a special need in terms of land tenure: as a consequence of the Unification Treaty of 3 October 1990, the former East German legal system had to be brought into line with that of the Federal Republic.

With regard to the subject matter of this book, the East German legal system was shaped by the development of agricultural policy after 1945. Soviet Military Administration Commands Nos. 124 and 126 of 30 and 31 October 1945 ordered the implementation of **land reforms**. Around 2.7 million hectares of agricultural and forestry land was expropriated, without compensation, from some 7,000 farms.

This was combined with 600,000 hectares of land already confiscated in eastern Germany by the National Socialists between 1932 and 1945 to create a land pool of some 3.3 million hectares, from which around 560,000 farmworkers or landless farmers, including many expellees and refugees, were allocated individual holdings of between five and ten hectares each. Around 33% of the land reform pool became state property. With effect from 1 July 1949, this was assigned to state-owned farms called *Volkseigene Güter* (VEGs).

Under the *Besitzwechselverordnung* or ownership transfer regulations originally enacted in the 1950s to govern this process (BWVO 1975), the land reform holdings allocated to the new farmers were neither freely alienable nor heritable. They could only be transferred, with state approval, to qualified individuals comprising, firstly, members of collective farms known as *Landwirtschaftliche Produktionsgenossenschaften* (LPGs) and, secondly, workers in the agricultural, forestry and food sectors. The same applied in the case of inheritance. These restrictions were lifted by the so-called *Modrow-Gesetz* ('Modrow Act') of 6 March 1990, after which the plots were once again rendered alienable and heritable under German civil law. That act, however, applied solely to duly instated holders of land reform plots, meaning those who came to hold such land in accordance with the rules governing the land reform. In practice, however, the East German authorities frequently failed to enforce the ownership transfer rules. Transitional provisions for these cases were lacking in the act of 6 March 1990. The resulting legal uncertainty was eliminated by article 233, paragraphs 11 *et seq.* of the Introductory Act to the German Civil Code (EGBGB 1994). Ownership of land reform plots not properly allocated in GDR times consequently only remains with the current holder if it would have remained with that holder had the land reform rules been properly applied at the time. Those who inherit built-on plots are granted special protection. Heirs who have long used a built-on land reform plot for residential purposes are thus protected even in the absence of a formal ownership transfer decision.

Another open question was how to deal with expropriations between 1949 and 1989. Such expropriations mainly applied to individuals who fled the GDR, whose property was usually confiscated after their flight. Under the Unification Treaty, restitution

has priority over compensation. The *Vermögensgesetz* or Act Regulating Unresolved Property Claims (VermG 2005) provides for restitution of expropriated property (over the years 1949 to 1989). Adopted by the People's Chamber of the German Democratic Republic, this act still remains on the statute books.

Expropriations on the basis of the Soviet Military Administration commands in 1945 were not restituted. The dispossessed received compensation. This course of action was confirmed by the European Court of Justice on 30 March 2005.

From 1952, based on the example of the Soviet *kolkhozy*, the collectivisation of agriculture began with the establishment of collective farms or *Landwirtschaftliche Produktionsgenossenschaften* (LPGs); this was accompanied by the abolition of privately held farms. The expectation was that collective farming of large areas would increase efficiency in agricultural production. In total, collectivisation led to the creation of some 3,850 LPGs and around 460 state-owned farms or *Volkseigene Güter* (VEGs).

Finally, in the 1960s, the entities created by forced collectivisation began to be subjected to a programme of **specialisation and industrialisation**. The crop farming operations of multiple LPGs were merged into a single crop production LGP (*LGP-Pflanzenproduktion* or LGP-P), while what remained of those collective farms continued operating, either separately or as an amalgamation of several farms, as livestock production LGPs (*LGP-Tierproduktion* or LPG-T).

An act governing LPGs, the *Gesetz über die Landwirtschaftlichen Produktions-genossenschaften* (LPGG 1952) – 'LPG Act' in the following – provided the legal basis for collectivisation and specialisation. This created the legal institution of 'collective land use', which overlaid the still existing title to the land. Under section 8 (1) of the LPG Act 1959, and subsequently section 18 of the LPG Act 1982, LPGs received, free of charge, a full, perpetual right to use their land, which was contributed by LPG members or via district leases by the council of the county (*Kreis*). An LPG was authorised to use all contributed land as it saw fit, to make land improvements and changes, to erect buildings (houses and apartment blocks, farm buildings and stables), to remove roads and water bodies, to create new roads and water bodies on third-party land and also to retransfer the contributed land to third parties without the landowner being involved in any of these matters; as a rule, landowners were not even informed. This led to a separation of land use and land ownership, effectively resulting in expropriation (Thiemann 2004).

Farmland expropriated between 1949 and 1989 was made state property and placed under the responsibility of a legal entity, the purpose of which was the management and use of state-owned land. This responsibility was given to the LPGs.

1.3 Reversing the separation of land and building ownership in eastern Germany after 1990

Reunification created the need to reverse the separation of land and building ownership that came about as a result of collectivisation. Due to the complexity and duration of the necessary administrative procedures (see section 2.4.1.5), affected landowners and building owners were provided with a temporary arrangement until 30

September 2001 in the form of a moratorium under article 233 paragraph 2a (9) of the Introductory Act to the German Civil Code (EGBGB).

From the early 1950s, separate ownership of buildings was created by granting rights of use to state-owned land. This made individual home ownership possible, initially for specific social groups. The right of use was granted by issuing a deed. Buildings and other assets already on the land became the personal property of the user. In 1976, the right of use established in this way was included in the Civil Code (*Zivilgesetzbuch*), which entered into force on 19 June 1976 (ZGB 1975). Users had to pay a usage charge (section 288 of the Civil Code). However, it could be stipulated in legislation that use was free of charge (section 288 (3) of the Civil Code). The right of use was alienable and heritable (Harder 1998).

LPGs, too, were also allowed to grant such rights of use to citizens for private land held by the LPG (section 291 of the Civil Code). In rural areas, rights of use were mainly granted as 'collective rights of use' under section 18 of the LPG Act. This created separate ownership, independent of the land ownership, of agricultural buildings and facilities, owner-occupied homes and other residential buildings and outbuildings (sections 27 and 28 of the LPG Act). A separate folio was added for the building property in the building register. No folio was added in the building register for LPG farm buildings.

The right of use granted for owner-occupied homes generally related to an area of 500 m²; the area figure was also included in the deed. However, no separate cadastral parcel was created in the field for the granted right of use by splitting it out of the plot encumbered with the right of use. Instead, the state property service merely created a right-of-use parcel in the cadastral map by dividing the plot without surveying in the field; this did not affect the right of ownership. When a building was erected on a right-of-use parcel, no survey was done of the building. As a result, there was no proof in the property map that the building was actually sited within the area of the granted right of use. In addition, parts of buildings and other built structures such as garages, sheds or cess pits are often outside of that area.

Owner-occupied homes were even built on third-party land by decision of the LPG manager, without formally granting a right of use and issuing a deed; the LPG manager's decision was considered legally watertight as the manager was "acting with the consent of state authorities". In this way, building ownership was established without a folio being added to the building register.

Rights of use granted by an LPG were usually perpetual. The building owners obtained the rights of use to the land concerned without paying rent to the landowner.

In order to bring about a long-term and socially acceptable solution to the problems outlined in sections 1.2 and 1.3, the People's Chamber of the German Democratic Republic, even before the Unification Treaty of 23 September 1990 entered into force, created a set of land readjustment instruments largely based on the provisions of the (Federal German) Land Consolidation Act in an act concerning the structural adaptation of agriculture in the German Democratic Republic to the social and ecological market economy – the Agricultural Adaptation Act of 29 June 1990 (*Landwirtschaftsanpassungs-gesetz*, abbreviated LwAnpG). This is described in detail in section 2.4.1.5.

2 Land consolidation as an instrument of rural development

2.1 Social policy challenge and development approaches

2.1.1 Rural development policy

The Federal Republic of Germany is a country of great social, economic, cultural and geographical diversity; it is also, in equal measures, an industrial, high-tech and agricultural country. While the service, manufacturing, industrial, retail and transportation sectors contribute most to the gross domestic product, agriculture and forestry dominate land use, with 50.8% of Germany's land area used for agriculture and 29.8% under forest cover. Depending on how rural regions are defined, they are home to between 30% and 50% of the German population (BBSR 2017). Another characteristic feature is the way in which metropolitan regions and conurbations are interspersed with rural areas.

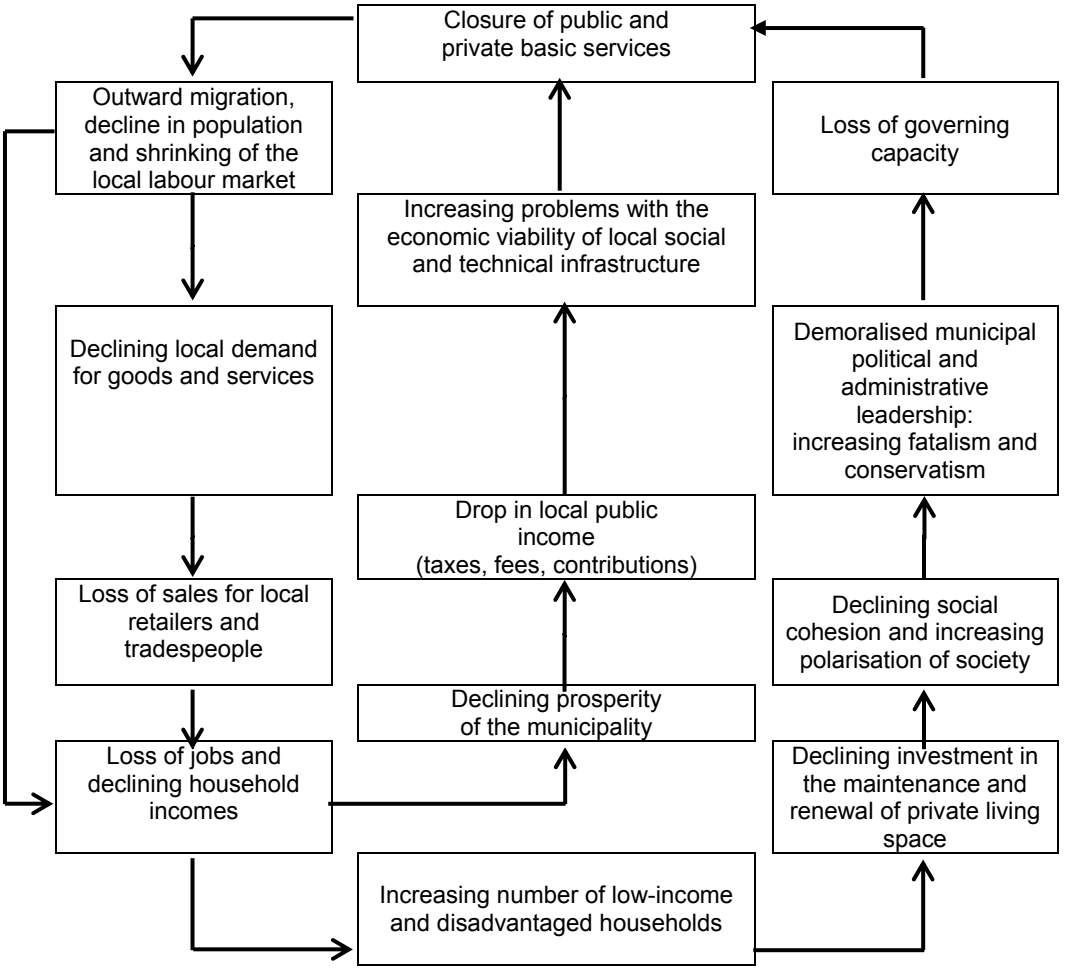
Germany's rural regions show the same diversity as the country as a whole. They differ, for example, in terms of landscape, natural conditions, regional traditions, cultural offerings and, most of all, economic situation. Rural regions today once again face major challenges. These include demographic change, the globalisation of markets, a persistently difficult labour market situation in some parts of the country, and climate change. Regions that stand out for their strong economy contrast with others that suffer high unemployment, lacking prospects and, as a consequence, rural exodus – especially among the younger population.

In view of their diverse roles and functions for their entire territorial surroundings, the development of rural regions is a constant, future-focused task that is directed at dealing with specific challenges depending on the category of region. These include ongoing exodus from peripheral rural regions, economic structural change in agriculture in particular with its effects on the job supply, the nature of land use, the environment in the broadest sense and the landscape, economic globalisation, combined with a loss of skilled jobs, the digital transformation of all areas of life, a growing lack of basic services in the areas of local provision, education, health care and mobility, and climate change. Two key factors for development prospects and development potential are good transport links to economic centres and active engagement of the regional population as a human resource.

Rural regions vary in profile from structurally weak regions with a scarcity of jobs and training places and with low population densities to prospering regions on the outskirts of conurbations enjoying the benefits of growth. Increasing spatial disparities can currently be observed between individual regions in Germany.

Structurally weak rural regions on the periphery are frequently affected by shrinkage processes. Figure 2.1-1 provides a simplified representation of the causal chain of population migration, infrastructure adaptation and living conditions. A representation like this can also help in identifying initial pointers for development strategies to limit or avoid the negative effects of shrinkage processes. Many challenges can only be surmounted through constructive supra-local cooperation (Kötter et al. 2020).

Fig. 2.1-1: Cumulative causal chains of shrinkage processes and living conditions (source: after Kötter 2016)



Rural areas on the outskirts of prospering urban regions tend to face considerable demand for land, primarily for housing development, transport, agriculture, resource extraction, nature conservation and recreation. This leads to intensified land use, growing land use competition, land use conflicts and rising land prices. New approaches are needed here for sustainable land use, for balancing interests between urban and rural regions and for meeting the quantitative and qualitative demands placed on land today.

A basic problem is the deterioration of living conditions in some regions due to growing spatial disparities both between the various categories of rural regions and between rural and urban regions. As a result, the public debate in spatial planning is increasingly shaped by the question of spatial justice and equivalence of living conditions. Although the constitutionally enshrined goal of equivalent living conditions continues to enjoy broad consensus as a central mandate for action in policymaking and administration, intensive debate is currently underway as to how it can be achieved, for example in rural development. Equivalent living conditions are not understood here as

identical living conditions everywhere, but as ensuring defined minimum standards on matters such as employment opportunities, general basic services, infrastructure and the environment (Kötter 2016).

This equivalence principle requires ongoing adjustment of policy objectives and of public spending priorities, continuous monitoring and, when the time comes, reinterpretation. In all of this, the distinctive regional characteristics and strengths of the various rural regions must be taken into account and preserved so that they can be exploited as development potential. Key factors for the future viability of rural regions in Germany include:

- Safeguarding mobility, local provision, education facilities and health care
- Adapting basic services while maintaining minimum standards
- Connection to regional transport networks and provision with broadband Internet as part of the digital strategy
- Inter-municipal cooperation both among rural municipalities and between them and urban centres
- More flexible laws and standards and their regionally appropriate application
- Support for structurally weak communities to help them expand their options
- Sustainable and, in particular, economically viable, environment-friendly and nature-friendly land use.

Notwithstanding ongoing structural change, agriculture remains an essential pillar of rural regions and a key stakeholder in the entire regional development process. In some regions, agriculture and its upstream and downstream sectors contribute over 15% of value added to the entire regional economy (the national average is 0.9%). Moreover, widespread cultivation of the land shapes a cultural landscape that secures the basis for the diverse functions of rural regions. Present-day challenges include conflicts between intensive farming and nature conservation, biodiversity and climate change mitigation. These also create an urgent need for action with regard to agri-environmental measures.

The guiding principles and approaches for integrated regional development described above have been taken up by policymakers at European Union, national and state level and implemented in formal development strategies, action plans and funding programmes. Germany's federal structure and its membership of the European Union create a need for horizontal and vertical coordination in rural development, because all three policy levels pursue the sustainability principle and the equivalence principle with their available means.

At European level, the strategic and operational framework for rural development is the EAFRD Regulation (Regulation (EU) No 1305/2013 of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development; EAFRD 2013); funding is provided as co-financing of the applicable national measures. The Regulation has three thematic focuses:

1. Improving the competitiveness of agriculture and forestry by supporting restructuring, development and innovation
2. Sustainable management of natural resources, and climate action (improving the environment and agriculture)

3. Balanced territorial development of rural economies and communities including the creation and maintenance of employment.

For the 2014-2020 funding period, the European Commission also linked together other funds that partly relate to rural development for the first time in a Common Strategic Framework (CSF) with the aim of ensuring a uniform basic direction in funding. The CSF thus includes:

- The European Agricultural Fund for Rural Development (EAFRD)
- The European Regional Development Fund (ERDF)
- The European Social Fund (ESF)
- The Cohesion Fund and the European Maritime and Fisheries Fund (EMFF).

2.1.2 From development approaches to action areas

At national level, the German federal and state governments have systematically pursued rural development since 1969 under the Joint Task for the Improvement of Agricultural Structures and Coastal Protection (*Gemeinschaftsaufgabe "Verbesserung der Agrarstruktur und des Küstenschutzes"*, abbreviated GAKG) on the basis of an act of the same name of 21 July 1988, most recently amended on 11 October 2016 (GAKG 1988).

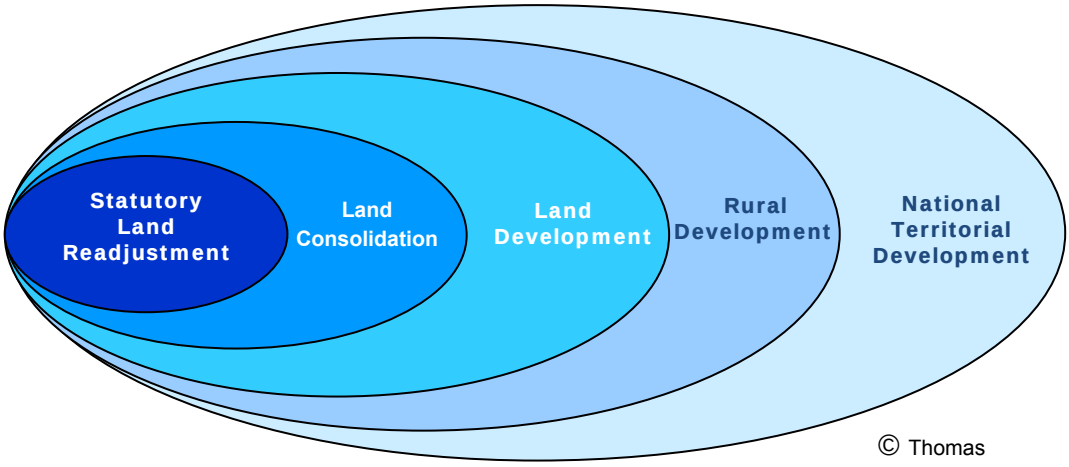
In coordination with the European Commission (vertical coordination with the EU), the current 2019-2022 planning period provides for funding for the following measures:

- Integrated rural development strategies
- Rural community development plans
- Regional management
- Village development
- Infrastructure measures adapted to the rural character
- Reorganisation of rural land ownership and shaping of rural areas
- Broadband provision for rural regions
- Small enterprises providing basic services
- Amenities for local basic services
- Regional budgets.

The term 'integrated rural development' (IRD) is important in this connection. It implies that measures follow a strategic, cross-sectoral approach; the pursued agricultural objectives are integrated and coordinated with other sectoral objectives such as local recreation, road construction, nature conservation, landscape management, flood protection and so on (horizontal coordination).

At the level of the German states, the development policy goals and development approaches are implemented with the aid of various policy instruments and administrative levels. The various action areas represented by rural land readjustment and land consolidation display a shell-like structure and fit together to form the rural development onion diagram shown in figure 2.1-2.

Fig. 2.1-2: Rural development onion diagram (Thomas 2006a)



In each case, the next larger action area includes the objectives of the one preceding it and features a larger instrumental and in some cases also a larger institutional framework:

'Land consolidation' thus goes beyond 'statutory land readjustment' and includes improving the structure of agriculture as a sectoral planning segment.

The term 'land development' (*Landentwicklung*, in the meaning used in the German Land Consolidation Act) encompasses all 'land-related' and land use-related measures that have the overall aim of improving living and working conditions in rural regions. It includes the planning, preparation and implementation of all measures for maintaining and enhancing the residential, economic and recreational function of rural areas in order to advance and improve living conditions outside of urban centres. Land readjustment is not therefore limited to land used for agriculture or forestry, but takes in all land covered by a readjustment.

'Rural development' (*ländliche Entwicklung*) comprises all other measures that go beyond land development, such as providing rural regions with suitable transport infrastructure and with basic service amenities and other services, promoting agriculture-related crafts and trades, broadband and local heating supply measures, and promoting tourism.

The term 'territorial development' (*Landesentwicklung*) is mostly used synonymously with territorial planning, meaning overall spatial planning for an entire state. This applies at a larger spatial scale and has the purpose of creating a coherent and coordinated development plan for the state including all rural and urban regions, thus providing the legal framework for all subordinate planning levels. It thus follows a sectorally and spatially integrated approach with a view to optimum regional development across the whole state.

Important present-day and future action areas for rural development include:

- Development and renewal of villages as places for living, working and basic provision

- Supporting structural change in agriculture, diversifying the rural economy and promoting digital technology in rural regions
- Safeguarding, stabilising and adapting essential public services
- Sustainable housing and infrastructure development, with a focus on infill development in villages and reducing land take
- Climate change mitigation and adaptation
- Protecting and safeguarding the natural foundations of life, including biodiversity
- Promoting multifunctional land use and preserving cultural landscapes.

On this basis, the German states develop rural areas programmes of their own (vertical coordination with the federal government and horizontal coordination with other sectoral planning authorities). North Rhine-Westphalia, for example – Germany's most populous state with a population of 18 million – has the following funding priorities:

- Rural community and village development plans
- Rural roads and paths plans
- Village renewal and development
- Investment in infrastructure measures adapted to the rural character
- Investment in the reorganisation of rural land ownership and the shaping of rural areas (land consolidation)
- Broadband provision.

2.1.3 The purpose of rural land readjustment

Traditional ownership and tenure structures and prevailing land uses often stand in the way of prosperous rural development. Field shapes and sizes, for example, frequently go back to 19th or early 20th century agricultural practices and no longer meet the technical needs of modern agricultural practices and equipment. The same applies to ownership and tenure structures and to land use patterns in settled areas – primarily villages – which in many cases no longer meet contemporary needs with regard to traffic, housing development, the village community, essential public services and the specific requirements of agriculture.

This mismatch between land use and contemporary needs is incidentally nothing new; as early as the turn of the 19th century, policymakers and administrators in German territories developed policy instruments to take into account prevailing economic and social needs in land use, and made them universally binding by enshrining them in law (Meitzen 1868, Weiss 1982). These mainly took the form of officially instigated land readjustment measures. This form of land readjustment can take place either voluntarily based on an agreement between landowners or as a statutory administrative procedure with a readjustment plan decided by the competent land readjustment authority.

Statutory land readjustment in Germany must take place on the basis of German property law. The guarantee of private property by the state is constitutionally enshrined

in Article 14 (1) of the German Basic Law (*Grundgesetz*). Property and people's freedom to arrange their own affairs are guarantors and engines of prosperity and provide the basis for the political stability of a free and democratic polity. The purpose of property is to afford the individual a degree of freedom under property law and hence to enable owners to lead their lives under their own responsibility; it is intended to be 'of use' to the individual. Core elements of the constitutional concept of property are private benefit and the individual's fundamental freedom of disposition over property. At the same time, the state reserves the right to determine the content and limits of the right to property (article 14 (1) sentence 2 of the German Basic Law), and statutory land readjustment measures are precisely such a determination (Thomas 2009).

This antithesis has been addressed by legislation on the reorganisation of rural land ownership for over 200 years, with a variety of different objectives (Thomas 2005 and 2009).

The multifaceted nature of the challenges to be resolved in rural reorganisation demands a high degree of expertise, responsibility and integrity from the land consolidation engineer, who must consequently be a master of many trades. Above all, it requires an ability to balance the different interests and frequently conflicting goals in a reorganisation of ownership and tenure and to bring about the best possible solution in the reorganisation plan. The nature of the task served by rural reorganisation today, and the legal instruments available today to carry out that task, are presented in the following. An overview of the land readjustment instruments available in Germany is provided by the figure below.

Fig. 2.1-3: Land readjustment instruments in Germany
(after Thomas 1993, supplemented by Thiemann 2008)

	Voluntary land readjustment	**Statutory land readjustment**	
Private law	Utilisation agreement (section 104 et seq. of the Civil Code) Land lease (section 581 et seq. of the Civil Code) Field exchange (section 581 et seq. of the Civil Code) Voluntary exchange of leased land (section 581 et seq. of the Civil Code) Sale/purchase of plots of land (section 433 et seq. of the Civil Code) Exchange of plots of land (section 515 of the Civil Code)		
Public law	Act on Plot Division (section 2 Act on Plot Division) Boundary Adjustment Act of the State of Hesse and the Free and Hanseatic City of Hamburg** Voluntary land exchange (section 54 of the Agricultural Adjustment Act)* Voluntary land exchange (section 103 a et seq. of the Land Consolidation Act)		

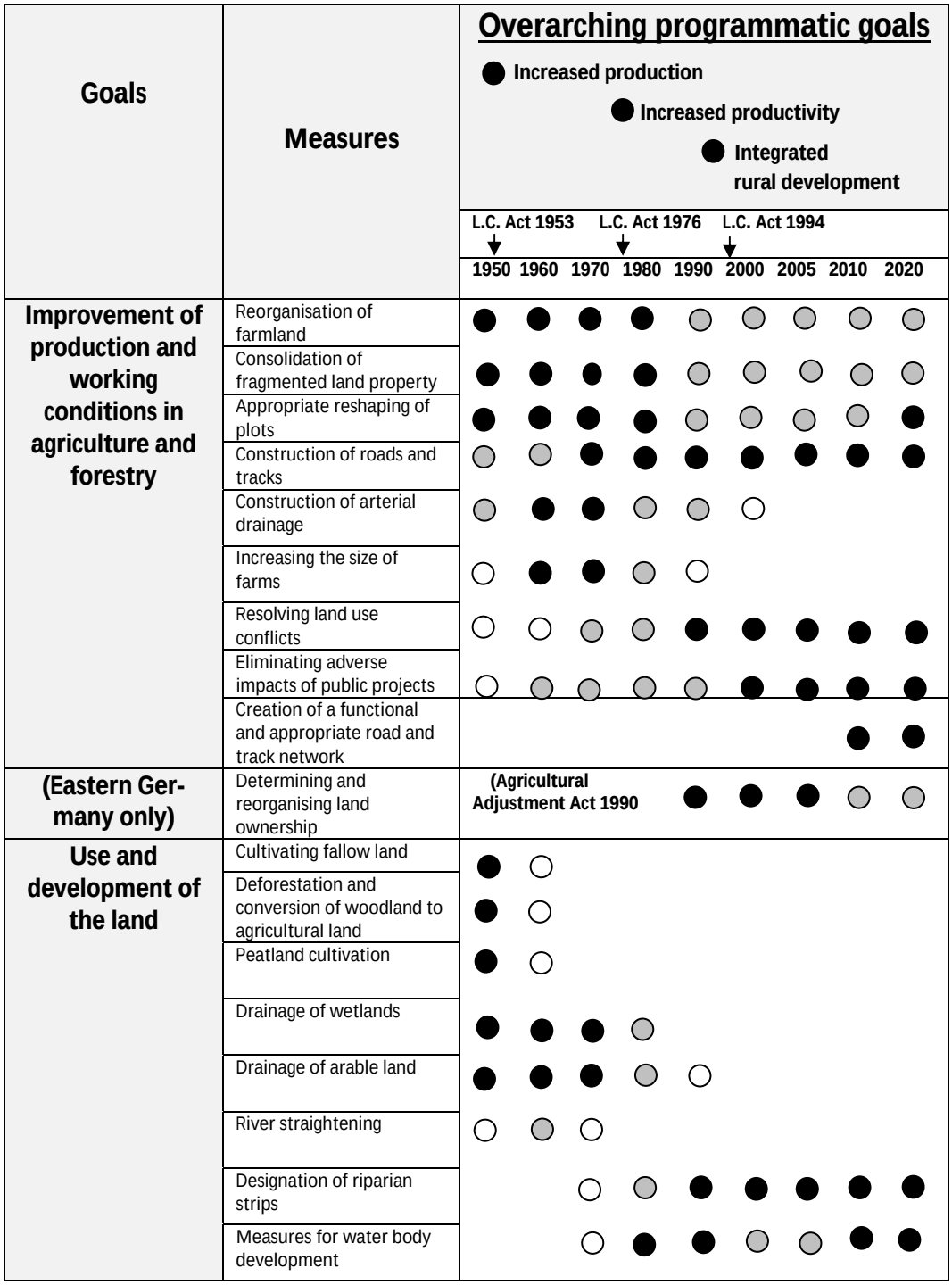
	(* *Land Consolidation Act applies with the necessary modifications*)	Separation of common property (North Rhine-Westphalia Separation of Common Property Act)** Consolidation of forest cooperatives (North Rhine-Westphalia Common Forest Land Act)** Accelerated consolidation (section 91 of the Land Consolidation Act) Simplified reallocation (sections 80 – 84 of the Federal Building Code) Reallocation (section 45 et seq. of the Federal Building Code) Simplified land consolidation (section 86 of the Land Consolidation Act) Land readjustment procedure (section 56 et seq. of the Agricultural Adjustment Act)** Standard land consolidation (section 1 in conjunction with section 37 of the Land Consolidation Act)	**Private benefit**
		Land consolidation for projects of public interest (section 87 et seq. of the Land Consolidation Act) Assignment of property under mining law (section 90 of the Land Consolidation Act) Expropriation under section 85 of the Federal Building Code or state-specific legislation	**Public benefit**

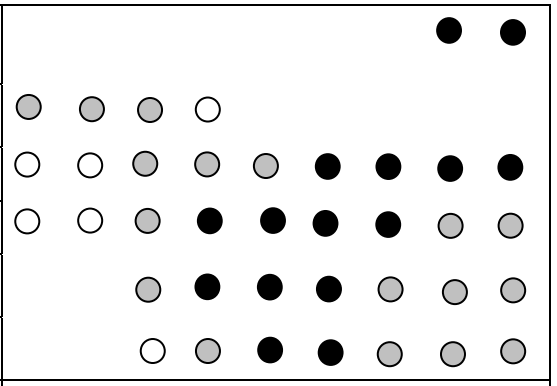
*** These are state-specific land readjustment acts, such as the Common Forest Land Act (Gemeinschaftswaldgesetz) and Separation of Common Property Act (Gemeinheitsteilungsgesetz) in the State of North Rhine-Westphalia, the Boundary Adjustment Act (Grenzbereinigungsgesetz) in the states of Hamburg and Hesse and the Agricultural Adjustment Act (Landwirtschaftsanpassungsgesetz) for the states of eastern Germany.*

2.1.4 Reorganisation objectives and reorganisation instruments

The objectives and social policy emphasis of reorganisation measures under the Land Consolidation Act are continuously evolving, and the objectives have changed considerably since their beginnings (see, for example, Weiss 1982 and Thomas 2005). Until the 1970s, one of the main objectives of land consolidation was to increase agricultural output. In the major revision of the Land Consolidation Act in 1976, this objective was dropped in favour of an integrated approach, and land consolidation became a key tool of rural structural policy: land development.

Fig. 2.1-4: Changing emphasis of land consolidation in Germany
(Thomas 2005, updated by Kötter et al. 2020)



	Implementation of the EU Water Framework Directive	
	Soil improvement measures	
	Soil conservation measures	
	Landscape development	
	Allocating land for nature conservation	
	Implementation of landscape planning	
	Natural flood retention	
Support for rural development	Resettlement (of displaced persons)	
	Housing for farm workers	
	Resettlement (of ethnic Germans from eastern European countries)	
	Site decongestion	
	Rural housing development	
	Village land reorganisation	
	Village renewal	
	Village development	
	Village core development	
	Rural tourism	
	Diversification	
	Broadband	
	Basic services	
		Land consolidation **Integrated land consolidation** **Integrated rural development** **1950 1960 1970 1980 1990 2000 2005 2010 2020**
Key	○ **less significant** ◌ **significant** ● **highly significant**	

The objectives of land development as pursued by land consolidation today are summarised in Guidelines for Land Development (*Leitlinien Landentwicklung*) published by the Working Group on Land Development (*ARGE Landentwicklung*). The latter is composed of the heads of the land consolidation administrations of the 16 German states and supports the German Conference of Agriculture Ministers. The objectives are stated as follows (translated from ARGE Landentwicklung 2013a):

> *The objective of land development is to ensure the equivalence of living conditions in rural regions in Germany for the long term, having particular regard to the conditions of globalisation, climate change and demographic change. Future-focused land development therefore centres on strengthening the regional resources of rural regions, supporting the maintenance and creation of income sources in rural regions, safeguarding the future of rural communities and supporting sustainable land use, all with the support of active community participation. It aims to preserve rural regions as working regions for agriculture and forestry and to stimulate employment in the economy. Furthermore, land development supports sectoral diversification in rural regions, regional value creation and renewable energy initiatives. Land development enhances infrastructure by the maintenance and creation of local roads and farm roads in accordance with present-day needs and by means of broadband provision. In addition, it helps preserve property values in rural regions. It strengthens rural and community development.*

Land development by means of rural land readjustment gained a new task at the time of German unification: that of resolving the 'land question' – the major challenge presented by differences between the land ownership systems in the German Democratic Republic (GDR) and the Federal Republic of Germany. The socialist ownership and agricultural system in the GDR had to be transformed to a social order based on private property and freedom to arrange one's own affairs (Thöne 1993). A particular challenge here consisted of reversing the legal separation of building and land ownership in the GDR and instating full ownership under the Civil Code (*Bürgerliches Gesetzbuch*) of the Federal Republic of Germany.

2.2 The integration of land consolidation into the national legal framework

2.2.1 Constitutional law, private law and public law

Constitutional law is part of public law. It governs the relationship of the state as sovereign authority to its citizens. The central legal framework in the Federal Republic of Germany is the German Basic Law (*Grundgesetz*) – the German constitution.
This grants certain basic rights to citizens of the Federal Republic of Germany and in some cases to all people. The state may interfere with these rights subject only to very strict conditions.

In Germany, law is generally divided into two branches:

- Private law
- Public law.

Private law

Private law governs legal relations between citizens and thus between legal subjects with equal rights. Under private law, private persons are generally permitted to

enter into or refrain from entering into legal relations with other persons. Private law is divided into:

- General private law (civil law), the main branches of which that are relevant to this book are the law of obligations, the law of property, family law and inheritance law
- Other private law (commercial law and company law, copyright law, competition and antitrust law, and employment law).

The statutory framework of private law in Germany is the German Civil Code (*Bürgerliches Gesetzbuch*, abbreviated BGB).

Public law

Public law deals with:

- The legal relations of public authorities
- The legal relations between citizens and the state and other holders of public authority
- Relations between and among bodies corporate and holders of public authority. Administrative law is also part of public law that governs relations between the public administration and citizens. As a rule, the relationship between the state and citizens is one of superiority and subordinacy.

Land consolidation is part of what is called special administrative law. Special administrative law is specially made for the needs of specific administrative responsibilities (*'lex specialis'*). If special administrative law does not contain a dedicated provision for a specific administrative act, then general administrative law applies.

Constitutional law

Constitutional law is part of public law. It is divided into:

- Basic rights, which comprise rights of citizens towards the state and the state's obligations to protect the citizen
- Structural constitutional law, which governs legislative procedures, the structure of the state and relations among the organs of state
- State church law, which governs relations between the state and religious communities.

2.2.2 Spatial and sectoral planning law

Germany's three-tier federal structure of federal government, states and municipalities shapes the German system of spatial planning. The division of powers and responsibilities between the three tiers is matched by a system of distinct planning levels; while these are clearly defined and distinguished in legal, organisational and substantive terms, they are also interconnected by bidirectional feedback and by complex rules on information, consultation, coordination and binding effect. Federal spatial planning is essentially limited to developing guiding principles of spatial planning that also provide the legal basis for territorial planning; it also develops overarching requirements for sectoral planning. Territorial planning elaborates on the federal principles of spatial planning at the level of the German states, while ultimate local spatial planning objectives are developed at municipal level taking into account federal spatial planning requirements and state-level territorial planning objectives. Municipalities are the planning authorities that, by acting at the lowest planning level, stipulate on the specific use of land for building and other purposes.

The task of federal spatial planning under the Federal Spatial Planning Act (*Raumordnungsgesetz*; ROG 2008) is to provide a binding foundation for sectoral planning and public investment from the perspective of regional and general government structural policy. It lays down substantive guiding principles to promote sustainable spatial development throughout Germany's territory and create equivalent living conditions in all regions. The guiding principles on spatial development are generally merely recommendatory and non-binding. In contrast, all principles laid down in federal spatial planning for subsequent planning levels, territorial planning, sectoral planning and spatially relevant public infrastructure projects are binding. Those principles have to be taken into account, as concerns relevant to the entire area of the Federal Republic of Germany, in all subsequent decisions that involve a balancing of interests or the exercise of discretionary powers.

When it comes to supporting and promoting the spatial development of the Federal Republic of Germany and also to the advancement of infrastructure measures, an important role is played by structural policy in each of the German states. The Federal Spatial Planning Act requires the states to carry out territorial planning. They issue state spatial planning acts that elaborate on the guiding principles for spatial planning and adapt them to the needs of each state. As specified in the Federal Spatial Planning Act, state-level planning is divided into two levels. Territorial planning covers the spatial development of an entire state, while regional planning covers regions within a state. The competent planning authorities compile state-wide and regional spatial structure plans in which they lay down principles and spatial planning objectives to be pursued for all spatially relevant plans and infrastructure projects. State spatial planning authorities must ensure that the principles of spatial and territorial planning are adhered to or taken into account, as applicable, in municipal planning. In a bidirectional feedback process, they receive input from cities and municipalities and are required to coordinate municipal development objectives with higher-level planning objectives. This is intended to ensure that territorial planning development objectives are helped rather than hindered by urban development planning, thus avoiding misallocation of public investment.

Below state-level spatial planning, regional planning operationalises and implements territorial planning objectives and integrates them into sectoral planning. It therefore intermediates between territorial planning and local land-use planning.

A requirement under section 1 (4) of the Federal Building Code (*Baugesetzbuch*; BauGB 2017) for local land-use plans to be aligned with spatial planning objectives and the requirement for coordination between the various planning levels (bidirectional feedback) ensure that the planning levels do not contradict each other and the guiding principles formulated in general terms for spatial planning are made more specific from planning level to planning level and hence reflected in spatial planning (ARL 2020 and BMVI 2016).

2.2.3 The plot of land as the subject of land consolidation

A **plot** of land (*Grundstück*) is a spatially delimited part of the earth's surface that is listed with a serial number in the inventory (*Bestandsverzeichnis*) part of the land register (*Grundbuch*). This definition follows in German law from section 3 (1) of the Land Register Code (*Grundbuchordnung*) (GBO 1994) and the German Civil Code (*Bürgerliches Gesetzbuch*). With regard to factual information on a plot, the land register cross-references the official register of plots of land – the cadastral register (*Liegenschaftskataster*) – which contains plots as surveyed and mapped units, and designates them with the parcel numbers of cadastral parcels. A plot is generally acquired by a notarised deed of sale, including any buildings on it, as these are

considered to be essential parts of a plot of land under section 94 of the German Civil Code.

In German law, a plot (*Grundstück*) is distinguished from a parcel (*Flurstück*). **Parcel** is a cadastral term; a parcel is the smallest unit of the spatially delimited parts of the earth's surface listed in the cadastral register. A plot is a piece of property that is listed under a serial number in the land register; it can be made up of several parcels that do not even have to be next to each other.

A **land right** (*grundstücksgleiches Recht*), in German law of property, is a right *in rem* that is treated in law in the same way as the ownership right to a plot of land. Land rights include heritable building rights, apartment ownership rights, mining rights and ship ownership.

A **heritable building right** (*Erbbaurecht*) is similar but not identical to the concept of leasehold in other legal systems. It comprises the right to erect or maintain a building on land belonging to another party against payment of a regular ground rent under section 1 (1) of the Heritable Building Right Act (*Erbbaurechtsgesetz*) (ErbbauRG 1919). It is established by contractual agreement between the landowner and the holder of the heritable building right, notarisation with conveyance and entry in the land register. The contractual agreement also specifies the duration of the agreement, the ground rent and other conditions necessary for execution of the agreement. From the perspective of the landowner granting the right, a heritable building right is a limited right *in rem* encumbering the plot in question. It is entered in Division II (*Abteilung II*) of the landowner's land register folio (*Grundbuchblatt*) and must always rank first, meaning any other encumbrances already listed in Division II must be downgraded by one rank. This raises particular difficulties in the case of two rights that both have to rank first in Division II of the land register folio, such as a heritable building right and stipulations with regard to subsequent heirs. When rights are registered, the date of registration normally determines priority. The order of priority among rights is determined in law by section 879 of the German Civil Code, which distinguishes between rights in one and the same division and rights in Division II and III of a land register folio.

Registering a heritable building right affects two folios in the land register: A separate folio is added for the holder of the heritable building right; the land register folio for the landowner granting the right remains in place and the encumbrance consisting of the heritable building right is entered in it in Division II. A separate land register folio is also added for the heritable building right itself, complete with inventory, Division I, Division II and Division III. Under section 879 (1) sentence 1 of the German Civil Code and Division 45 (1) of the Land Register Code, priority among multiple rights registered in one and the same land register division is determined by the visual sequence of entries – that is to say, III/1 ranks above III/2, and so on. If an exception is to be made and rights listed (one after another) in the same division are intended to have equal rank, then this must be specially noted (section 879 (3) of the German Civil Code and section 45 (1) of the Land Register Code). This is particularly important if registration of multiple rights in the same division is requested simultaneously. As rights can only be registered if they are notarised, the determination of their ranking by the notary is crucially important. If registration of multiple rights is requested simultaneously, the notary must precisely instruct the land registry as to the order of priority to be observed for rights registered in one and the same division.

Apartment ownership: Under the German Civil Code, ownership of parts of a building *in rem* is not recognised and ownership of all buildings erected on a plot of land, as essential parts of the land, is exclusively assigned to the landowner (section 94 of the Civil Code). The Apartment Ownership Act (*Wohnungseigentumsgesetz*) of 1951 (WEG 1951/2021) created the possibility of establishing separate ownership for apartments.

For this purpose, section 1 of the Apartment Ownership Act divides ownership rights into apartment ownership (separate ownership) and jointly owned property. A separate land register folio is added for the separate ownership of an individual apartment. The jointly owned property is likewise given a land register folio of its own.

The Apartment Ownership Act stipulates in particular on the following:

- Establishment of apartment ownership
- The community of apartment owners
- Administration of the jointly owned property
- Heritable building rights in respect of apartments and heritable permanent rights of residence.

Further rights *in rem* to plots of land comprise easements, limited personal servitudes, usufruct, real rights of preemption, real burdens, and liens (land charges and mortgages).

In addition to expertise in planning law, planning methodology, engineering and administrative law, a land consolidation engineer must therefore also have knowledge of cadastral law and land register law.

2.3 Principles to be observed in land consolidation

As seen in section 2.1, land consolidation is a statutory land readjustment procedure in which all official decisions are made in the form of determinations under public law (administrative acts).

Land consolidation can therefore be defined in general terms as follows:

- *An administrative procedure (land consolidation procedure)*
- *provided for in statute law*
- *conducted by a public authority (land consolidation authority)*
- *for the reorganisation of (rural) land ownership for a specific purpose (for example, to improve production and working conditions in agriculture and forestry).*

Land consolidation therefore involves interaction between the state, as represented by an authority, and citizens – specifically, landowners and holders of other rights to land. In addition to the land consolidation act as *lex specialis*, various other rules must be observed. These follow from the constitution, other national statutory provisions and international law. Firstly, various European Union directives are of relevance to land consolidation:

- Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment
- The 1991 Nitrates Directive, Directive 91/676/EEC
- The 1992 Habitats Directive, Directive 92/43/EEC
- The 2009 Birds Directive, Directive 2009/147/EC
- The 2000 Water Framework Directive, Directive 2000/60/EC.

Certain international conventions are also relevant, although they do not have direct legal effect. These include:

- The Convention on Biological Diversity of 29 December 1993
- The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security (VGGT 2012).

The main principles to be observed are as follows:

- The rule of law
- The right of each participating landowner to a compensatory land allocation of equal value
- The right of the parties to active participation in the land consolidation procedure
- Sustainability and consideration of environmental concerns
- Transparency of the administrative procedure.

These principles do not apply additively and side by side, but are closely interrelated.

2.3.1 The rule of law

The rule of law means that government and the administration may only act within the scope of prevailing law. Citizens' rights are guaranteed; official decisions are subject to independent judicial review. What this means for land consolidation in practice is shown in relation to a number of key aspects in the following.

a) **Respect for and protection of legitimate rights** of the affected landowners is a *conditio sine qua non* for any land consolidation procedure. This relates first of all to the rights of the landowners. It also relates, however, to all other natural and legal persons who have property or usage rights pertaining to the land in the land consolidation procedure – for example, tenants, beneficiaries of rights of way and of other easements (such as energy utilities) and the creditors of land charges, including annuity land charges. As a rule, these rights are recorded in the land register. In most European countries, however, there are also lawful rights that are not recorded in the land register ('traditional' rights) or that are not yet so recorded (due to inheritance, for example). For this reason, at the beginning of a land consolidation procedure, the land consolidation authority must conduct a full investigation into all lawful rights to be taken into account in the ensuing work.

b) **Equal treatment of the parties** follows not only from the constitutional provisions of nation states, but also from the 1950 European Convention on Human Rights. The principle of equal treatment in land consolidation procedures relates first of all to the equal treatment of men and women with regard to land ownership rights. Equality is generally seen as a matter of course in everyday life. In practice however, land consolidation procedures in particular are susceptible to informal discrimination, such as when only the husband attends a meeting for parties to express their preferences for the land reorganisation even though parts of the land in question are the property of the wife or are jointly owned by both spouses. As a matter of principle here, all invitations to meetings and all relevant administrative acts must be sent to both husband and wife by separate mail, and the land consolidation authority can only accept representations by a husband concerning his wife's land or concerning jointly owned land if he can present a valid power of attorney from his spouse.

Equal treatment must also, however, be observed and put into practice in non-formal parts of the land consolidation procedure – and there are good practical reasons for doing so. It is frequently the case in land consolidation procedures that meetings of participants prior to initiating a land consolidation and public hearings on reorganisation of the land consolidation area are attended very predominantly by men. Experience shows that the quality of the opinion-forming process on the course of action to be taken, on environmental concerns and on the everyday life of a village benefits very considerably if women and men contribute and discuss their opinions. This also applies when it comes to electing the board of the body of participants in order to attend to

issues of common interest in the land consolidation procedure. The land consolidation authority should insist here that the board include several women.

c) Equal treatment of the parties to a land consolidation procedure must be observed in substance and not just in form. This means **neutrality and objectivity** towards all parties. That is because the land consolidation authority has to take many discretionary decisions in a land consolidation procedure, especially in the reorganisation planning phase, in order to balance the sometimes mutually exclusive interests of land consolidation participants. Those decisions must be made in such a way that no preferential or detrimental treatment is evident to an informed outside observer. Neutrality and objectivity of the land consolidation authority must be a salient feature of the process from the very beginning. As the saying goes, "trust is hard to gain but easy to lose."

d) The **proportionality principle and safeguards against administrative overreach** in legislation and administrative action generally follow from the national constitution or relevant administrative law. They mean that where two or more options are available for an administrative decision that encroaches on citizens' rights, the option must always be chosen that minimises the impact on the affected party or parties. A typical case in rural reorganisation is where a reorganisation limited to consolidating plots of land can be achieved by a voluntary land consolidation on the basis of mutual agreements between the parties to the exchange. In such a case, a voluntary land exchange (see section 5.3) would take precedence over ordering a statutory land consolidation procedure.

e) The rule of law means that for every official decision (administrative act) there must be a **right of appeal** that may lead to judicial review of the decision. Under German land consolidation law, even discretionary decisions taken by an authority can be reviewed by the courts to establish whether the authority made appropriate or inappropriate use of its discretionary power. This applies in particular to administrative acts in connection with confirming the results of valuation and drawing up the reorganisation plan.

Weighing of participants' interests under section 44 (2) of the Land Consolidation Act

> Section 44 (2) In respect of the allocation of new lots, the farm management conditions of all participants shall be weighed against each other and all factors that have a substantial influence on the crop yield, the use and realisation of the plots shall be duly considered.

If the court adjudicating a case determines that a decision was made in inappropriate use of discretionary power, meaning without carefully weighing the facts, then the administrative act in question will be annulled – in many cases with far-reaching consequences for the remainder of the land consolidation procedure. The aim here is to ensure a verifiable balance between the frequently conflicting interests of the parties to a reorganisation.

This incidentally also applies at an earlier stage of the proceedings: to the question of whether, in the official decision initiating a land consolidation procedure (the land consolidation decision issued by the land consolidation authority as described in section 3.1.3), the objectives to be pursued in the specific land consolidation have been appropriately weighed in an expedient manner and in accordance with the requirements of the Land Consolidation Act. If the land consolidation authority exceeded its statutory

powers to the detriment of one or more participants in the initial land consolidation decision, then that administrative act can even still be contested in a court of law after publication of the final land consolidation plan, in the form of an ancillary matter to an action contesting the plan. More on that in section 2.5.

2.3.2 The right of each landowner to a compensatory land allocation of equal value

In the statutory land readjustment procedure for land consolidation, the right of every landowner to a compensatory land allocation of equal value (*wertgleiche Landabfindung*) is a fundamental principle and is laid down in law without any restrictions. Each and every landowner must receive compensation in land of equal value for the land they contribute to a land consolidation procedure – irrespective of whether they contribute 20 square metres or 200 hectares.

The right to a compensatory land allocation of equal value under section 44 (1) of the Land Consolidation Act

> Section 44 (1) In compensation for their old plots of land, participants shall each be entitled to receive land of equal value; the deductions* made according to Section 47 shall be taken into account. The entitlement of each participant shall be assessed on the basis of the valuation according to sections 27 to 33. The assessment of value shall be based on the situation valid at the time when the new legal status supersedes the old one.

** The 'deductions' referred to here are a land contribution that all landowners must make to common facilities such as farm tracks and roads in proportion to the ratio of the value of their old plots to the value of all land in the land consolidation area. Depending on the specific area of land needed for common facilities, the contribution is usually between 1% and 3% of the value of the contributed land. This is covered in detail in section 3.2.5.2.*

Fulfilling the entitlement to a compensatory land allocation of equal value is not simply an arithmetical exercise where the value of land contributed to the land consolidation is matched against the value of the allocated plots; on the contrary, a comprehensive analysis must be performed that also takes into account all other factors that have a significant influence on crop yield and on the use and exploitation of the land. These include, for example, benefits gained from combining plots in the form of better access to fields from the village, fuel, seed and fertiliser savings, labour time savings and reduced harvest losses. Hence, land consolidation must not put the individual participant in a worse position than before in terms of property and farm management.

This provision in the Land Consolidation Act follows from the constitutional provisions on property in article 14 of the German Basic Law, under which property is guaranteed by the state but, in pursuance of the constitutional principle of the social state, the state reserves the right to define the content and limits to the exercise of the right to property by laws, and even the right to compulsorily purchase property for the public good. Such stipulations – or ones to more or less the same effect – are to be found in most European constitutions. In order to see whether and to what extent these vary from article 14 of the German constitution, however, it is sometimes necessary to look in several different parts of the constitution concerned, as shown here by the example of Ukraine:

Fig. 2.3-1: Provisions of the German and Ukrainian constitutions on the guarantee of property

Country	Guarantee of property	Stipulations on content and limits: 'social state' principle	Expropriation	Confiscation
DE	**Article 14 (1)**	**Article 14 (1), second sentence, and 14 (2)**	**Article 14 (3)**	**–**
	Property and the right of inheritance are guaranteed.	Content and limits are governed by legislation. (2) Property entails obligations. Its use shall also serve the public good.	Expropriation shall only be permissible **for the public good**. It may only be ordered by or pursuant to a law that determines the nature and extent of compensation.	
UA	**Article 14 (2)**	**Article 13 (3) and 13 (4)**	**Article 41 (5)**	**Article 41 (6)**
	Right of property to land is guaranteed.	Property entails responsibility. (4) The State ensures the protection of the rights of all subjects [...], and the social orientation.	Expropriation of objects of the right of private property may be applied as an exception for reasons of **social necessity**, and on the grounds of and by [...]	

Article 14 (1) sentence 2 of the German Basic Law provides the constitutional legitimation for being able to order and carry out statutory land readjustment procedures in which the ability of landowners to freely dispose of their property is restricted – at least temporarily – and the actual use to which land is put is affected by land reorganisation. This defining of the content and limits of the right to property has to be justified in terms of the public interest. In land consolidation, for example, it is justified by the fact that reorganising land to improve production and working conditions in agriculture is not only to the personal benefit of the farmers involved, but also strengthens the national economy and improves food security in the country. More on the objectives of land consolidation in section 2.4.

It follows that, exceptions apart, statutory land consolidation must pursue 'private benefit' objectives, and must do that to a very predominant degree. If public interest objectives gain the upper hand and land consolidation predominantly pursues 'public benefit' objectives as a result, the land consolidation becomes – at least in part – a compulsory purchase measure. While this is possible in principle, it requires additional statutory provisions based on the law of compulsory purchase. More on that in section 5.1.

2.3.3 The right of the parties concerned to active participation in land consolidation

The active participation in land consolidation by landowners and holders of other land rights follows from the rule of law principle on which land consolidation is based. Active participation of all parties affected in some way by land consolidation is also key to

the success of rural reorganisation measures and therefore in the genuine interest of all stakeholders involved in development measures. It improves decision-making quality and makes it easier to surmount the inevitable problems in implementation. If the parties see that everyone can have their say and that all opinions are indeed considered when the final decisions are made, this builds trust in the neutrality and objectivity of those in charge and the outcome is the opposite of the top-down decision making often seen in the public sector.

This participation and consultation process needs to begin even before the decision is made to initiate a development measure in the form of land consolidation in a given community or region. The process continues through all steps of the land consolidation procedure and is made up of a combination of information, consultation and active participation. A distinction has to be made here between participation relating to the legitimate individual interests of landowners and other rights holders and participation concerning issues of common interest affecting all land consolidation participants.

The assertion of private interests in the context of active participation in the land consolidation procedure is the individual responsibility of the parties involved. This generally begins even before any decision is made about contemplating the possibility of land consolidation. The initial impetus usually comes from outside: Popular discontent with the local situation is articulated in various forms, such as complaints to the head of the local council about local traffic or recurrent flooding in a village after heavy rainfall. The trigger can also be economic or structural problems in agriculture. Reasons may include the infrastructure situation in a village, a loss of everyday amenities or young people leaving the village to live in town. When such concerns mount, it is time for systematic action. This can be done by following the methodology for compiling an Integrated Rural Development Concept (*integriertes ländliches Entwicklungskonzept*, or ILEK; see, for example, BMVEL 2005; Bröckling 2004). With professional guidance and intermediation, residents are put in a position here, as bearers of local knowledge or 'local experts', to work out for themselves how and with what methods the adverse trend is to be reversed. This approach based on broad consensus results in a local development strategy with a package of prioritised development measures. It is at this stage that it becomes clear whether land consolidation would be expedient or even necessary for the implementation of measures that have been identified as urgent.

The same method can be applied in the event of structural problems that extend beyond the boundaries of a single municipality. Working with a group of parties selected by the region, an integrated regional development concept (*integriertes regionales Entwicklungskonzept* – IREK, or simply REK) is then drawn up as an instrument of inter-municipal cooperation. The same methodology has been used to arrive at a development strategy in LEADER regions.

If the problem is more sectoral in nature – such as a need for improvements in the agricultural structure of farms, or broken irrigation systems – then the analysis can be restricted to an 'agricultural structure development plan' (*agrarstrukturelle Entwicklungsplanung*, or AEP) (Bröckling 2004) or a feasibility study.

An agricultural structure development plan is an informal sectoral plan for the agriculture sector. It was originally a precondition for the funding of agricultural structure improvement measures under the act establishing the Joint Task for the Improvement of Agricultural Structures and Coastal Protection (GAKG 1988). The funding principles for

land consolidation, village renewal and rural road construction have since been merged into principles for the funding of integrated rural development. This underscores the cross-cutting character of an agriculture structure development plan. As ‘local experts’, the affected parties also have the decisive say here in plan development.

As will be described in the following, the land consolidation authority must solicit the above-mentioned local knowledge of affected residents at numerous stages of the land consolidation procedure: when determining the rightful landowners and investigating unregistered rights, in land valuation, and when hearing the preferences of landowners and tenants with regard to the reorganisation of their land.

The elected board of the body of participants is called upon here wherever issues of common interest are concerned. These are issues where the individual interests of participants compete with each other and where it would be too much to expect of individual participants for them to possess the neutrality and objectivity needed to make an appropriate decision. This is the case, for example, when it comes to establishing the basis for land valuation and drawing up the “plan covering the common and public facilities […] with accompanying landscape conservation plan” (see section 3.2.2). The timing of the transition from the former status to the new status (see section 3.3.1.2) is also necessarily an issue of common interest because too many conflicting interests are involved.

The harnessing of local knowledge by active participation of all involved is of great value for the ongoing progress of a land consolidation procedure; it ensures that decisions can be made on a full factual basis and consequently accelerates the work process. Above all, however, it helps ensure that participants closely identify with the land consolidation. Local people see the land consolidation as ‘their thing’.

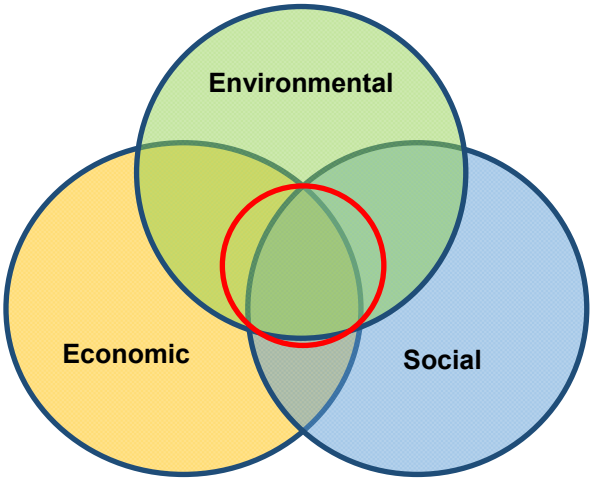
2.3.4 Sustainability and consideration of environmental concerns

The principle of sustainability has been regarded as a general categorical imperative for all government action, certainly since the United Nations Conference on Environment and Development at Rio de Janeiro in 1992. It is not always applied with sufficient rigour, however. In 1987, the Brundtland Commission defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”. Figure 2.3-2 shows the considerations underpinning sustainability in abstract, diagrammatic form:

- Does a measure make economic sense?
- Does it enjoy social acceptance?
- Is it environmentally compatible?

These three dimensions are closely interrelated; the greater the overlap between all three, the more sustainable the planned measure. As well as intergenerational equity at the local and regional scale, in some cases it is also necessary to consider intergenerational equity at global level.

Fig. 2.3-2: The principle of sustainability



The principle of sustainability is best met in the intersection of all three components.

All rural development measures directly affect all three dimensions. In land consolidation projects, the established legal framework and processes based on extensive experience create the optimum conditions for ensuring that the measures taken attain the best possible degree of sustainability. It is even possible to perform a general economic impact analysis (see section 4.7) in which the individual dimensions are worked through together with other questions in concrete terms:

Environmental dimension
What impact do the measures have on the three environmental factors of soil, water and air?
Do the measures consume non-renewable resources?
Do they increase the share of renewable resources?
Do they conserve biodiversity and landscape diversity?
Will they reduce pollution and environmental contamination?
Do they protect or include measures for the protection and development of ecosystems?

Economic dimension
Is the capital employed put to effective use?
Do investment-related measures result in additional local and regional investment spending?
Is appropriate use made of local and regional human capital?
What impact do the measures have on employment in the areas concerned?
Do the measures help reduce hunger and poverty?

Social dimension
What is the position regarding participation and involvement in the measures by affected parties?
Where did the initiative for the measures come from?
Do the parties affected have the opportunity to contribute creatively to the process?
Do all measures safeguard cultural identity?
Do the measures enjoy social acceptance?

The legal basis and tools available for ensuring that the principle of sustainability is adhered to and that consideration is given to environmental concerns in modern land consolidation are described in the sections that follow. In addition, it is shown how, as part of modern, integrated land consolidation procedures, it is possible for landscapes that have been cleared and made monotonous by intensive farming to be returned to ecologically functioning countryside and for environmental degradation processes to be halted and reversed.

2.3.5 Transparency of the administrative procedure

Freedom of information is the unconditional right of every citizen to inspect documents and files of the public administration. This right follows from the principle of public access to official records, under which public authorities must make documents and files accessible to citizens, thus creating administrative transparency. The EU has addressed this issue with a number of regulations and directives from 1990 onwards. Public access to documents of the EU administration itself is governed by Regulation (EC) No 1049/2001 of 30 May 2001 regarding public access to European Parliament, Council and Commission documents.

Freedom of information is guaranteed today in over 110 countries by freedom of information acts and local-level freedom of information bye-laws. These provide for freedom of information rights and detail the procedure to ensure free access. The individual's right of access is not conditional on legitimate interest and is only limited where there is a conflict with public or third-party private interests; in such instances, the authority must state the reasons for refusal.

This right must therefore be safeguarded in land consolidation as an administrative procedure under public law. Digital and analogue mass media are an obvious means to this end. A dedicated website should therefore be provided for each land consolidation procedure and regularly updated with all relevant facts, developments, announcements and decisions, together with any documents. The website should already be online in the preparatory phase of a land consolidation procedure. In addition, important announcements should be published in daily newspapers and posted in places provided for such announcements, both in the affected communities and in neighbouring communities.

Notwithstanding the significant effort they involve, however, such transparency activities are no substitute for individual dialogue between the parties involved and the authorised representatives of the land consolidation authority. The Land Consolidation Act requires the public announcement of certain decisions that take the form of administrative acts. In addition to this, however, project managers need to be inventive and deploy a wide range of other activities to ensure that all parties involved are fully informed and to create a climate of mutual trust. Meetings of the participants' assembly should be held on a regular basis (at least twice yearly) so that the project manager can provide information on the status and progress of the land consolidation procedure as well as on any problems that may have arisen, and to give people the opportunity to raise questions. Regular meetings of the board of the body of participants with the land consolidation authority's project managers (on a specific day of the month, for example) for mutual exchange on relevant information and open-ended consultation ahead of pending decisions also help create transparency in the course of a land consolidation procedure. The aim is to enable and maintain dialogue among all land consolidation stakeholders, in order to prevent mistrust, suspicion, bias, misinformation and rumours from arising in the first place. Above all, a situation must be avoided where individual parties have and are able to exploit an information advantage over others.

Advice from an experienced land consolidation project manager

Talk to the people!"
and
"Trust is hard to gain but easy to lose!"

Transparency in administrative procedures is thus not achieved by the formal application of legal requirements. Above all, it requires project managers to have empathy for the state of mind of land consolidation participants. This is because a land consolidation, with the reorganisation of personal and family property holdings, affects the parties involved directly and in their livelihoods. Land consolidation temporarily restricts the individual's free and autonomous right of alienation in respect of their property in a technically and legally complex process that is by no means familiar to all involved. This creates enormous emotional pressure that can only be alleviated by full information and process transparency.

The socioeconomic added value of rural development measures is defined as the quality of the measures concerned times the degree of public acceptance.

The socioeconomic added value of rural development measures

Socioeconomic Added Value = Quality × Public Acceptance

With excellent quality but little public acceptance, added value tends towards zero.

The same applies with good public acceptance but poor quality of execution.

This applies equally to land consolidation. Adhering to the above principles contributes significantly towards achieving the *maximum possible socioeconomic added value.*

2.4 The objectives of land consolidation

As a result of the constitutional provisions on the guarantee of property, statutory land readjustment requires legitimation in law (see the fourth paragraph of section 2.3.2); this legitimation is derived from the objectives that statutory land readjustment pursues. Those objectives are determined as a rule by national policies. In the case of land consolidation as an instrument of rural development, they are also reflected in EU cohesion policy.

The objectives and social policy requirements of reorganisation measures under the Land Consolidation Act are continuously evolving, as shown in figure 2.1-4. When laying down the objectives of reorganisation in law, it is therefore advisable to formulate them in such a way that they do not have to be continually adapted to societal needs. They should be worded at a level of abstraction that reflects the public interest in a territory-wide resolution of prevalent land-use problems while not becoming caught up in the details of individual local and regional measures, which would require the statutory objectives of land readjustment to be subject to frequent revision.

2.4.1 Land consolidation measures with private benefit objectives

The private benefit objectives pursued by land consolidation measures in Germany can be found in sections 1, 37, 86, 91 and 103a of the Land Consolidation Act.

2.4.1.1 Standard land consolidation

The word 'standard' in the term 'standard land consolidation' (*Regelflurbereinigung*) is intended to reflect the fact that the provisions of sections 1 and 37 of the Land Consolidation Act constitute the core of the Act and thus represent the statutory standard for the conduct of integrated land consolidation. All supplementary procedure types are special cases that are subject in part to a simplified version of the formal procedure and in part to certain preconditions.

The objectives of standard land consolidation under the Land Consolidation Act

> Section 1 Under the provisions of this Act, agricultural land holdings may be rearranged with a view to improving the production and working conditions in agriculture and forestry as well as promoting the general use and development of land (*Flurbereinigung*).
>
> Section 37 The land consolidation area shall be reshaped with due regard for the respective structure of the landscape to serve the interests of the parties concerned as weighed against each other, to further the general use and development of the land and to benefit the general public. The area in question shall be rearranged and scattered or uneconomically shaped plots shall be consolidated to meet modern managerial requirements and reshaped to obtain units of a more favourable location, shape and size; ways, roads, water bodies and other common facilities shall be provided, soil-conserving, soil-improving and landscaping measures shall be taken as well as any other measures improving the basic conditions of the farming enterprises, reducing the amount of work and facilitating farm management. Village renewal measures may be taken; building plans and similar plans shall not prevent the built-up area of a village from being included in a Land Consolidation Plan. The legal situation shall be cleared.

The catch-all provision in section 1 of the Land Consolidation Act matches the list of objectives in the Federal Spatial Planning Act (*Raumordnungsgesetz*) and also the territorial planning objectives of the German states. Those objectives are to improve rural living conditions, to ensure that people employed in agriculture and forestry benefit from general income trends, to safeguard the supply of the population with high-quality food at reasonable prices, to conserve, restore and develop the productivity and utility of nature and to improve species conservation.

Agriculture and forestry continue to be a major factor in the rural economy and are of general importance to society as a whole due to their diverse functions associated with the land. They are the only sector of the economy that ensures the management, conservation and development of the cultural landscape throughout the country. It is important to ensure that agricultural and forestry enterprises stay competitive. Areas of farmed land need to be adapted in location, shape and size to changing farm management requirements as a result of ongoing structural change in agriculture, and need to be provided with a suitable network of roads and water bodies. In the process, reorganisation must help farmers and foresters take advantage of land-related support programmes. Productivity gains and time savings can free up farmers to engage in non-agricultural activities and exploit alternative sources of income. Forward-looking land management can help prevent land-consuming public infrastructure projects from negatively impacting land use for farming and forestry. Existing land use conflicts are resolved.

Tasks relating to the use and development of the land include maintaining a healthy natural balance and restoring habitats and countryside features to a nature-like

state. With a view to stabilising ecosystems on a long-term basis, it is necessary to make sure that climate change mitigation, environment protection, nature conservation and landscape management measures can be implemented and effectively locked in place while having due regard to owner and user interests. This has to do with preserving the cultural landscape by ensuring that large areas remain under cultivation, landscape planning, the establishment of ecological networks, the conservation of soils and waters and safeguarding supplies of clean drinking water. Compensation and substitution measures for impact mitigation under nature conservation law and environmental improvement measures in villages and other built-up areas are also most likely to last if they are implemented in suitable locations and with due regard to property rights.

Strengthening the rural economy and securing jobs are crucial to rural development. As well as a productive and competitive, market-oriented and environmentally compatible agriculture and forestry sector, this also requires jobs and alternative workplaces outside of farming and forestry. The key development factors here are infrastructure with sufficient capacity to meet demand (in terms of transport, amenities, waste disposal, telecommunication, education and culture), attractive residential surroundings and rich environmental, recreational and cultural value. These factors have to be supported and enhanced. Resolving competing land-use interests and reorganising ownership and tenure provide legal certainty, activate private capital and so promote private and public sector investment.

All of the above is included in the mandate for rural areas in section 1 of the Land Consolidation Act. The three purposes are each sufficient, on their own or in any combination, to justify a land consolidation. In all of this, the protection of land ownership must be given high priority; the purpose pursued must always predominantly be of private benefit. A land consolidation procedure that pursues the entire range of objectives under sections 1 and 37 of the Land Consolidation Act is also referred to in the literature as ‘integrated land consolidation for land development’.

The catch-all provision in section 1 of the Land Consolidation Act also corresponds to the objectives of agricultural policy in the European Union following from article 39 of the Treaty of Rome.

Known as the ‘second pillar’ of the Common Agricultural Policy, the European Union development programme addresses rural regions as a whole; in addition to the traditional focus on agriculture and agricultural land use, it aims to improve the general living conditions of the rural population, identifying four funding axes for the purpose:

Axis 1: Improving the competitiveness of the agricultural and forestry sector
Axis 2: Improving the environment and the countryside
Axis 3: Quality of life in rural areas and diversification of the rural economy
Axis 4: Local initiatives rural development initiatives (LEADER).

In the practical implementation of land readjustment for rural development purposes, it is sometimes not necessary to pursue the entire range of objectives listed in the Land Consolidation Act, and individual structural improvement measures may be sufficient to resolve a particular problem. An example is where reorganisation is to be restricted to merely combining plots. The German Land Consolidation Act provides for a simplified procedure for such instances.

2.4.1.2 Simplified land consolidation

The range of objectives for simplified land consolidation in part replicate and in part add to the objectives for standard land consolidation. Under section 86 (2) and (3) of the Land Consolidation Act, a simplified procedure is possible where the planned

measures relate as a rule to resolving individual structural problems or individual problems relating to the use and development of the land.

Should it transpire in the course of the land consolidation that an integrated approach is needed to resolve the problems concerned, then it is necessary to switch to the standard land consolidation procedure.

Simplified land consolidation under section 86 of the Land Consolidation Act

> Section 86 A simplified land consolidation procedure may be initiated
> 1. to render possible or to carry out land development measures, especially measures to improve the agrarian structure, settlement measures, measures concerning the renewal of rural settlements, urban development, environmental protection, ecological water engineering, nature protection and landscape conservation or measures reshaping the external appearance of the village or the natural scenery;
> 2. to rectify unfavourable conditions of the general use and development of land resulting from or caused by the construction, alteration or removal of infrastructure facilities or similar measures;
> 3. to resolve conflicting interests concerning the use of land;
> 4. to carry out a requisite reorganisation of land holdings in hamlets, small communities, areas with isolated farms, and in communities where a land consolidation procedure has already been carried out.

2.4.1.3 Accelerated consolidation

Accelerated consolidation of plots under section 91 of the Land Consolidation Act

> Section 91 In order to ensure that the improvement of production and working conditions in agriculture and forestry aimed at by land consolidation is realised as quickly as possible and in order to enable necessary measures of the protection of nature and of landscape conservation, an accelerated land consolidation procedure may be carried out in communities where the creation of a new road system and major water resources projects are, for the time being, not required; ….

2.4.1.4 Voluntary land exchange

The simplest form of rural land readjustment is a voluntary land exchange. This enables individual landowners to exchange land with the aid of the land consolidation authority in order to improve working and production conditions.

Voluntary exchange of agricultural land under section 103a of the Land Consolidation Act

> Section 103a (1) Voluntary land exchange may be carried out as a quick and simple method to reshape rural land parcels aiming at an improvement of the agrarian structure.
>
> Section 103a (2) Voluntary land exchange may also be carried out for reasons of the protection of the natural environment or landscape conservation.

In the case of accelerated consolidation and the voluntary exchange of rural land, the formal and procedural provisions of the Land Consolidation Act apply analogously,

but a large number of procedural steps and coordination requirements may be left out depending on the complexity of the task. Before initiating a land readjustment procedure under the Land Consolidation Act, the land consolidation authority must therefore decide what form of procedure will achieve the readjustment objective most efficiently. More on that in chapters 3 and 5.

2.4.1.5 Reorganisation needs resulting from the unification of Germany

German reunification in 1990 created a new unification-induced task for land reorganisation: that of resolving the 'land question' – the major challenge presented by differences between the land ownership systems in the German Democratic Republic (GDR) and the Federal Republic of Germany. This involved transforming the socialist ownership and agricultural system in the GDR into a social order based on private property and people's freedom to arrange their own affairs (Thöne 1993).

The legal foundation for resolving the associated problems was laid in an act "concerning the structural adaptation of agriculture in the German Democratic Republic to the social and ecological market economy" – the Agricultural Adjustment Act (*Landwirtschaftsanpassungsgesetz*; LwAnpG 1991). This provided the legal basis for pursuing two different land readjustment tasks in rural areas:

The determination and reorganisation of land ownership

Reversing the separation of land and building ownership.

a) Division 8 of the Agricultural Adjustment Act lays down the requirements for land readjustment measures for the **determination and reorganisation of land ownership**; this is subject to the following principles:

The legal basis for land readjustment procedures for the determination and reorganisation of land ownership

Section 1 Private ownership of land and cultivation on the basis of private ownership shall be fully restored and guaranteed in agriculture and forestry.

Section 43 (1) and (3) Every member of a collective farm or registered cooperative shall have the right to terminate his or her membership by giving notice.

Section 45 Upon termination, the outgoing member shall, except as otherwise stipulated, regain the full right of alienation and direct possession of the member's contributed pieces of land and farmstead.

Section 46 (1) If the collective farm or registered cooperative is unable on objective, economic or legal grounds to return the contributed land, the outgoing member may demand that, in place of the contributed pieces of land, such pieces of land be transferred to the member as are at an economically reasonable distance from the farmstead, are adjacent to each other and on farm roads and correspond in nature, size and quality to the contributed pieces of land. The procedure for the land exchange shall be governed by Division 8.

Section 46 (2) If no agreement is reached on the land exchange, a land readjustment procedure shall be carried out in accordance with section 56.

Principles for land readjustment procedures for the determination and reorganisation of land ownership under sections 53 to 56 of the Agricultural Adjustment Act

> 53 (1) By reason of the departure of members of a collective farm or registered cooperative or the establishment of individual farms, or in order to restore the unity of independent ownership of buildings and facilities and plantings and the ownership of land, the ownership of plots of land shall be reorganised at the request of a party involved, taking into account the interests of the parties involved.
>
> (2) Subsection (1) shall apply with the necessary modifications if the owner gives notice in respect of collectively used land and lets it for the purpose of establishing or enlarging individual farms or market gardens.
>
> Section 54 (1) As the procedure for settling ownership, a voluntary land exchange shall be sought.
>
> Section 56 (1) If no agreement is reached on a voluntary land exchange, a land readjustment procedure shall be carried out […].

The necessary measures are carried out in accordance with section 63 (2) of the Agricultural Adjustment Act applying the provisions of the Land Consolidation Act (FlurbG 1976) with the necessary modifications.

Fig. 2.4-1: Numbers of and area covered by procedures conducted under the Agricultural Adjustment Act and the Land Consolidation Act in connection with the determination and reorganisation of ownership in eastern Germany
(source: BMEL 2002 and 2018)

Year	Procedures under the Agricultural Adjustment Act		Procedures under the Land Consolidation Act	
	Number	ha	Number	ha
2002	568	486 501	384	353 011
2018	188	129 849	587	562 300

b) A particular challenge here consisted of reversing the legal separation of building and land ownership in the GDR and reinstating full ownership of land and buildings within the meaning of the German Civil Code (BGB 2002) (Thomas et al. 2014a). The objective of **reversing the separation of building and land ownership** is described as follows:

The legal mandate for reversing the separation of land and building ownership under section 64 of the Agricultural Adjustment Act

> Section 64 Ownership of the pieces of land on which, on the basis of a right of use governed by law, buildings and facilities have been erected that are independently owned by a collective farm or third party shall be reorganised at the request of the owner of the piece of land or building or facilities […].

Due to the complexity and diversity of possible solutions in procedures for reversing the separation of building and land ownership, the following are also relevant in addition to the Agricultural Adjustment Act:

- Property Law Adjustment Act (*Sachenrechtsänderungsgesetz*; SachenRÄndG 1994)
- Law of Obligations Adjustment Act (*Schuldrechtsänderungsgesetz*; SchuldRÄndG 1994).

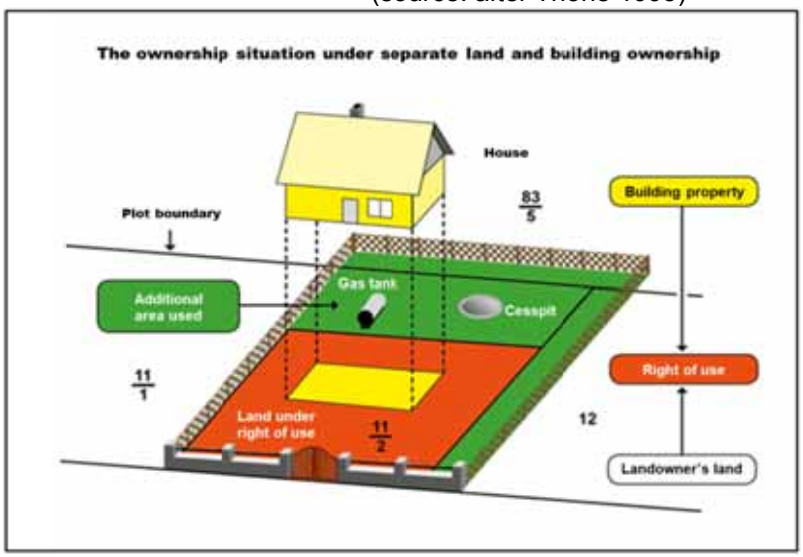
Landowners and building owners have the following procedural options:

1. A mutually agreed and freely negotiated private-law settlement under the German Civil Code, with notarisation (applicable from 3 October 1990)

2. Reversal of the separation of land and building ownership in a procedure under section 64 of the Agricultural Adjustment Act for rights of use granted by a collective farm (applicable from 3 July 1990)

3. Reversal of the separation of land and building ownership by legal transfer, with notarisation, on the basis of the Property Law Adjustment Act (applicable from 21 September 1994).

Fig. 2.4-2: The ownership situation under separate land and building ownership
(source: after Thöne 1993)



The landowner's land is green.

The land under the granted right of use is red.

The land occupied by the separately owned building is yellow.

Options 1 and 3 are of a private law nature. Readjustments under option 2 are made in an officially conducted procedure; as a rule, the solution found comes down to exchanging the plot that is encumbered with a right of use by providing a replacement plot of approximately equal value. In a procedure under the Agricultural Adjustment Act, the parties involved do not incur any costs of implementation (such as for the necessary step of surveying the plots of land) or administration fees.

The above unification-related reorganisation objectives are indisputably of a private benefit nature, meaning that they are in the interest of the parties affected by a reorganisation of ownership, because they remove impediments to farm management and settle unclear ownership. Clarifying rights of ownership and use in relation to legal positions resulting from the socialist period is nevertheless also of general public interest. The Agricultural Adjustment Act is the primary legal basis for the measures to be undertaken. Only where the Agricultural Adjustment Act does not contain provisions for the administrative procedure can the Land Consolidation Act be applied with the necessary modifications. Provided that the requirements for doing so are met,

procedures under the Agricultural Adjustment Act can be continued in all or part of the procedure area as procedures under the Land Consolidation Act. Procedures under the Land Consolidation Act can also be combined with procedures under the Agricultural Adjustment Act. As a result of this, land readjustment procedures are carried out in eastern Germany both under the Agricultural Adjustment Act and under the Land Consolidation Act.

2.4.2 Land consolidation measures with public benefit objectives

The range of objectives outlined for private benefit land consolidation in the foregoing thus presupposes that the reorganisation aimed at in a land consolidation procedure is self-evidently and incontrovertibly in the private economic benefit of the land consolidation participants and that the equal value of the compensatory land allocation for each participant is guaranteed.

Where, on the other hand, a reorganisation of rural land tenure is to be undertaken predominantly in the public interest, then it is a public benefit measure. This has legal and cost implications. In addition, a land consolidation initiated with such an objective cannot usually guarantee a compensatory land allocation of equal value for each land consolidation participant. Additional provisions under the law of compulsory purchase therefore come into play.

Public interest in the provision of land applies as a rule in the case of public infrastructure projects that require large areas of rural land and in the case of mining. In such cases, the land consolidation measure is designed to avoid 'special sacrifice' compulsory purchases affecting individual farms and posing a threat to their continued existence and, instead, to spread the loss of land across a sufficiently large number of landowners so that there is no such threat to any one farm.

2.4.2.1 Large-scale acquisition of land and land consolidation for projects of public interest

Land consolidation procedures in the case of permissible compulsory purchase under section 87 of the Land Consolidation Act

> Section 87 (1) If, for special reasons, it is permissible to acquire land by compulsory purchase and if such a measure would affect agricultural land on a large scale, the authority responsible for the compulsory acquisition may apply for the initiation of a land consolidation procedure if the loss of land to be incurred by the parties concerned is to be apportioned among a larger number of owners or if disadvantages that the project may bring about for the general use of the land are to be avoided.

Land consolidation for projects of public interest comes into consideration, for example, for the construction of public roads or motorways, railways, flood protection measures, building or extending airports, constructing dams and suchlike. As a rule, land for planned infrastructure projects will not be available where it is needed, or not in sufficient quantity. More on that in section 5.1.

2.4.2.2 Land consolidation procedures in the case of provision of land for a mining company

It is also a public benefit land readjustment measure if a private-sector company has to make use of private land to carry out an activity in the public interest, such as supplying energy. This is provided for in section 90 of the Land Consolidation Act.

Land consolidation procedure in the case of provision of land for a mining company under section 90 of the Land Consolidation Act

> Section 90 Where, in the case of rural land, the large-scale provision of land in accordance with regulations of mining law is effected or permissible and the landowners lodge a justified claim for the mining company to acquire title of ownership in the land in question, the loss of land incurred by the parties concerned may be distributed among a larger number of owners by way of a land consolidation procedure.

In the conduct of such a land consolidation, the provisions on land consolidation for projects of public interest apply analogously.

Land consolidations of this kind are occasioned not only by the mining of fossil fuels, but also by large-scale quarrying of other mineral resources such as sand or gravel.

One form of land assignment mainly practised in the opencast mining region west of the Rhine is based not on the assignment of ownership but on a property lease. Farm owners contractually let the right to possession of their land to a mining company for a period of 20 to 30 years for the exploitation of coal reserves in opencast mining. Ownership of the land remains with the farmers concerned. In return, they are paid annual or capitalised lump-sum compensation in proportion to the leased area. The mining company undertakes to recultivate the mined land after closure of the opencast mining operation, and to return it to the farmers in a ‘cultivable’ condition and in a form consolidated by means of a land consolidation procedure; an example can be found in section 5.2.

To summarise with regard to the objectives of land consolidation:

Statutory land readjustment with the consequence of limiting the constitutional guarantee of property does not acquire legitimacy merely by being in the objective interest of the participating landowners and being of a private benefit nature or in the public interest and hence of a public benefit nature. Nor does statutory land readjustment acquire legitimacy from the fact that it constitutes a less serious intervention than other means of statutory action. The objectives pursued by statutory land readjustment procedures have to be given legitimacy in statute law. Consequently, the statutory specification of land readjustment objectives also specifies the scope within which administrative decisions may be made in the course of a land readjustment procedure (Thomas 2009).

2.5 Institutions and stakeholders in land consolidation

Municipalities are the lowest-level political subdivision in the state; they are self-governing territorial authorities. Municipal self-government means the independent management of a municipality’s own local affairs under its own responsibility. To this end, municipalities have the right to enact bye-laws to govern their affairs. Municipal bye-laws are generally binding and can be enforced by the general means of administrative law.

Municipal self-government affairs essentially involve everything that concerns the local community and its individual members. They include the municipal water and energy supply, constructing and maintaining municipal roads, the management of municipal assets, local cultural, welfare and health provision, the operation of community facilities and suchlike. Self-government responsibilities also include regulating and guiding building development in the municipal territory according to the social, economic, cultural, safety and health needs of the local population by means of preparatory and binding land-use plans ('municipal planning autonomy'). Municipalities are required by law to discharge these and similar responsibilities; they may also address other tasks voluntarily.

As a public intervention in land ownership within municipal territory, land consolidation conflicts with the general responsibility of the municipality for municipal self-government affairs, including municipal planning autonomy. This conflict has to be resolved creatively and constructively in the course of a land consolidation project.

2.5.1 The land consolidation authority

Public authorities are characterised by the fact that they perform statutory tasks. These include all orders, decisions or other sovereign measures that are made by a public authority to regulate a particular matter in the sphere of public law and are designed to have direct, external legal effect. Even though their superordinate entities (the federal government, states, counties or municipalities) act through them, public authorities act towards the public in their own name. In Germany's federal system, land consolidation is a matter for the German states.

Carrying out land consolidation is the responsibility of a land consolidation authority (*Flurbereinigungsbehörde*); which sectoral authority is designated the 'land consolidation authority' and who has oversight over it is determined by primary or secondary legislation.

The responsibilities of the land consolidation authority under sections 2 and 3 of the Land Consolidation Act

Section 2 (1) Land consolidation shall be carried out within a given area […] under the direction of the responsible authorities.

(2) Land consolidation shall be given first priority by the *Länder*. They shall determine which authorities are to be consolidation authorities (*Flurbereinigungsbehörden*) and higher consolidation authorities (*obere Flurbereinigungsbehörden*) and shall confine their areas of responsibility.

Section 3 (1) The local consolidation authority shall be the one in whose area of responsibility the consolidation area is located. By way of exception, the higher consolidation authority may direct that another than the local consolidation authority act as consolidation authority.

With the exception of decisions reserved by law for the higher land consolidation authority, the land consolidation authority has 'comprehensive jurisdiction' and sole (final) operational responsibility for implementation of the entire project; this continues to apply even if it contracts out specific administrative or technical work to suitably qualified service providers. It may also bring in other experts as needed. In the course of a land consolidation, it must make the necessary administrative decisions and carry out all measures required of it by law and by the land consolidation decision (section 3.1.3).

Acting in enlightened self-interest, it ensures the active participation the parties involved, and also their institutional representation within the work process. It is neutral and objective towards all parties and aims for maximum process efficiency.

The representatives of the land consolidation authority are aware of the need for a constructive working relationship with local councillors and municipal administration officials.

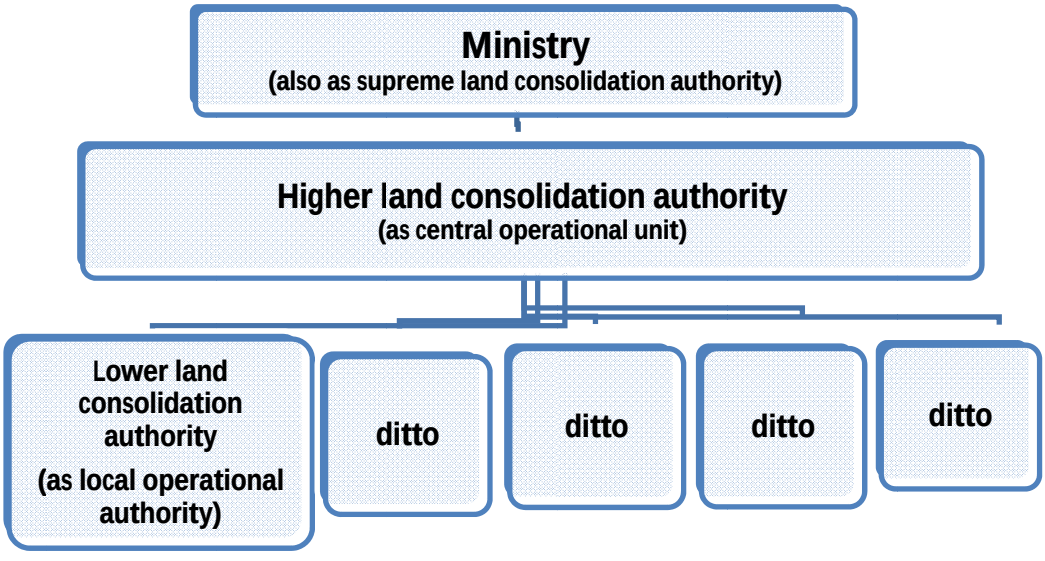
Land consolidation authorities in Germany are authorities of the German states, established in the requisite number throughout the territory of each state and organised since 1920 with a hierarchical structure (under the *Umlegungsordnung*, or Reallocation Code, of 21 September 1920). The head of the authority thus represents the authority towards the outside world and administrative decisions are delegated to subordinate officials.

Until 1920, land consolidation authorities were organised in accordance with the collegiate system. Reorganisation procedures were carried out by special commissions established throughout the country. These special commissions were made up of a certain number of commissioners with specific professional backgrounds (law, agronomy and engineering). In contrast to the modern administrative organisational system, the special commissions had to make decisions as a collegiate body. Today's form of organisation was introduced as early as a century ago for reasons of administrative efficiency; the collegiate system nevertheless survives as a form of organisation in the conduct of land consolidation in a number of southern European countries to this day.

The model structure of a land consolidation authority has three tiers, as follows:

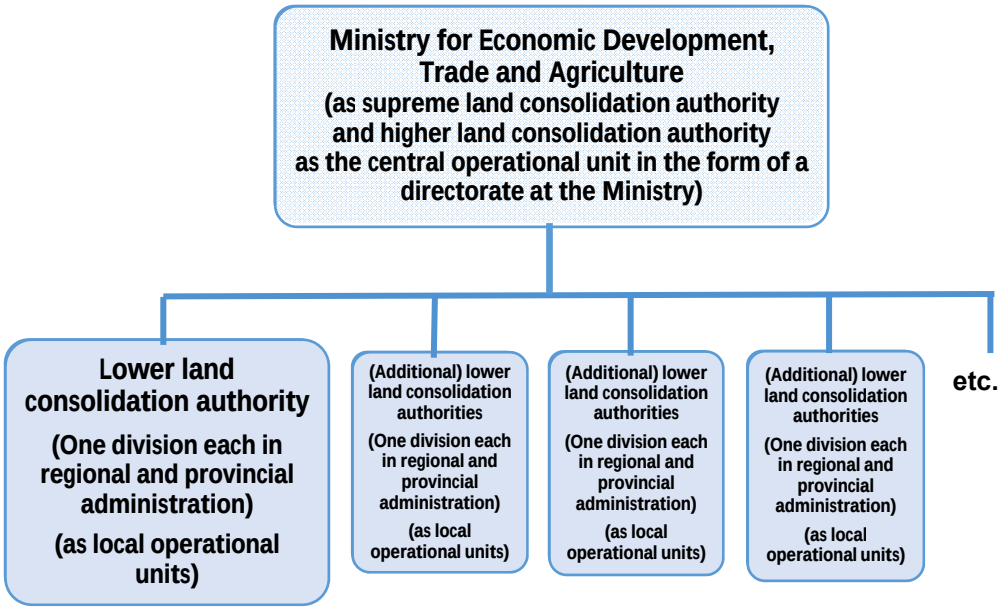
- Local (lower) land consolidation authorities
- The higher land consolidation authority, which is a state-level supervisory authority for land consolidation matters
- The competent government ministry comprising the supreme land consolidation authority.

Fig. 2.5–1: Organisational chart of a three-tier land consolidation administration (as a sectoral state authority)



The number and regional distribution of lower land consolidation authorities in the territory of a given state depends on the number and geographic distribution of the land consolidation projects they are required to conduct. Depending on the extent of land consolidation activity in a given state, a two-tier structure may also be sufficient and appropriate:

Fig. 2.5–2: Organisational chart of a two-tier land consolidation administration (as a sectoral state authority)



The administrative costs (procedural costs) incurred by the land consolidation authorities for personnel and material are borne by the German state concerned (section 104 of the Land Consolidation Act). This also includes all costs incurred in land consolidation procedures by contracting out individual steps to outside service providers or other experts. Such an arrangement is also practised in countries where the land consolidation authority discharges its duties as a land consolidation 'commission'. The procedural costs then also include expense allowances for commission members as well as costs incurred by the local municipality for providing administrative staff, office space (including running costs) and office supplies.

2.5.2 The parties to a land consolidation procedure

Parties to a land consolidation procedure comprise all citizens and institutions affected in some way by the land consolidation. The nature of a citizen's involvement depends on whether, and if so in what form, the citizen has rights to property to be included in the reorganisation (section 10 of the Land Consolidation Act).

- **Participants** (*Teilnehmer*) in a land consolidation procedure are landowners and holders of heritable building rights.
- **Participants of a secondary order** (*Nebenteilnehmer*) in a land consolidation procedure are:

- The municipality or municipalities and associations of municipalities that have land affected by consolidation procedures within their territory.
- Other bodies corporate that will receive land for common or public facilities and/or whose boundaries will be altered.
- Water and soil associations whose districts constitute or form part of the land consolidation area and have an effect on it or are affected by it.
- Any owner of rights in land that constitutes or forms part of the land consolidation area or owner of an interest in such rights or of personal rights conferring the entitlement to possession of or to use or limit the use of the land.
- These include tenants of agricultural or forest land or tenants of residential buildings, creditors of mortgages and land charges, beneficiaries of real burdens, usufructuaries, beneficiaries of easements and limited personal servitudes and holders of real rights of preemption. The holders of such rights are normally evident from the land register. If there are 'unknown' rights that are not evident from the land register, then the holders of those rights are parties to the land consolidation if the existence of the rights can be proven. In the case of an ownership or heritable building right, the holder of the right becomes a participant.
- Owners of plots of land that are not part of the land consolidation area but where the owners will be liable to make a contribution towards the costs of maintaining or implementing common facilities because they benefit economically from the land consolidation measures; these include downstream riparian landowners along water bodies that will be modified in the land consolidation procedure or owners who will benefit in terms of access from the improvement of boundary roads in the land consolidation procedure.
- Owners of plots outside of but adjoining the perimeter of the land consolidation area who will have to take part in the establishment of fixed boundary marks along the perimeter for the purpose of determining the area boundary.
- Individual persons who will receive new plots of land from unallocated land not required for the compensation of participants ('residual land') and who are not already participants as landowners become participants of a secondary order until entry into force of the new legal status.

If municipalities or the state (or other bodies corporate) are owners of land that is included in a land consolidation procedure – irrespective of whether it is land designated for specific public purposes or land available for economic use – then they are also participants. In cases where a municipality is a participant, it is represented by the mayor as the head of the municipal administration or by a person appointed by the mayor. The formal obligations to be observed when making dispositions of municipal land are governed by the rules of procedure of the municipality concerned. In the case of state-owned land, the state participates through a representative appointed by the competent government ministry; the formal obligations to be observed when making dispositions of the land are governed by the rules of procedure of the government concerned.

The individual first and second-order participants are directly involved in the procedure only to the extent that their own individual interests are concerned; with regard to issues of common interest – that is, common affairs of all persons and institutions affected by the land consolidation – they are represented by the constituent organs of the body of participants, and primarily its board and chairperson (see section 2.5.4).

They nevertheless have opportunities to contribute personally in the various phases of the land consolidation.

The land consolidation authority is required to act *ex officio* in order to identify the participants.

Identification of the parties under section 11 of the Land Consolidation Act

> Section 11 The consolidation authority shall make the investigations necessary to identify the parties concerned with due observance of Sections 12 through 14.

Investigations to identify the parties involved begin immediately after the decision that a land consolidation is to be carried out. The purpose of such investigations is to enable entitled parties to assert their interests during the land consolidation procedure. Entries in the land register (*Grundbuch*) constitute the authoritative source for identifying owners (section 12 (1) of the Land Consolidation Act). In cases where land register entries are manifestly incorrect or where a right is not recorded, the land consolidation authority may consider a right as established if the asserted holder of the right provides proof in the form of a public deed (such as a certificate of inheritance) or a certificate of the right of possession issued by the municipality. If another party claims conflicting rights or there is no proprietary possessor, the land consolidation authority may appoint a proxy (section 12 sentence 3 of the Land Consolidation Act). In certain cases, at the request of the land consolidation authority, a proxy has to be appointed by the guardianship court (section 119 of the Land Consolidation Act). The appointed proxy is treated as an entitled party in the land consolidation procedure and may make representations in the procedure that, in relation to the land consolidation authority, the true entitled party must accept as binding. For the latter to participate in person, it is up to that party to bring about a correction to the land register or to establish entitlement by other means.

Identifying the lawful owners of and holders of rights to land in a land consolidation procedure is a task whose scope should not be underestimated and which sometimes requires quasi-forensic investigative skills. Especially in the case of older entries in the land register, extensive research often has to be done in order to identify the true owners.

As a land consolidation procedure does not restrict ordinary transfers of property (in the form of sale, exchange, gifting, inheritance or the establishment of rights to land), it is necessary to have a provision that specifies the legal position of a right holder who enters when such a procedure is already underway.

Legal succession in the course of a land consolidation procedure under section 15 of the Land Consolidation Act

> Section 15 Any person who acquired land that is situated in the land consolidation area shall accept any consequences of the procedure as far as implemented prior to the entry of the parcel in the land register up to presentation of a certificate proving the acquisition. The same shall apply to any person who becomes a party concerned by acquisition of a right.

This provisoin is intended to prevent ordinary property transfers from creating a necessity to reopen phases of the procedure that have already been completed.

Finally, there is one further ‘party’ involved:

- **The general public:**
  Public involvement in land consolidation procedures arose in western Europe during the 1980s as a result of legislation on environmental impact assessments, because the outcome of such assessments – and not only those carried out as part of a land consolidation procedure – has to be announced to the general public (see section 4.5). Since then, it has been standard practice to approach the general public from an early stage in the development of integrated local and regional development concepts (see section 4.1) and to encourage members of the public to participate in the formulation of rural development strategies. Placing such strategies on a broader base of 'local knowledge' indisputably makes for an improvement in quality. Also, if in a particular instance a development strategy results in a need for a land consolidation procedure, broad public acceptance for such a measure is then ensured.

  Formal and obligatory involvement of the general public takes place for compilation of the plan covering the common and public facilities with the accompanying landscape conservation plan (section 3.2.2.2); the public is consulted here on the outcome of the related environmental impact assessment.

  Above and beyond the statutory participation procedure, the land consolidation authority is expected, and also well advised, to make use of modern public relations tools to keep the public regularly informed about its activities.

2.5.3 The municipality in land consolidation procedures

The municipality (*Gemeinde*) has various roles in a land consolidation procedure:

- The municipality has local planning autonomy in the municipal territory and ensures the provision of essential public services for its citizens. The Land Consolidation Act takes this into account by classifying the municipality or municipalities that have land affected by consolidation procedures within their boundaries as participants of a secondary order.
- As the owner of municipal land designated for specific public purposes (roads, paths, parks, playgrounds and other common areas for water supply, schools, sports facilities, swimming pools, waste disposal and suchlike), the municipality is a landowner and as such a participant in the land consolidation procedure.
- The same applies to municipal land available for economic use, such as agricultural and forestry land and land held by the municipality as an owner of residential properties or grantor of heritable building rights. In consequence, the municipality is a participant as defined in section 2.5.2 and as such is to be involved in the same way as any other natural or legal person owning land or holding land rights.
- The municipality has a further, special part to play when local politicians, professionals in the municipal administration or the public make increasing calls for structural change in rural parts of municipal territory. A municipal guiding hand is needed here for the necessary opinion-forming and resolution process, certainly if civil structures are poorly developed in the community and a preliminary agricultural structure plan, a land consolidation programme or even an integrated rural development strategy has to be drawn up for the municipal territory (see section 4.1).

- In some European countries, on a voluntary basis and as a service to participants, the municipality provides support tasks for the body of participants in land consolidation procedures (section 2.5.4). This includes managing the financial incomings and outgoings of the body of participants, administrative and technical tasks in connection with implementing the land consolidation plan, collecting land consolidation contributions from participants, settling monetary compensation among participants once the incontestability of the land consolidation plan has been established, and claiming, spending and accounting for state subsidies. Municipal involvement in this capacity can even be essential if the national land consolidation legislation does not give the body of participants the legal status of a body corporate.

2.5.4 The body of participants and its constituent organs

The decision that a land consolidation is to be carried out establishes the body of participants (*Teilnehmergemeinschaft*) as a body corporate. Its members are the landowners and holders of heritable building rights within the land consolidation area; their membership is established by operation of law (section 16 of the Land Consolidation Act). The body of participants is subject to supervision by the land consolidation authority in order to ensure that the body of participants acts in conformity with the purpose of the Land Consolidation Act.

The body of participants is the representative body for the land consolidation procedure. It attends to the participants' common affairs, meaning responsibilities where it is in the objective interest of the participants that they be dealt with at this level. This begins at an early stage, with potential land consolidation participants' involvement in the decision that land consolidation is to be carried out and in specifying the objectives of the land consolidation. Even though the body of participants is then not yet established as a body corporate under the Land Consolidation Act, the land consolidation authority must already begin working at this stage to ensure the participation of a broad majority of the local population. Issues of common interest further include:

- Preparation of the plan covering the common and public facilities with accompanying landscape conservation plan under section 41 of the Land Consolidation Act ('roads and water resources plan') and implementation of the land consolidation plan
- Construction of the common facilities (ways, water bodies, windbreak hedges, compensation measures under nature conservation law, landscape conservation measures, soil improvement measures and similar measures for the common benefit as specified in the land consolidation plan)
- Implementation of measures for compensatory land allocation of equal value for individual participants, such as recultivating land after the elimination of old roads and removing old plot fences that are no longer needed
- Settlement of the monetary amounts specified in the land consolidation plan.

Entering into contracts requires the consent of the land consolidation authority.

Expenditures necessary for implementing the land consolidation (implementation costs), such as costs of building roads, of landscape conservation and of maintaining the constructed facilities, are borne by the body of participants. Funding for these costs is covered by financial or material contributions from the participants and by government

grants. The municipality may contribute voluntary, non-purpose-specific grants to relieve the burden on participants.

Following completion, ownership and maintenance of common facilities is assigned in many cases to the municipality or to other entities with their consent. This releases the body of participants from having to ensure the maintenance and public safety of the facilities for the long term and hence also from having to remain in existence for this purpose after the end of the land consolidation procedure. If this does not occur, responsibility for maintaining and ensuring the public safety of these facilities remains with the body of participants. The land consolidation authority may make the initiation of a land consolidation procedure conditional on the municipality giving a binding advance undertaking to take over the facilities.

The internal organisation of and arrangements for consensus formation in the body of participants are specified only with regard to their main features in the German Land Consolidation Act; the body of participants may adopt supplementary arrangements in organisational bye-laws.

The **constituent organs of the body of participants** are:

- The participants' assembly
- The board of the body of participants
- The chairperson of the board of the body of participants.

Each of these constituent organs is assigned rights and duties in the Land Consolidation Act.

The **participants' assembly** comprises all participants, meaning all landowners and holders of heritable building rights. Participants each have a single vote, regardless of the size of their property; joint landowners also have a single vote. Powers of the participants' assembly include electing and removing board members, requesting information from the board, requesting statements on progress and matters of fundamental importance, and the adoption of organisational bye-laws; the latter can extend the statutory powers of the participants' assembly (section 18 (3) of the Land Consolidation Act).

The board of the body of participants

The members of the board and their deputies are elected at a meeting of the participants' assembly by a majority of votes cast. If possible, the number of board members should be determined in such a way that all numerically significant groups of parties can be represented on the board. The members of the board and their deputies do not all have to be actual participants of the land consolidation procedure.

It is thus customary for a representative of the municipality in whose territory the land consolidation is carried out to be elected to the board of the body of participants. The board should also include a representative of tenants, of a family enterprise and of a hospitality establishment. It can also be helpful to have a member of the village community on the board who is not a landowner. The aim is to ensure that board decisions on common affairs reflect a representative cross-section of the opinions of all parties to the land consolidation procedure. If no board is elected and setting a new election date holds little prospect of success (for example due to a lack of candidates), the land consolidation authority may appoint board members and deputies (section 21 (4) of the Land Consolidation Act).

In practice, the board is the most important constituent organ of the body of participants in land consolidation and is also the one with the biggest workload. It conducts the business of the body of participants, attends to its common affairs and makes all related decisions that are not reserved for the participants' assembly. The

members of the board and their deputies act in a *pro bono* capacity. As a rule, they receive lump-sum compensation for their time and expenses, paid by the body of participants.

The chairperson (of the board) of the body of participants and the deputy chairperson are elected by the board from among its number; in the states of Bavaria and Saxony, an official of the locally competent land consolidation authority is generally elected as chairperson of the body of participants.

The chairperson is the statutory representative of the body of participants in the land consolidation and represents the body of participants in and out of court. He or she chairs meetings of the participants' assembly and board meetings, implements their resolutions and issues administrative acts on behalf of the body of participants, such as notices for the collection of land consolidation contributions from participants.

Associations of bodies of participants

For the joint performance of their responsibilities, under section 26a *et seq.* of the Land Consolidation Act, bodies of participants may join together to form an association of bodies of participants; as a body corporate, this discharges the statutory responsibilities of its members.

The association is subject to the supervision of the land consolidation authority. If the bodies of participants forming an association extend over the territories of two or more land consolidation authorities, the higher land consolidation authority determines the competent land consolidation authority for supervision purposes.

The association's responsibilities include, in particular:

- Central funds management with handling of payments and support in collecting land consolidation contributions; the association of bodies of participants may be given the right in organisational bye-laws to collect land consolidation contributions directly from the participants in a land consolidation procedure
- Planning construction projects, putting them out to tender, awarding construction contracts and construction management and control
- Land banking for the purposes of land consolidation.

Such associations can be given additional responsibilities under legislation of the German states implementing the Land Consolidation Act, such as the conduct of investigations to identify participants and the valuation of land.

If payments are handled for and on behalf of an individual body of participants by a local bank or by way of central funds management by an association of bodies of participants (thus constituting a 'land consolidation fund'), the land consolidation fund is subject to the instructions of the board of the body of participants concerned in each instance and to the supervision of the land consolidation authority. Unless otherwise stipulated, disbursements require a disbursement order signed by the chairperson of the body of participants and the consent of the land consolidation authority.

At national level, the 26 associations of bodies of participants currently in existence in Germany have joined together to form the *Bundesverband der Teilnehmergemeinschaften* (Federation of Bodies of Participants) (BTG 2018); this has the legal status of a registered association (*eingetragener Verein*, abbreviated e. V.). The Federation does not perform any statutory responsibilities, but merely represents its members' interests at national and European level and facilitates the exchange of experience among its members. It currently represents the interests of approximately 3,800 bodies of participants comprising over three million landowners in Germany.

2.5.5 Bodies representing public interests

Land consolidation procedures have a direct impact on the spatial structure of the area concerned. Various other authorities and institutions are consequently involved in land consolidation; these are referred to as bodies representing public interests. Bodies representing public interests (*Träger öffentlicher Belange*, abbreviated TÖB) are administrators and guarantors of public responsibilities, notably public authorities, utilities, transport providers and other public and private institutions representing public interests (with regard to sectoral planning) in the land consolidation area. By law, they have to be consulted on specific planning and construction projects and are involved in official decisions where planning affects their scope of responsibility. First of all, they include the local municipality and the municipality or municipalities adjoining the land consolidation area. They also include the county (*Landkreis*) with its statutory responsibilities as a territorial authority, together with farmers' and forestry associations. As regards public agencies, it is necessary to involve authorities and institutions relating to transportation, environment protection and nature conservation, landscape conservation, preservation of historic buildings, monuments and sites of archaeological interest, recreation, preservation of village and countryside character, water resources management including water supply and sewage disposal, flood protection and civil protection, telecommunications, hunting and fishing, energy supply, pipeline operators, allotment gardens, mining and mineral resource extraction. There is no definitive list of bodies representing public interests; instead, those to be involved in a given land consolidation depend on the sectoral planning context.

Bodies representing public interests must be heard and consulted in a formal meeting:

- Prior to the decision that a land consolidation is to be carried out and delineating the land consolidation area
- When establishing the general principles for an appropriate reshaping of the land consolidation area
- When preparing the plan covering the common and public facilities.

A special position is occupied by associations recognised under section 3 of the Environmental Appeals Act (*Umwelt-Rechtsbehelfsgesetz*; UmwRG 2017) in conjunction with section 63 of the Federal Nature Conservation Act (*Bundesnaturschutzgesetz*; BNatSchG 2009). These organisations, many of which have the legal status of a registered association, are not bodies representing public interests for the purposes of planning law, but are formally involved in the same way as bodies representing public interests at all relevant stages of the procedure. As a result of EU Directive 2003/35/EC on access to justice in environmental matters, it is now also generally accepted in other European countries that non-governmental organisations should be involved in the same way as bodies representing public interests in matters concerning nature conservation, environment protection and climate change mitigation. The same applies to churches and religious communities, whose in-depth knowledge of former burial sites, religious monuments in the countryside and traditional processional and pilgrimage routes frequently enables them to provide valuable information for the planning of new road infrastructure. Local heritage societies and transregional hiking clubs are also involved for the same purpose.

A certain problem is posed by military infrastructure. Military telecommunication cables and power lines are generally not visible on the ground and are subject to strict secrecy. The land consolidation authority must find a way here in each particular case to

ensure that such infrastructure is not damaged in the subsequent construction of common and public facilities.

Bodies representing public interests and other public interest institutions are required to submit their comments with regard to their own plans and any goal conflicts with the land consolidation plan within one month and to restrict themselves in this connection to their own area of responsibility. The involvement and consultation of such bodies serves the objective of coordinating land consolidation planning as comprehensively as possible with national spatial planning and state territorial planning (vertical coordination) and with third party interests (horizontal coordination).

2.5.6 The public land register and cadastral register

The role of the public land register (*Grundbuch*) and cadastral register (*Liegenschaftskataster*) and interactions between the registries and the land consolidation authority in the conduct of land consolidation are covered in part by formal and substantive provisions of the Land Consolidation Act and are addressed in detail in section 4.2.3.

2.5.7 Private-sector service providers

Preparing and implementing a land consolidation and putting into effect the new status laid down in the land consolidation plan involves a multitude of administrative, planning, technical and legal tasks. These begin in advance of a land consolidation with the compilation of a preliminary agricultural structure plan, an integrated rural development concept, a feasibility study and similar work products. Once the decision to carry out a land consolidation procedure has been made, it is necessary to investigate the legal land ownership and current land use situation. Valuing the plots of land and drawing up the plan covering the common and public facilities with the accompanying landscape conservation plan, including an environmental impact assessment, require high levels of expertise and extensive experience; the same goes for drawing up the land consolidation plan, in which land ownership is reorganised in line with present-day needs and to the benefit of the individual participants.

Finally, the measures laid down in the plan covering the common and public facilities must be put into effect by carrying out the necessary construction work, and the public land register and cadastral register corrected to reflect the new legal position. All of these steps have to be prepared for, implemented and documented with the aid of a wide range of geodetic work, including both cadastral surveys and purely technical engineering surveys.

Responsibility for the proper and flawless execution of all this work lies with the land consolidation authority. In the past, the work in connection with implementing a land consolidation was mostly done by the staff of the land consolidation authority. This continues to be the case to this day in countries where land consolidation activity is limited to sporadic projects, such as in the Scandinavian and Baltic countries (Veršinskas et al. 2020). In countries with intensive land consolidation activity throughout their territory – such as Germany, where 4,000 to 6,000 land consolidation projects are underway at any time – individual tasks or even entire work sections are contracted out to engineering firms.

If the land consolidation authority takes the form of a land consolidation commission, all administrative and technical work must be contracted out to service providers; the commission's activities are then limited to efficiently organising and awarding work sections and to formally accepting the completed work, holding the

statutory meetings with the parties involved, making the requisite decisions and issuing the necessary administrative acts.

The land consolidation authority has ultimate responsibility for all work involved in a land consolidation. This also continues to apply if the land consolidation authority, in order to spread the workload and accelerate project processes, makes use of outside service providers experienced in land consolidation matters. When work is contracted out, the staff of the land consolidation authority must therefore at least have the expertise to accurately specify the required work and timeframe in tender documents, monitor the contractor's progress, appraise the fitness for purpose and correct execution of the completed work and grant formal acceptance. The staff of every land consolidation authority should therefore include experts in surveying, agricultural engineering, where applicable forest management, environmental sciences (ecology and biology), structural engineering, water resource management, administration and law. If the land consolidation authority takes the form of a commission, the profile of expertise to be covered by the commission members is generally even laid down by law, as is the case for example in the Republic of Serbia (Thomas 2017).

Certain points need to be considered when selecting potential service providers:

External service providers used in land consolidation must have sufficient experience in land consolidation matters; they must possess the technical means to deliver the contracted work packages and their IT must be compatible with the land consolidation authority's specifications. When the work packages to be contracted out involve 'bulk' work with a tight timeframe, the potential contractor must also demonstrate that it has the necessary staffing capacity. This is generally indispensable when it comes to delineation and demarkation of the new parcel boundaries in the field and transfer of the parcels with the new boundaries to recipients.

In the case of cadastral work, the service provider must have state authorisation to carry out such work. That authorisation is laid down in the respective national surveying and cadastre legislation, is generally obtained by supplementary training and examination following graduation in geodetics and is verified by presentation of a state licence. The work concerned consists of checking and determining the boundary of the land consolidation area, marking parcel boundaries, surveying and geodetic documentation of the common and public facilities and surveying the new parcel boundaries. This authorisation also has to be held by the members of staff in the land consolidation authority whose task it is to check the results of cadastral surveys and certify their suitability for entry in the cadastral register.

When awarding contracts to service providers, public administrations in almost all European countries must comply with statutory procurement requirements. Award of contract must normally be based on a preceding invitation to tender. These procurement requirements not only specify the procurement procedure; above all, they ensure that invitations to tender, award decisions and the contracting of service providers are carried out by an independent contracting authority that is not identical with the organisational unit receiving the work. As a contracting authority will not usually have expertise in the work to be awarded, exclusive responsibility in the procurement process for accurate specification of the work and proper evaluation of bids lies with the land consolidation authority. The latter describes all works to be provided as accurately as possible in the requirements specification document; in the technical specification document, the potential contractor describes in concrete form how and by what means it intends to meet the client's requirements. Consequently, the land consolidation authority's expert must be involved in the contracting authority's selection decision.

One exception from the formal procurement procedures that normally have to be adhered to applies when contracting out to individual experts, such as when specific

work calls for knowledge that goes beyond general agricultural or geodetic expertise. In particular, recognised experts can be contracted by way of direct award. This may be necessary in the case of special compensation questions such as valuing crops, timber stands, special-purpose buildings or infrastructure, specific hydrological or ecological matters, questions concerning the statics of bridges and suchlike.

All costs incurred in connection with contracting private-sector service providers are costs of the procedure and are therefore attributable to the land consolidation authority and not the body of participants.

2.5.8 Vested operators

A special case in German public administration is the 'vested operator' (*beliehener Unternehmer*). The power to discharge public responsibilities with public-law acts is vested here in a private-law legal person or natural person. This is a form of indirect public administration in which responsibilities that by law are the exclusive reserve of a public authority are discharged by the vestee as a quasi-public authority. Within the scope of its mandate, the vested operator has all procedural powers and obligations under the Administrative Procedure Act (*Verwaltungsverfahrensgesetz*). Lawmakers have a wide margin of choice regarding whether and to what extent they wish public responsibilities to be discharged through organs of the state or through vested operators. Vested operators, and agents of the administration, are nevertheless civil servants for the purposes of liability law, with the consequence that responsibility for any breach of official duty normally lies with the state. Public authority may only be vested by or pursuant to a legislative act.

In the context dealt with in this book, German lawmakers have made use of the possibility of vesting public authority both in the Land Consolidation Act and the Agricultural Adjustment Act.

- Under section 99 (2) of the Land Consolidation Act, the land consolidation authority may, in an accelerated consolidation procedure (section 2.4.1.3), vest suitable entities or experts with the power to negotiate an agreement with the parties concerned and to submit an accelerated consolidation plan; the suitable entity or expert is a vested operator or agent of the administration. The authorisation may also be withdrawn. The vested entities and persons act in relation to participants in accordance with the administrative procedure legislation of the relevant state. They are not permitted to be authorised if they are also landowners in the consolidation area.
- The vested operator is restricted in this instance to 'simple' actions of state and is not allowed to issue administrative acts (Seehusen; Schwede 1997).
- Under section 53 (4) of the Agricultural Adjustment Act (*Landwirtschaftsanpassungsgesetz*), the competent state authority may vest suitable entities with public powers for the determination and reorganisation of ownership (section 2.4.1.5). By law, this excludes the implementation order (see section 3.3.1) and the provisional transfer of possession (see section 3.3.3) in a land consolidation procedure, as these are administrative acts. These are reserved for the land consolidation authority.

3 The phases of a land consolidation procedure

Over the past almost 70 years since the Land Consolidation Act was originally adopted in 1953 (*Flurbereinigungsgesetz*; FlurbG 1976), the development of land consolidation in Germany has been shaped by a wide variety of different societal needs. The objectives pursued in reorganisation procedures are determined by contemporary economic and general social developments. In some cases, these objectives have been incorporated in legislation and in situation-driven legislative amendments. In others, however, they have been formulated at a sub-legislative level or guided by evolving 'best practice'.

The process to be worked through in practical terms is determined by a multitude of sectoral planning requirements – in particular, considerations relating to the use and development of the land in reorganisation of the procedure area – and by the surveying work involved. While the topic of land development engineering and land improvement issues "has fallen somewhat out of favour in recent years or is even looked down upon" (Werner; Haberstock 2001), it is unavoidable in the context addressed in this book. The process of land consolidation is more than the sum of its many parts. There are numerous interdependencies and interactions between the various process stages, and knowledge of these is pivotal to achieving an efficient outcome. So that the interrelationships described in the following can be explored further as necessary, special care has been taken to provide a detailed list of sources. The aim of this chapter is thus to present the phases of a land consolidation procedure with its land readjustment and sectoral planning components as a coherent whole, while also going into the reciprocal relationships between methodology, process and progress. Knowledge and consideration of these interrelationships helps in exploiting the potential for optimising processing time, cost and quality of the overall outcome.

The presentation of the land consolidation work process is based on the standard land consolidation procedure under section 1 in conjunction with section 37 of the Land Consolidation Act, as described in Thomas (2010). However, the presentation of the process in the following largely omits coverage of the applicable legal basis and administrative requirements; the relevant provisions of the Land Consolidation Act are shown in the third column in figure 3.0-1. Instead, the presentation of the land consolidation work process focuses on the practical side of carrying out a reorganisation procedure from an administrative, technical and operational point of view. The steps involved are basically inherent in all statutory rural land readjustment measures and are therefore not distinguished according to the type of procedure being carried out.

The steps making up the procedure are as follows:

Fig. 3.0-1: The land consolidation work process: steps in a land consolidation procedure

Work phase	Tasks to be completed	Legal basis in the Land Consolidation Act
1. Preparation and delimitation of a planning area	Preparatory socio-economic analyses and studies of the planning area Exploratory talks	
2. Initiating and ordering the land consolidation procedure	Coordination between authorities	Section 5 (2) and (3)
	Informing those likely to be affected	Section 5 (1)
	Ordering the land consolidation procedure	Section 4
	Establishing the constituent organs of the body of participants	Sections 16 to 26 (e)
3. Review of the current situation	Ascertain the spatial, economic and ecological conditions	
	Identify plans of bodies representing public interests	
	Obtain data from the land register and cadastral register concerning the affected plots	Sections 12 to 14 and 30
	Identify those concerned and their rights to the plots	Section 11 *et seq.*
	Determine the value of and ascertain the plots	Sections 27 to 32
4. Reorganising the land consolidation area	Develop the principles for reorganisation	Sections 37 and 38
	Drawing up a plan for common and public facilities and its approval/ acceptance	Section 41
	Consultation with the participants in the land allocation (preferences hearing)	Section 57
	Drafting and publication of the reorganisation plan	Section 58
	Preparation and publication of the land consolidation plan	Section 59
5. Implementing the land consolidation plan	Implementation order	Section 61 or section 63
	Arrangements for the transfer of property	Sections 65 and 66
	Construction of common and public facilities	Section 42
	Correction of public records	Sections 79 to 81
	Decisions on legal actions	Section 140
	Financial settlement of the procedure	Sections 151 and 152
6. Completion of the land consolidation procedure	Concluding determination Delivery of the concluding determination to the body of participants Archiving of the procedure documents	Section 149 (1) Section 149 (2)

3.1 The preparatory phase

3.1.1 Preliminary procedure

Exploring the potential need for reorganisation

The initial impetus for a reorganisation procedure can come from various quarters:

For example, individual farmers or a group of farmers, often accompanied by the farmers' association representative, might approach the land consolidation authority and describe problems and difficulties they face in tilling their land or in terms of vehicle access and transport from farm to field or field to factory. In forestry, it is usually fragmented land ownership and poor access to woodland that stands in the way of economically viable forest management. Concerns of this kind usually relate to structural or functional deficits in land use and their impact on the productivity of farms or forestry operations, leading those affected to ponder their situation and seek out the land consolidation authority.

In the case of problems in the spatial development of a municipal community, the impetus usually comes from the municipal administration.

In recent years, the need for land consolidation has frequently been articulated in regional development processes; it may come to light as the result of an Integrated Rural Development Concept (*integriertes ländliches Entwicklungskonzept*, or ILEK; for example, BMVEL 2005) or in the context of a LEADER process. Sometimes, residents come to the conclusion during formulation of a village development strategy (Thomas 2010, p. 405) that parts of the surrounding farmland also require reorganisation as well as the built-up area of the village. Impetus for land consolidation procedures also comes from other public authorities that have requirements of their own with regard to the nature and extent of land use in a region. These include sectoral planning authorities for transportation, water resources management, nature conservation, landscape conservation, historic monument and local heritage preservation, energy supply and waste management; they also include non-governmental organisations, notably those involved in nature conservation and environment protection. A land consolidation planned for other reasons often presents a welcome opportunity for such stakeholder groups to raise their own concerns and preferences in the land readjustment procedure.

If the desire for land consolidation is articulated by civil society stakeholder groups pursuing sectoral interests, an Integrated Rural Development Concept with a regional or thematic focus may be developed first in order to ensure that there is indeed a need for reorganisation and that the envisaged land consolidation fits without conflict with the region's general development goals.

The decision directing that a land consolidation procedure is to be carried out is a discretionary administrative decision, but it is one made by the exercise of circumscribed powers. It must be verifiably based on the legal requirements and it is subject to judicial review. For this reason, the decision is preceded by wide-ranging preliminary investigations and deliberations. In all exploratory activities at this early opinion forming stage and in subsequent decision making, the land consolidation authority has to address two aspects in particular:

- Can the problems that have been raised be resolved or alleviated with the tools of rural reorganisation?

- And can the reorganisation measures be carried out in a 'private benefit' manner, meaning for the benefit of the landowners involved?

The authority forms its opinion with regard to the need for reorganisation first of all on the basis of the observations in existing development concepts or development strategies. General maps showing ownership, tenure and any fragmentation of tenure provide additional information on the land use situation in the region concerned; further indispensable documents providing information about the outward appearance of the area subject to reorganisation include pedological maps prepared by the national geological survey, phytosociological maps from specialist nature conservation units and topographic maps provided by the territorial survey for the region in question.

This information gathering can be usefully supplemented by exploratory discussions with the farmers' association, the municipal administration and other bodies representing public interests that are specifically affected, and by site visits, information events and individual and group discussions with potential parties to the procedure.

In-depth investigations

In the case of complex land use problems, it can be helpful to supplement the available documentation with in-depth appraisals such as agricultural and silvicultural site investigations, agricultural structure development plans or a stakeholder impact analysis.

- **Agricultural and silvicultural site investigations** serve the purpose of determining the suitability of site-adapted agricultural or silvicultural land use and of drawing up management recommendations; they also serve to prevent negative effects on water bodies or the soil. In addition to geological/pedological and phytosociological studies, attention is also given to other site factors such as climatic conditions, relief, hydrogeology, leaching and erosion risk, soil compaction susceptibility, and so forth. When changes in land use, water resource management measures or soil improvement measures are planned, information must be provided about their impacts. The outcomes of the investigations and the management recommendations are documented in agricultural site reports or technical papers and presented in map form.

- An **agricultural structure development plan** (*agrarstrukturelle Entwicklungsplanung*, or AEP) is a sectoral agricultural plan of a cross-sectional nature. It helps safeguard the importance of agriculture for rural areas at the level of the local region and to coordinate its land needs with that of other spatially relevant schemes (such as road construction or housing developments). This involves collecting and analysing all facts relevant to planning, the development of agricultural structure objectives and the formulation of proposals for their achievement, while also having due regard to municipal planning. Agricultural structure development planning identifies areas of conflict, development opportunities and decision making needs relating to land use in general and agricultural structure in particular, and develops guiding principles and/or conceptual land use plans for the planning area.

- A **stakeholder impact analysis** identifies who is or who may be affected by a particular public project, and in what way. For example, in connection with construction of the ICE high-speed rail link between Cologne and the Frankfurt region, a stakeholder impact analysis for the section located in the state of North Rhine-Westphalia was already conducted at the routing phase to clarify whether the original 559 ha (Kasimir 2001) land requirement for the project and the resulting offsetting measures under nature conservation law could conceivably be met without endangering the continued existence of farms along the route.

  When determining the route for the A14 autobahn from Halle to Magdeburg, the land consolidation areas were delimited on the basis of an analysis of the ownership situation, tenure situation and a land user map (see figures 3.0-2 to 3.0-4).

Fig. 3.0-2: Ownership map

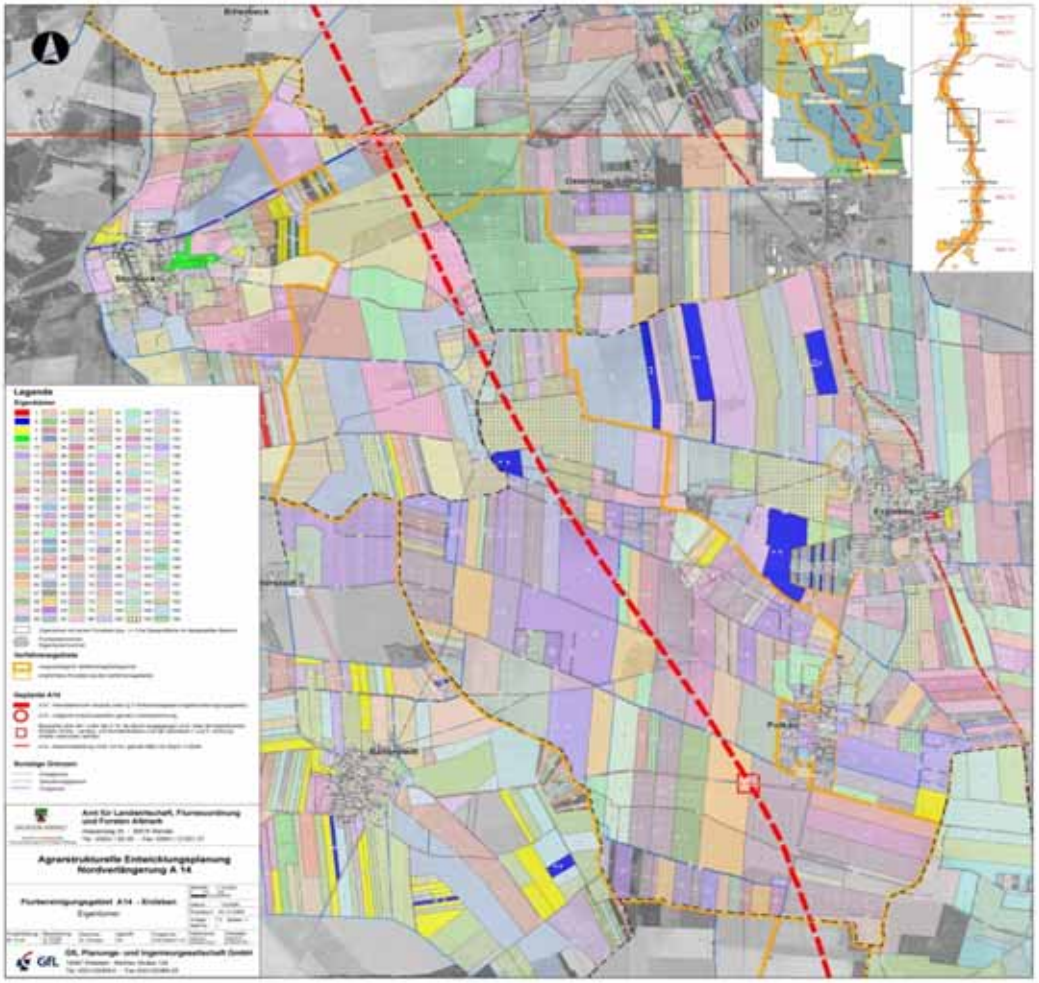
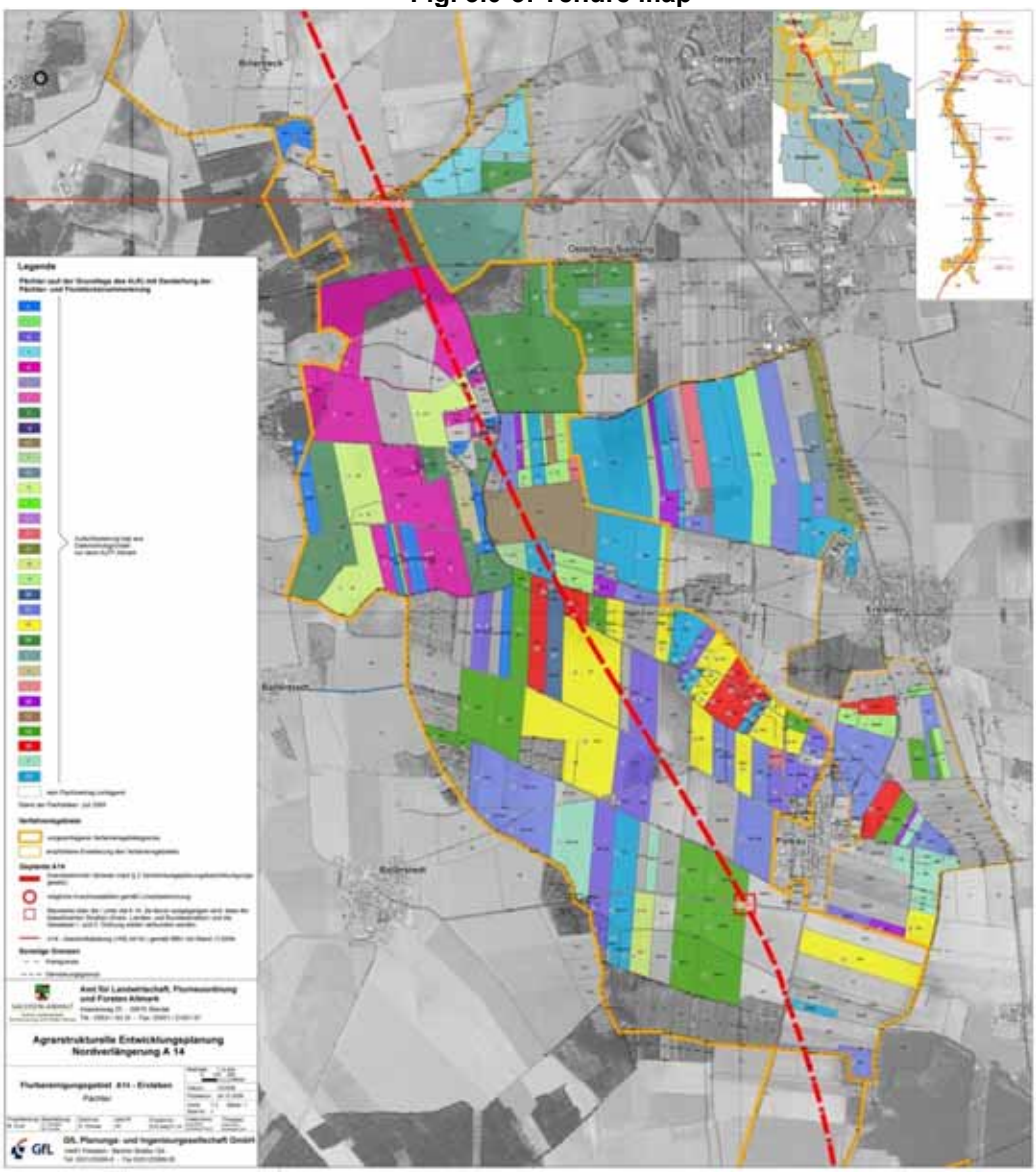
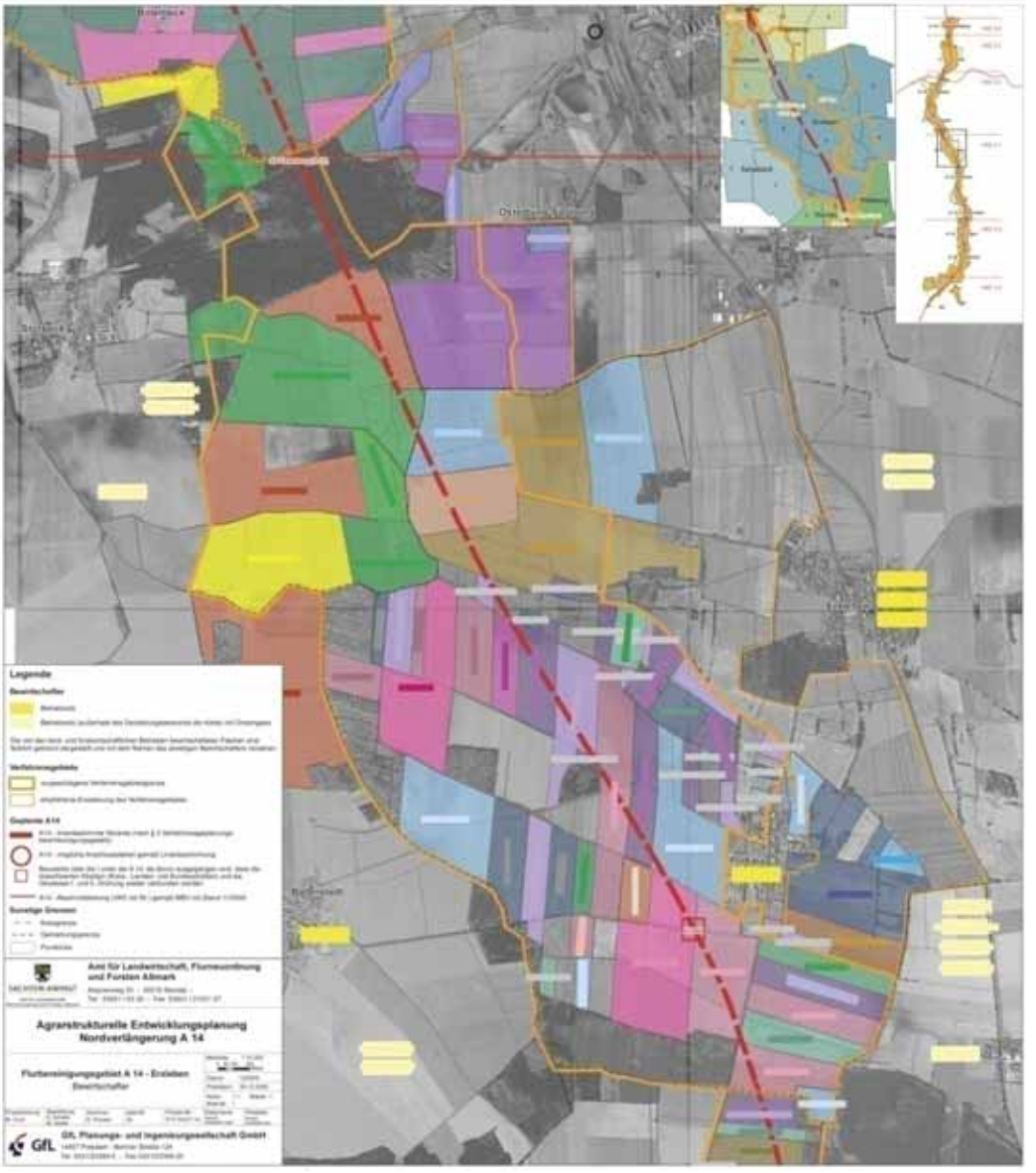


Fig. 3.0-3: Tenure map



The tenure map shows which owner or tenant manages each parcel of land. No distinction is made between ownership or leasehold. The pieces of land managed by a particular farm are shown uniformly in one colour, irrespective of whether the farm owns or leases the land or merely borrows it from the owner, as is often the case among family members.

Fig. 3.0-4: Land user map
(Source: Amt für Landwirtschaft, Flurneuordnung und Forsten Altmark, Saxony-Anhalt)



The land user map (Bewirtschafterkarte) is distinctive to eastern German agriculture. Leased areas are exchanged among tenants on the basis of contractual agreements or informal agreements between farm managers. This results in a situation where the land that farmers cultivate is not always the farmland they have actually leased, but land received in exchange for leased land. As well as ownership and tenure, it is therefore also necessary to distinguish who actually farms each piece of land, and this is shown in the land user map.

Whereas the ownership map can be generated directly as a vector graphic from inventory data in the cadastral register, this is not possible for the tenure map or the land user map. In many cases, such matters have to be clarified in time-consuming investigations over the course of a land consolidation procedure, because there is no comprehensive official record in Germany of land leases or exchanges of leased land.

Special investigations of this kind are generally contracted out to specialised agencies or engineering consultancies. The costs are borne by the land consolidation authority.

At the preparation stage of a land consolidation, the land consolidation authority also notifies the nature conservation and landscape preservation agencies of the envisaged assessment area and the matters to be assessed. The agencies involved inform the land consolidation authority of their knowledge concerning nature and the landscape and of their nature conservation and landscape preservation plans and measures in the land consolidation area.

To avoid delays and unnecessary effort in the environmental impact assessment (EIA) for the land reorganisation procedure, a preliminary evaluation as to whether negative environmental impacts are to be expected in the land consolidation procedure is made in the initial phase of the project, within the meaning of section 7 of the Environmental Impact Assessment Act (*Gesetz über die Umweltverträglichkeitsprüfung*; UVPG 2021). This generally takes place in connection with the hearing on initiation of the land consolidation procedure (section 3.1.2).

Although according to section 18 (2) of the Environmental Impact Assessments Act, a hearing of this kind is not required in a land consolidation procedure, the land consolidation authority, as the planning authority in the land consolidation procedure, is nevertheless well advised to already address the scope of the survey and the assessment method in the meeting for informing and hearing the parties concerned (section 3.1.2), especially since by that time all relevant facts (objectives of and measures under the procedure) are known and made public, at least in general form. This is because environmental concerns in the region in question already have to be incorporated into the development strategy drawn up during the preparatory stage of deciding whether a land consolidation procedure is to be carried out (see section 4.1). The meeting for information and hearing of the parties concerned and of the bodies representing public interests is also the time and place for communicating whether measures planned in the land consolidation will have environmental impacts, along with the nature of any such impacts.

In land consolidation procedures to be carried out specifically with nature conservation or landscape development objectives, this type of screening can usually be used to conclude the information hearing with a finding that an environmental impact assessment is not required. Any decision not to carry out an environmental impact assessment must be published, as must the outcome of any such assessment.

If negative environmental impacts are expected, it is necessary to determine whether and how any long-term impacts can be avoided. The land consolidation authority conducts the required meeting with the affected bodies representing public interests and recognised nature conservation organisations. These are informed at the

meeting about the content and scope of the documents they will be expected to provide. The meeting covers the issues relevant to the conduct of the EIA.

Finally, it is important for the land consolidation authority to obtain as much information as possible on formal and informal plans that other entities (such as the municipality and sectoral planning authorities) may have for the region concerned. This is because the land consolidation authority, once it decides to implement a land consolidation, should aim not only to resolve the land use problems that have been identified, but also all other latent or foreseeable land use conflicts that may yet arise. Equipped with a full picture of the reorganisation needs present in a region from the perspective of territorial and sectoral planning, the land consolidation authority is able to choose the right procedural instrument and base the decision to implement a land consolidation on the right reorganisation objectives. If the area affected by the problems is too large, the work is subdivided geographically and chronologically and the decision is made to carry out a 'chain' of land consolidation procedures (see section 5.1).

The decision-making process for a land consolidation

A land consolidation not only has to be expedient in the opinion of the land consolidation authority; it must also be objectively necessary and in the interest of the parties involved (section 4 of the Land Consolidation Act). In other words, there must be structural deficiencies that can only be lastingly rectified by a land consolidation procedure. That it is in the interest of the parties is not established by voting, but has to be assessed solely on an objective basis. The key point is whether land consolidation can rectify the structural deficiencies and whether it is foreseeable that it will be of overall benefit to the parties involved. An envisaged land consolidation must be of private benefit, meaning that it is in the private economic interest of the landowners. This is not decided by the subjective opinion of individual parties. Instead, the implementation of land consolidation must be in the best interest of the parties involved as established having due regard to all circumstances relevant to planning and after objectively weighing the facts (Seehusen; Schwede 1997). For this reason, the land consolidation authority carefully sounds out the general acceptance of the planned measures among the affected landowners prior to making its decision, because no land consolidation should be initiated against the will of a majority of owners.

If in-principle acceptance of a land consolidation cannot be achieved, the preliminary investigation ends with an internal administrative decision not to implement a land consolidation or to postpone it; the parties involved should be notified of this decision.

The situation is different with decision-making for reorganisation procedures where the implementation decision requires an official application. This is the case with land consolidation for projects of public interest (section 87 of the Land Consolidation Act), land consolidation procedures for the provision of land in accordance with mining law (section 90), accelerated consolidation (section 91) and voluntary land exchanges (section 103a). It is also the case with land readjustment procedures under sections 53 and 64 of the Agricultural Adjustment Act. The requirements for these are covered in the sections relating to these procedures, 2.4.1.3 and 2.4.2.2.

3.1.2 Meeting for information of the parties concerned and hearing of bodies representing public interests

If after the preliminary investigations a land consolidation is held to be expedient, the land consolidation authority formally notifies the authorities affected by the planning of the envisaged reorganisation and holds the required meetings to inform the landowners involved and to hear the farmers' association, the competent territorial planning authority, the municipalities and associations of municipalities, and other authorities and organisations (section 5 of the Land Consolidation Act). In the public information meeting, the prospective participants are fully informed about the planned reorganisation procedure, including, in particular, the purpose, the specific objectives, estimated costs and how they will be met, and the stages of the reorganisation procedure.

This phase of the preparations should be accompanied by an information campaign in local print media and municipal political bodies.

The outcome of these hearings is then used to finally determine whether the legal and circumstantial requirements are met for the decision to carry out a reorganisation procedure.

Ranking land consolidation procedures under limited human and financial resources

A standard land consolidation is initiated by the higher land consolidation authority acting *ex officio* and on the basis of a report from the head of the relevant lower land consolidation authority. In most German states, this decision is tied to a work and financial plan agreed upon with the state government ministry that is designated as the higher land consolidation authority. Given the constant high level of demand for land consolidation procedures, the limited operational capacity of land consolidation authorities and the limited financial resources available to meet the costs, it is necessary to rank the conflicting expectations by order of priority. Methodologically speaking, this can be done in two different ways:

- A ranking based on the sectoral policy preferences in the relevant German state, in that the competent ministry indicates the state government's development priorities for rural regions: Precedence could thus be given in one instance to improving the competitiveness of agriculture and forestry and in another to socially acceptable implementation of environmental policy goals or improving village living conditions; there may also be region-specific priorities. Such an approach can create practical difficulties in administration if there is a change in the state government, as a new government's differing sectoral policy priorities might mean having to disappoint the expectations of regional stakeholders.
- A ranking according to the 'added value' that the planned reorganisation measures are expected to create for the region concerned: In methodological terms, this added value is estimated in an 'impact-oriented assessment' (see section 4.7.3). This is a methodology developed in the state of North Rhine-Westphalia in order to determine the societal benefit of rural development measures (BMS 2005). Since 2006, the states of Rhineland-Palatinate and

Lower Saxony have ranked planned measures in the form of an *a priori* assessment of expected benefit (BMS 2006).

Given the methodological and legal problems in both approaches, the most persuasive solution for prioritising measures in a state-wide ranking is likely to be a combination of the two.

Delimitation and potential alteration of the land consolidation area

Delimitation of the procedure area is at the discretion of the land consolidation authority. It should essentially be done in such a way that the purpose of the reorganisation is achieved as effectively as possible. The limits must therefore be drawn so as to enable the creation of an efficient network of roads and water bodies and a generous consolidation of land ownership, but also in a manner that is expedient for surveying purposes. They should thus be based on local topography, where possible following prominent boundaries such as roads and watercourses, and fully encompass the area in need of reorganisation. In a reorganisation procedure under the Land Consolidation Act, delimitation of the procedure area is not constrained by municipal, county or state (*Länder*) boundaries. It may therefore extend over the territory of multiple municipalities. The minimum unit of delimitation is the parcel level, however, meaning that only whole cadastral parcels can be included in the land consolidation. It is not lawful for a land consolidation decision to include fractional parcels because landowners must each be able to know beyond doubt whether they are affected, and also to what extent.

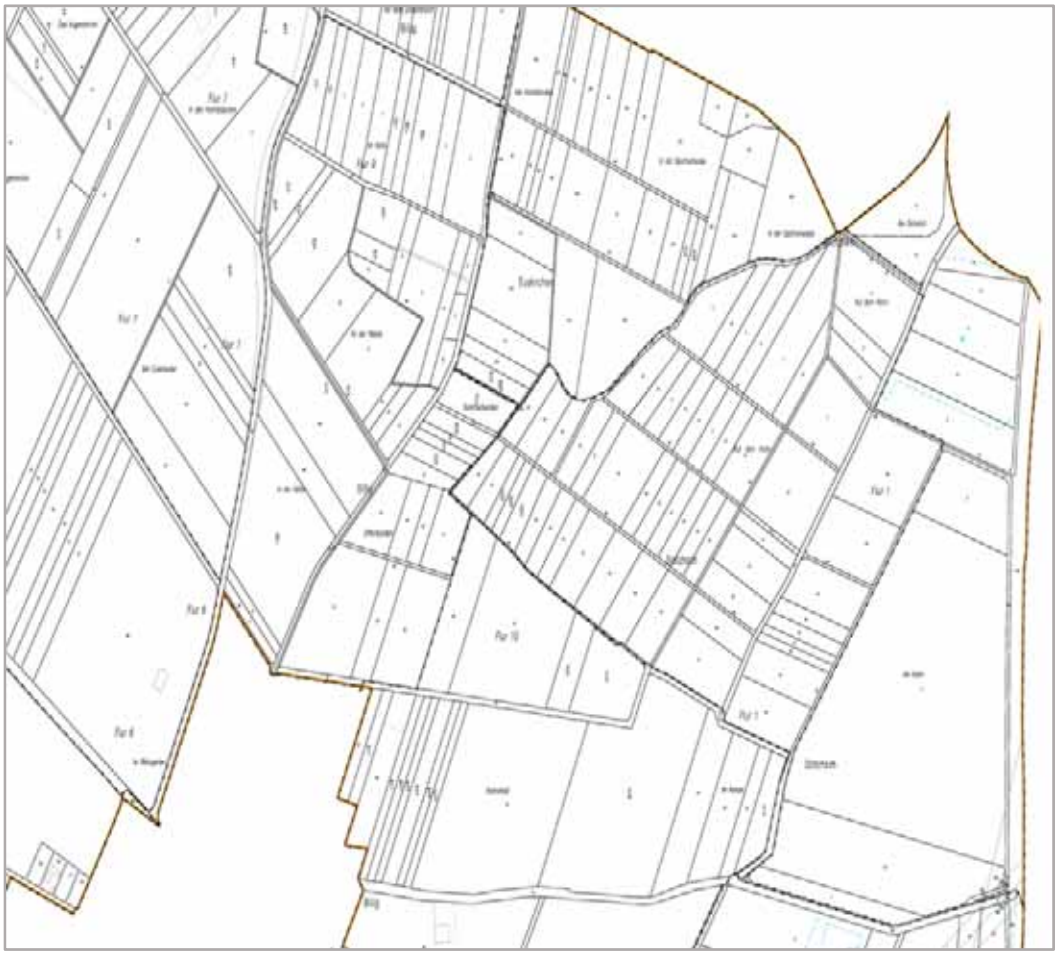
Land consolidation may include the built-up area of a village; this is recommended if the land consolidation is to be combined with reorganisation measures within the village (such as village renewal measures, village land reorganisation and reorganisation of ownership of inlying roads, paths and water bodies) or if land is to be exchanged between inlying and outlying areas. If it is solely a matter of land re-allotment in an urban land-use category (*Baugebiet*), a reallocation of property rights under the Federal Building Code (*Baugesetzbuch*; BauGB 2017) may be considered instead of land consolidation (see also section 5.7). Including the built-up area of a village for the sole purpose of updating the frequently out-of-date cadastral register is not admissible. On the other hand, the procedure may additionally include individual plots (not just within the built-up area of a village) for surveying-related reasons – for example, because doing so reduces the cost of determining the perimeter of the land consolidation area. The same considerations often rule out the exclusion of individual plots even though they are not expected to be altered in the land consolidation.

Delimitation of the reorganisation area should be coordinated with the local cadastral registry to ensure that any specific details in the cadastral register are taken into account.

The delimitation of the procedure area should be well prepared in order to preclude subsequent changes as far as possible. It may nevertheless become necessary to add or remove areas in the course of the procedure, for example to accommodate individual participants' preferences regarding the plan (section 3.2.5.4). The land consolidation authority may order minor alterations to the area (up to 10% of the procedure area) in a simplified administrative procedure without a new hearing. Significant alterations, on the other hand, are subject to the same formal procedure as

the land consolidation decision and must be ordered by the higher land consolidation authority. Any alteration of the procedure area must be in the interest of the parties and necessary to achievement of the procedure objectives specified in the land consolidation decision. Considerations regarding the delimitation of a land consolidation for projects of public interest are addressed in section 5.1.

Fig. 3.1-1: Map of the land consolidation area of the Billig land consolidation (detail) (source: Bezirksregierung Köln)



The map of the land consolidation area is generated as an extract of the property map containing all parcels specified in the land consolidation decision. The perimeter of the land consolidation area is also marked in colour. This is required to follow parcel boundaries.

Fig. 3.1-2: Map of land ownership in the Billig land consolidation
(source: Bezirksregierung Köln)

3.1.3 The land consolidation decision

If a land consolidation proves to be necessary and expedient, the land consolidation decision is issued (section 4 of the Land Consolidation Act). By issuing the land consolidation decision, the higher land consolidation authority directs that a land consolidation should be carried out, determines the land consolidation area and legally establishes the body of participants in the land consolidation. Like many other orders issued pursuant to the Land Consolidation Act, the land consolidation decision contains a range of stipulations that can both benefit and place obligations on those affected. The land consolidation decision thus includes:

- The name of the reorganisation procedure; this is usually the name of the nearest place
- A precise designation of the plots of land included in the procedure. This is done by listing the names of entire cadastral districts or cadastral district subdivisions. If only parts of a cadastral district subdivision are included, the affected parcels have to be listed individually with their parcel numbers
- Establishment of the body of participants
- A request to assert unknown rights
- Stipulations on land transactions and temporary restrictions on the use of the land.

The explanatory part of the decision sets out the purpose and objectives of the reorganisation measure.

The land consolidation decision, in the form of the substantive part of the decision and a map of the area, must be published in accordance with the public notice rules applicable to municipalities and, together with the explanatory part, made available for inspection for two weeks, in order to inform all interested parties about the procedure objectives and the spatial extent of the procedure (section 6 of the Land Consolidation Act). There is a one-month period for appeal. Without delay after the land consolidation decision enters into force, the land consolidation authority transmits a copy to the land registry and the cadastral registry in whose districts the parcels in the reorganisation area are located. In both registers, the affected parcels are marked to show that they are subject to the pending reorganisation procedure. Similarly, parcels are marked to show if the land consolidation area is altered or the land consolidation procedure is discontinued due to subsequently arising circumstances (section 9 of the Land Consolidation Act). Transmission of the required data takes place electronically via the LEFIS land development information system (further information on LEFIS is available in German at www.landentwicklung.de/informationssysteme/lefis).

Cooperation between the land consolidation authority and the land and cadastral registries through the entire duration of the land consolidation procedure is dealt with in section 4.2.3.

Land transactions (purchases and sales, encumbrances, lettings, etc.) are not normally interrupted by land consolidation, but there are temporary restrictions on the use of the land.

Temporary restrictions on the use of land

Although no restrictions are placed on land transactions, certain restrictions are placed on the use of the land during a land consolidation procedure. Under section 34 of the Land Consolidation Act, certain changes in the condition and use of the land require the consent of the land consolidation authority from the time of announcement of the land consolidation decision up to the point at which the land consolidation plan becomes incontestable. Without the consent of the consolidation authority, the use of the land may not be changed in any way unless the changes are part of ordinary agricultural activities. Construction, establishment, major alterations to or removal of buildings, wells, ditches,

fences, terraced slopes or similar require the consent of the land consolidation authority. The removal of fruit trees, berried shrubs, grapevines, hop vines, isolated trees, hedges or shrubbery in the fields and on river banks is only permitted in exceptional cases, where it has no adverse effect on the use and development of the land including, in particular, on nature conservation and landscape preservation; consent from the land consolidation authority is required. If such alterations are made without consent, they may be disregarded in the land consolidation procedure, with the effect that any expenditure incurred for them is not compensated for if the land is allocated to another party in the land consolidation plan. Alternatively, the land consolidation authority may cause the original situation to be restored or may order replanting if an effected change in use infringes landscape preservation or nature conservation legislation; it may even impose a fine. The purpose of these restrictions, which take effect on announcement of the land consolidation decision, is to provide the land consolidation authority with the necessary freedom to plan, and also to prevent any further adverse impact on the countryside than that which is to be expected in any case from the land consolidation measures.

Granting or refusal by the land consolidation authority of permission for a change of use during the land consolidation procedure is a separate, and hence also separately appealable, decision that is necessary alongside other official approvals (such as under the Federal Building Code or under state-level building, water or nature conservation law); the land consolidation authority's reasoning for the decision must relate exclusively to matters relevant to reorganisation in the land consolidation procedure.

3.1.4 Election of the board

As soon as possible after the land consolidation decision enters into force, the land consolidation authority invites the participants (landowners and holders of heritable building rights) by public notice to elect the board of the body of participants. The board election is held by the land consolidation authority. With certain exceptions, all natural persons may be elected who have full legal capacity under civil law. They do not need to be involved in the procedure.

The land consolidation authority determines the number of board members to be elected by the meeting of participants. It may also make stipulations regarding groups to be represented in the composition and the election of the board. In doing so, it must have regard to the situation in the procedure area, such as the number of participants and, if applicable, representation of specific municipalities or districts. The participants' assembly may adopt bye-laws specifying the election procedure. All participants are entitled to vote. Each participant present in a meeting of the participants' assembly has one vote. Joint owners count as one single participant; if they are unable to agree how to cast their vote, then they cannot vote. Participants may be represented at the meeting by proxies, who must present a written power of attorney. Multiple powers of attorney do not give a proxy the right to cast multiple votes. If the land consolidation authority requires the signature on powers of attorney to be publicly or officially certified, this must be stated in the meeting invitation.

The main proceedings and outcomes of each meeting of the participants' assembly are recorded in minutes. These have to be signed by the chairperson of the meeting. The balance of votes with which each resolution is adopted has to be recorded. All minutes are collated in a minutes file in which all board resolutions in the course of the land consolidation are also recorded.

At the beginning of the meeting, the meeting chairperson explains the principles of the election procedure and the board's responsibilities. The chairperson asks the individuals proposed as board members and deputies if they would accept *pro bono* office if elected. They are informed that acceptance of office is obligatory. The election is conducted by secret ballot and in writing. As a rule, the election can be held in one single ballot. If only a few more eligible voters are present than there are board members and deputies to be elected, it is recommended that the board members and deputies be elected in separate ballots.

On completion of voting, the votes are counted to determine the outcome. The elected board members must accept *pro bono* office as board members unless they can show good cause for refusing to accept. On acceptance, each elected individual is a member or deputy member of the board. The meeting chairperson inducts the members of the board and their deputies by handshake. They must give their commitment at this juncture that they will perform all duties assigned to them by law and other stipulations impartially and disinterestedly, for the benefit of all concerned and to the best of their knowledge and belief, conscientiously observe the law, and not disclose confidential matters that become known to them as board members.

The induction of the board members and deputies is also recorded in the minutes. These are finalised by the chairperson of the meeting.

A deputy has to be elected for each member of the board elected by the participants' assembly. The deputies assume the duties of board members if the latter are unable to exercise their office. Should a member leave the board, the deputy with the most votes in the board election moves up to the board. If the board is composed along group representation lines, this must then be taken into account. The participants' assembly only needs to hold a by-election for a deputy if the board is no longer quorate.

If the procedure area or the purpose of the procedure is significantly altered (for example by a significant expansion of the land consolidation area or by additional village renewal measures), the land consolidation authority determines whether and in what number board members and deputies are to be removed from office or newly elected.

3.1.5 Identification of the parties concerned

The land consolidation authority is required to identify the parties concerned. Entries in the land register (*Grundbuch*) comprise the authoritative source for identifying the parties concerned (section 11 *et seq.* of the Land Consolidation Act).

The land consolidation authority carries out this work on the basis of the inventory data received from the land registry and cadastral registry and transmitted according to the procedure described in section 4.2.3.

The land consolidation authority may consider a right as established if the person asserting the right provides proof in the form of a public deed or a certificate issued by

the municipality that the person possesses the land in the manner of an owner or exercises the right of possession.

If the owner is not evident from the land register, the proprietary possessor is deemed to be a party. Should proprietary possession be disputed, the land consolidation authority may cause a proxy to be appointed for the party concerned for the duration of the dispute. The proxy is appointed by the local court (guardianship court) on application of the land consolidation authority. The same applies if there is no proprietary possessor.

In the event that no party can be identified from entries in the land register or from deeds or proprietary possession, the competent municipal registration office is asked for information. If this avenue also proves fruitless, investigations continue via any current tenant or the board of the body of participants. As a further possibility, it is advisable to research in church records. If these efforts also fail, the land consolidation authority again causes a proxy to be appointed by the competent local court (guardianship court).

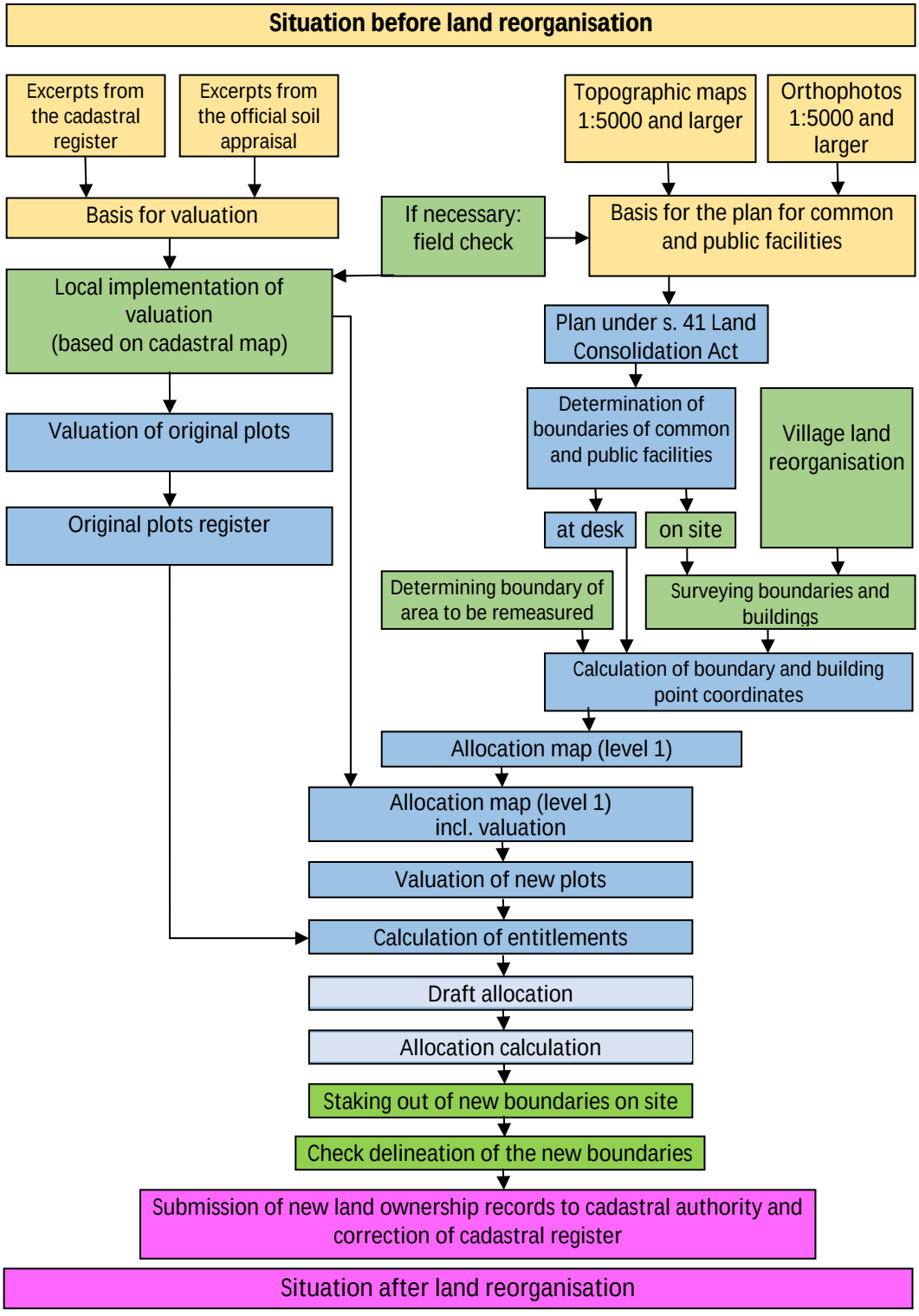
The outcome of the investigations to identify the parties concerned (referred to as 'legitimation') is the participants' register (*Teilnehmernachweis*), in which a separate sheet is created for each participant and assigned an identifier, the reference number (*Ordnungsnummer*). This reference number is also the identifier for all other person-related registers created in the course of the land consolidation (original plots register (*Einlagenachweis*) and compensatory allocations register (*Abfindungsnachweis*)); all other documents created in the course of a land consolidation (written submissions, appeals, certificates, etc.) are recorded by reference number.

3.2 The planning phase

The planning phase is the most time-consuming and labour-intensive phase of a land consolidation; it encompasses all processes in which, step by step on the basis of the above-described organisational preparations and assessment of the prevailing legal and factual situation, the reshaping of the land consolidation area and reorganisation of land ownership are brought to completion. The individual steps build on each other and are also closely interrelated.

Figure 3.2-1 shows the interrelationships between the technical workflows in a standard land consolidation. For the other land readjustment procedures under the Land Consolidation Act and land reorganisation procedures under the Agricultural Adjustment Act, the technical workflows and interrelationships are simplified according to the procedure.

Fig. 3.2-1: The planning documents in land consolidation derive from a variety of data sources (Thomas 2012 b)



3.2.1 Valuation

3.2.1.1 Principles of valuation in land consolidation

Under section 44 of the Land Consolidation Act, participants are each entitled to receive land of equal value in compensation for their plots of land, taking into account deductions made according to section 47 of the Act (see section 3.2.5.2). Each participant's entitlement to a compensatory land allocation is assessed on the basis of a valuation. The valuation is based on the situation prevailing on the 'valuation date', which under the Land Consolidation Act is the date on which the new legal status supersedes the former legal status (see section 3.3.1.1). In cases of provisional transfer of possession (see section 3.3.3), it is based on the date on which the provisional transfer takes effect. Valuation also serves to safeguard the rights of others. What is valued is the land, where applicable anything that is deemed an essential part of the land, and certain land rights.

The results of the valuation are used:

- For assessing the compensatory land allocations
- As the basis for setting the financial contributions under section 19 of the Land Consolidation Act
- To assess the equalisation payments for over or under-allocations under section 44 (3) sentence 2 of the Land Consolidation Act
- For determining the land contribution under section 47 of the Land Consolidation Act
- For assessing the amount paid in compensation for the contribution of land for public facilities under section 40 of the Land Consolidation Act
- In the case of land consolidation for projects of public interest, for determining the deductions of land under section 88 no. 4 of the Land Consolidation Act.

In the land valuation, binding exchange values are established for the plots in the land consolidation area. Methodologically speaking it is a comparative method of valuation; what matters are not absolute values in the form of monetary amounts, but the ratios between individual plots or parts of plots.

The land values are determined by dividing the plots in the procedure area into classes (valuation classes), which are assigned specific value units (*Wertzahlen*) per unit area according to their land condition and land use suitability.

Land valuation is done on different measurement bases according to whether the land is used for agriculture or forestry or is development land or building land.

Under section 28 (1) of the Land Consolidation Act, the valuation of land used for agriculture is to be based on the nationally available soil values under the Soil Appraisal Act (*Bodenschätzungsgesetz*; BodSchätzG 2007); deviation from those values is allowed. For this purpose, an evaluation of agricultural land is performed for the entire territory, in which soils are already classified into quality classes according to pedological, soil physiology and hydrological characteristics; details are provided in

section 4.3. The official soil appraisal distinguishes between arable land and grassland, specifying an arable land and grassland appraisal framework for the purpose and applying a 100-point quantitative scale; again, details are provided in section 4.3.

For the purposes of land consolidation, it is not usually sufficient simply to use the official soil appraisal. Some areas such as woodland and vineyards are not included and others are no longer correctly reflected due to changes in soil condition in the meantime. Also, changes in agriculture since the initial surveys have caused a shift in the relative values of certain soils (such as between arable land and grassland or between light and heavy soils). Furthermore, the criterion to be used for exchanges of land in land consolidation is not 'net long-term yield' as is used in some other land valuation contexts, but 'natural soil fertility' (Thomas 1990).

3.2.1.2 Performance of the valuation

The land consolidation authority directs the valuation with the aid of one or more soil experts.

Valuing the plots for a land consolidation area involves desk study, local inspection, analysis and documentation of the soils in the field and subsequent desk-based preparation of the documents for later use in the land consolidation procedure.

The board of the body of participants is to be involved in deciding the specific bases of valuation in the land consolidation area and should be present during the on-site valuation work; interested land consolidation participants may also take part.

To carry out the valuation, the land consolidation authority obtains the property map from the cadastral register, including the official soil appraisal for the land consolidation area, and draws up a valuation framework in collaboration with the board of the body of participants and the soil experts. It is also useful to obtain the appraisal records (*Schätzungsbücher*) and appraisal maps (*Schätzungskarten*) from the official soil appraisal. Information recorded in the appraisal records for each area – identified by cadastral reference – includes the appraisal date, the designation of the type of land use on which the appraisal was based, the designation of areas as soil units, soil unit subdivisions and special units whose value is not based on soil fertility, a description of the soil profiles (designating and non-designating profile pits) and the value units. The appraisal maps record the spatial delimitation of the areas designated as soil units, soil unit subdivisions and special units, the value units and the locations and numbers of the soil profiles together with the marks for the profile pits. Appraisal records and appraisal maps also record sample profiles and reference profiles.

When **drawing up the valuation framework**, it is therefore necessary to determine whether and to what extent the values from the official soil appraisal are to be modified and supplemented with local surveys for the purposes of the land consolidation. What matters are not the absolute value units for each class, but the differences between them; the class-to-class difference in value units must be such that the land gains or land losses resulting from exchanging one soil class for another offset the yield differences in cultivation.

The preparation of a valuation framework is described together with matters to be considered when doing so on the basis of an example in section 4.3. In addition to the basic data established in the valuation framework, the board of the body of participants,

the soil experts and the land consolidation authority also have to discuss various other value-influencing factors and determine how they are to be addressed in valuation:

The **treatment of additional value-influencing factors** may also have to be decided upon; the following are some examples of common issues:

- Steeply sloping terrain (> 6%):

  Sloping terrain with a slope greater than 6% makes cultivation more difficult. Such areas are marked down by 5% to 10%.

- Impaired soil hydrology:

  Waterlogged terrain is marked down by 5%.

- Drained areas:

  Natural soil fertility (with regulated soil hydrology) is already taken into account in the basic data within the valuation framework. However, drained land has yet to be marked up or down to account for the change in economic yield due to draining. The markups or markdowns are determined by the drain installation cost per unit area, depreciation already charged on the system (depending on its age) and regular maintenance costs (generally in the form of contributions to the association responsible for upkeep). These costs have to be calculated and the value units for plots in the drained area marked up or down accordingly. It is recommended that a record of the calculations be included in the valuation documentation.

- Microclimate considerations:

  Nothing is added to the basic data in the valuation framework; the microclimate has already been taken into account in the genesis of the basic data in the valuation framework.

- Woodland fringes:

  Woodland fringes have an effect on natural soil fertility. Field value factors are marked down according to the compass direction in which the woodland lies relative to the affected plots of land; for an indication of the size of the markdowns:

Woodland north of the affected plot	20%
Woodland to the east/west	35%
Woodland to the south	50%

  The area marked down is a 20 m strip parallel to the woodland fringe.

  Grassland is not marked down for a woodland fringe because there is hardly any effect on natural soil fertility.

- Valuation of land in protected areas:

  Land in a water or landscape protection area is not marked down because a protected area designation does not affect natural soil fertility.

- Above-ground and underground pipelines and cables:

  Above-ground and underground pipelines and cables are usually covered by rights in the form of easements or limited personal servitudes in favour of the

operator. The presence of pipelines or cables is usually taken into account in valuation by marking down the land-only value of the encumbered plot. For example, a 10% markdown is applied to a 10 m wide strip along cables < 20 kilovolts and to a 20 m wide strip along cables > 20 kilovolts.

In the case of underground pipelines or cables, a 10 m wide strip is marked down by, for example, 10%.

The width of the buffer strip can generally be seen from the relevant land register entry.

- Pylons and signal towers/control kiosks for underground cables:

  Pylons represent an obstacle to cultivation for the farmer; the associated extra cost and income shortfall must be offset in valuation in such a way that the impairment can be made good for the receiving landowner with a compensatory land allocation in the land consolidation plan; this compensatory allocation is therefore accounted for as a markdown on the value of the land held by the current and subsequently surrendering landowner. The size of the compensatory allocation is determined according to the severity of the impairment.

- Non-productive land:

  Common and public facilities and other areas that cannot be used for agricultural production are classified in the bottom value class in the valuation framework.

- Roads and water bodies to be eliminated in land consolidation:

  These areas will be revalued after recultivation and valued at a percentage markdown relative to the value of adjacent land, the percentage markdown depending on the quality of recultivation.

- Specialised crops and market gardens:

  Specialised crops (fruit, asparagus, tree nurseries, etc.) and market gardens are classified in the appropriate grassland or arable class and additionally marked as a fruit crop, asparagus field, tree nursery, etc.

- For the valuation of land under wind farms, solar farms or biogas plants, please refer to section 4.3.3. and to ARGE Landentwicklung (2014) in the references. When drawing up the valuation framework, it is necessary to decide whether these are to be appraised by yield (section 28 of the Land Consolidation Act) or – if applicable, as agricultural land suitable for non-agricultural use – at market value (section 29 of the Land Consolidation Act).

- Woodland:

  Forest land and timber stands must be valued by a recognised forestry expert in accordance with forest appraisal principles (as set out in the Waldwertermittlungsrichtlinien or forest appraisal guidelines; WaldR 2000). If there are any circumstances that go beyond the scope of the forest appraisal principles, it is necessary to decide how they are dealt with when drawing up the valuation framework.

- Development land and building land:

Development land and building land must be valued at market value according to its quality level. Its delimitation and value classification is a desk exercise done on the basis of binding municipal land-use plans. The areas are delimited in the valuation map according to the stipulations of the preparatory or binding land-use plan.

- Valuation of farmyard or building areas:

  These are not treated as building land because they are not exchanged. They are generally assigned value class 1 for arable land.

- Elements deemed essential parts of a plot of land:

  Elements deemed essential parts of a plot of land such as buildings, other structures, orchards and individual trees, if they are to change owners or be removed in land consolidation, are valued separately by recognised experts.

- Extractable mineral resources:

  Land with an enhanced market value due to extractable mineral resources (such as gravel, sand, gypsum or dolomite) is valued at first in the same way as other agricultural land. Its market value is appraised separately when it is exchanged in a land consolidation. Any other extraction rights are treated in the same way. Exchanges of such land are very rare because of the size of the compensatory payments that are usually involved.

Any temporary or remediable impairment of an area's natural soil fertility, such as ploughing compaction or heavy weed growth, is ignored in valuation. Such factors have no impact on long-term fertility. Pest infestation (such as nematode infection in beet-growing areas) has only a temporary effect on the fertility of the affected land and can be eliminated by suitable means.

- Setting of the monetisation coefficient:

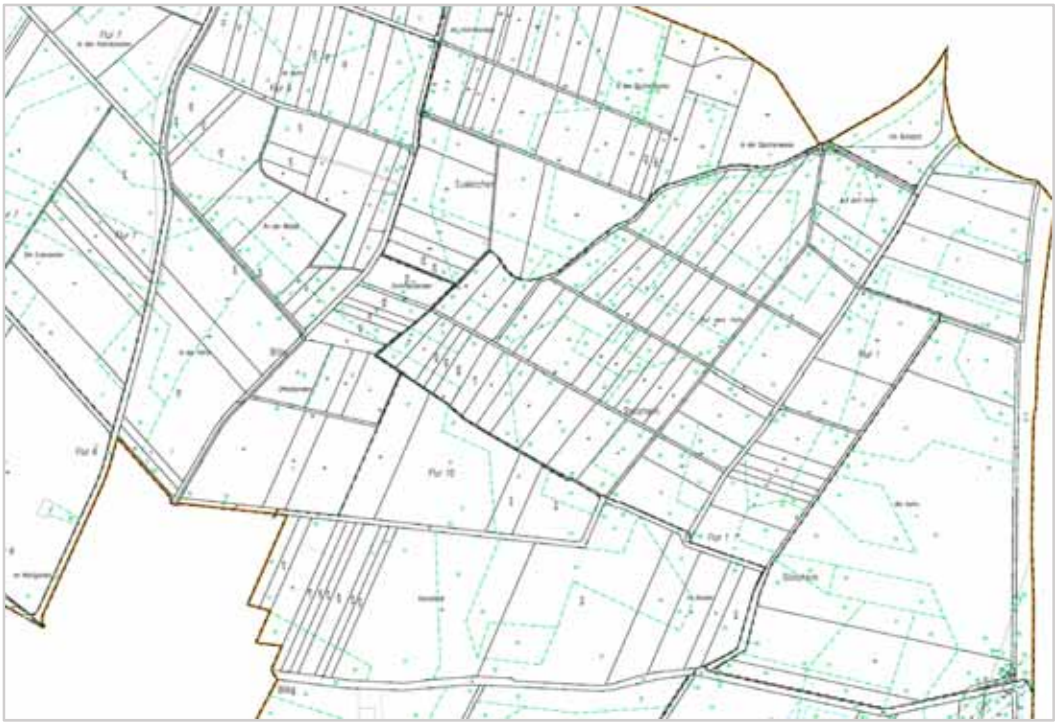
  So that the dimensionless index values can be converted into monetary (euro) amounts, a monetisation coefficient is set in euros (€) per value unit in consultation between the land consolidation authority, the board of the body of participants and the soil expert.

In the on-site valuation work, soil samples are taken to a depth of about one metre in an approximately 40 m x 40 m grid over the entire land consolidation area, examined by the expert and classified in the valuation framework classification scheme. For this purpose, soil profiles are extracted with a soil sampling auger and given to the expert for analysis and assignment to the value classes in the valuation framework.

A surveyor enters the results of the on-site soil surveys at the exact locations in printouts of the property map. These entries should indicate the value class attributable to the physical soil profile and any markdowns to be applied. After completing a cadastral district subdivision, the soil expert works with the surveyor using this set of discrete points to construct the boundaries of the value classes, thus delimiting areas of the same value class. This work is simplified considerably by recording the on-site valuation results with a pen computer or tablet, ideally with GPS support. Firstly, this removes the need for locating the delineated soil sample grid points by terrestrial survey. Secondly, the use of a computer greatly simplifies the task of constructing lines of equal value classes by interpolation and extrapolation. Finally, the digital field survey results can be fed directly into the system for valuing the original plots.

Following completion of the on-site valuation work for agricultural land and woodland in the entire procedure area, the land consolidation authority holds a final meeting with the land appraisers and the board of the body of participants to consult on the valuation results in summary form and make any necessary changes to the valuation framework. The results of the valuation are recorded in the valuation map.

Fig. 3.2-2: Valuation map (detail)



The land consolidation authority is required to make the documents relating to the results of the valuation (valuation map and valuation framework with any supplementary determinations) accessible to the parties for inspection and to explain them in a hearing (section 32 of the Land Consolidation Act). Any objections raised in the hearing do not constitute formal appeals, but give the land consolidation authority the opportunity to look into individual participants' objections to the valuation and resolve justified objections before officially confirming the valuation results. The concluding administrative act consists of the publicly announced official confirmation of the valuation results. To avoid incurring any legal detriment, participants should each confirm the correctness of the valuation, not only for their own land, but also for neighbouring plots and other plots that they may subsequently expect to be allocated.

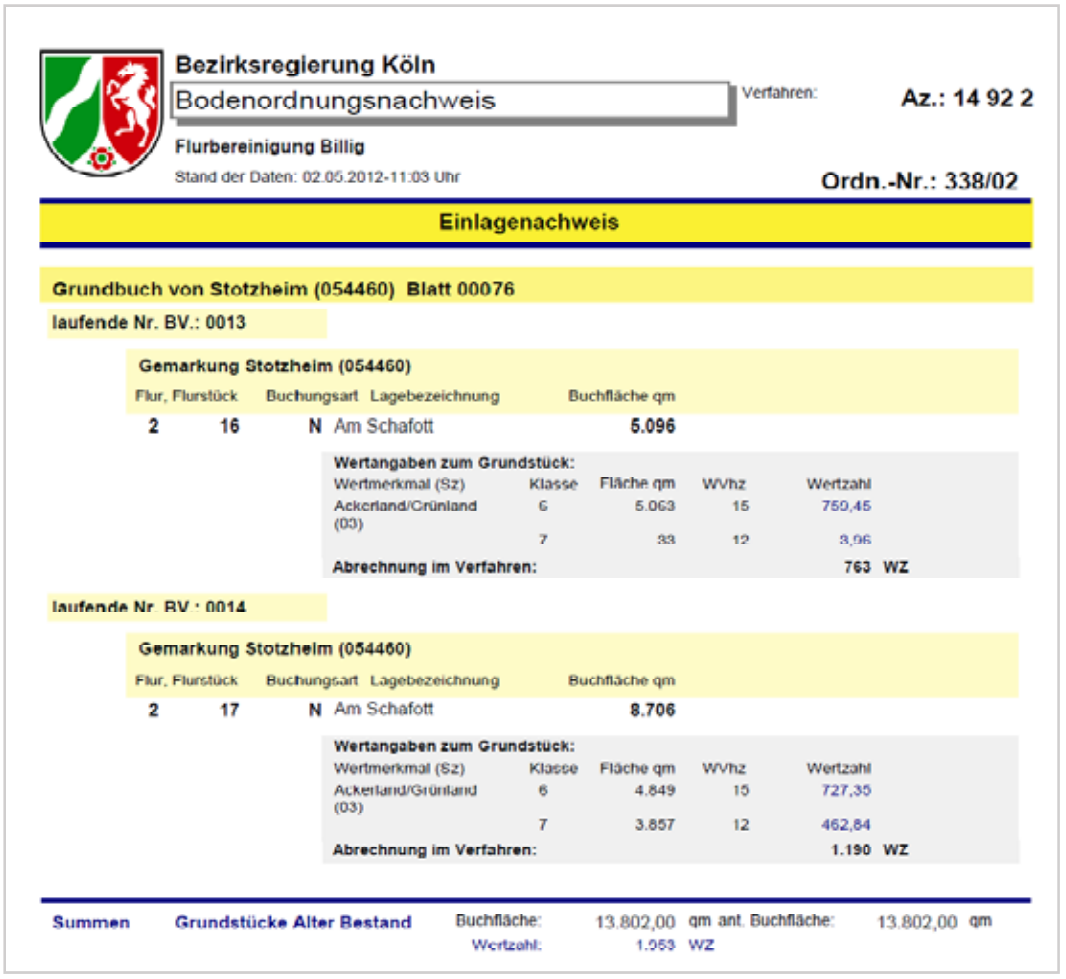
3.2.1.3 Valuation of the original plots

To value the individual plots for the remainder of the land consolidation procedure, it is necessary to value all soil unit subdivisions in the valuation map. The soil unit subdivisions within a plot of land are multiplied by the value unit for the relevant value class and added up to give the value of the plot ('valuation of original plots'). Plot sizes are generally based on cadastral register entries (section 30 of the Land Consolidation Act).

The value units assigned to a participant's original plots on the basis of the plots' size and division into classes are listed under the applicable reference number in an original plots register (*Einlagenachweis*), of which participants each receive an extract for their contributed plots of land.

The result of the valuation of original plots is the basis for calculating the land contribution (see section 3.2.5.2) and the individual compensation entitlements (see section 3.2.5.3).

Fig. 3.2-3: A personalised extract from the original plots register



Bezirksregierung Köln

Bodenordnungsnachweis

Verfahren: Az.: 14 92 2

Flurbereinigung Billig

Stand der Daten: 02.05.2012-11:03 Uhr

Ordn.-Nr.: 338/02

Einlagenachweis

Grundbuch von Stotzheim (054460) Blatt 00076

laufende Nr. BV.: 0013

Gemarkung Stotzheim (054460)

Flur	Flurstück	Buchungsart	Lagebezeichnung	Buchfläche qm
2	16	N	Am Schafott	5.096

Wertangaben zum Grundstück:

Wertmerkmal (Sz)	Klasse	Fläche qm	WVhz	Wertzahl
Ackerland/Grünland (03)	6	5.063	15	759,45
	7	33	12	3,96

Abrechnung im Verfahren: 763 WZ

laufende Nr. BV.: 0014

Gemarkung Stotzheim (054460)

Flur	Flurstück	Buchungsart	Lagebezeichnung	Buchfläche qm
2	17	N	Am Schafott	8.706

Wertangaben zum Grundstück:

Wertmerkmal (Sz)	Klasse	Fläche qm	WVhz	Wertzahl
Ackerland/Grünland (03)	6	4.849	15	727,35
	7	3.857	12	462,84

Abrechnung im Verfahren: 1.190 WZ

Summen **Grundstücke Alter Bestand** Buchfläche: 13.802,00 qm ant. Buchfläche: 13.802,00 qm

Wertzahl: 1.953 WZ

3.2.2 Plan covering the common and public facilities with accompanying landscape conservation plan under section 41 of the Land Consolidation Act

In consultation with the board of the body of participants, the land consolidation authority draws up a plan covering the common and public facilities including, in particular, the removal, alteration and construction of public ways and roads, water resource management facilities, soil improvement facilities and landscape preservation

features (roads and water resources plan with accompanying landscape conservation plan; section 41 (1) of the Land Consolidation Act).

This plan is discussed in a public hearing with the bodies representing public interests and the farmers' association (section 41 (2) sentence 1).

The plan has to be officially approved by the higher land consolidation authority (section 41 (3)).

The plan under section 41 of the Land Consolidation Act is the basis for the new layout of the plots in the reorganisation of land ownership. In form and substance, it is an agricultural sectoral plan for the development and reorganisation of a rural area. This is also evident from the process in which it is drawn up:

- The plan must take into account the requirements of spatial planning, territorial planning and guided urban development
- It must also take into account other public concerns
- The plan has to be coordinated with other sectoral planning authorities
- It requires an environmental impact assessment
- The affected institutions and parties have to be involved and heard
- The plan is officially approved by the higher administrative authority (in this case the higher land consolidation authority) with external legal effect.

3.2.2.1 Establishment of general principles for an appropriate reorganisation of the land consolidation area

In consultation with the farmers' association and the authorities and other organisations involved – including official certified agricultural advisers – the land consolidation authority establishes general principles for the reorganisation of the land consolidation area (section 38 of the Land Consolidation Act). The mandate for the land consolidation authority to reshape the land consolidation area is contained in the catch-all provision of section 37 of the Land Consolidation Act.

- Firstly, this specifies the tasks to be carried out: the area in question is to be rearranged, and scattered or uneconomically shaped plots consolidated and appropriately reshaped to meet modern farm management requirements; ways, roads, water bodies and other common facilities are to be provided; soil-conserving, soil-improving, landscaping and other measures are to be carried out to the benefit of the participants; the legal situation is to be settled; measures may also be undertaken to improve the built-up area of the village. As the broad scope of this list shows, land consolidation is understood as a comprehensive measure for the reorganisation of rural areas that aims for a wide-ranging improvement in local economic and living conditions by means of a variety of coordinated activities.
- Secondly, section 37 of the Land Consolidation Act contains various legal requirements that guide and limit the land consolidation authority in its discretionary planning decisions. These include respecting the structure of the landscape, weighing the differing interests of the parties concerned and safeguarding public interests with regard, for example, to spatial planning, territorial planning and local land-use planning. The possibility under section 37 (1) of the Land Consolidation Act of including the built-up area of a village in a

land consolidation affects urban development and agrarian interests in equal measure and makes close coordination between the land consolidation authority and the municipality essential.

The outcome of the coordinating work depends on the participation of those concerned and systematic analysis of the circumstances. Based on the assessment and analysis, the draft plan is drawn up in comprehensive dialogue with the parties concerned in the land consolidation.

The growing need over the last 30 years to take account of environmental protection, nature conservation and landscape preservation issues has created major new challenges for land consolidation officials. Human life, health and the economy depend on species and habitat diversity, clean water, pure air, healthy soil and the sustainable use of these natural assets. Land consolidation officials therefore have to negotiate between participating landowners, farmers, environmentalists and conservationists and act as intermediaries for implementation of their planning proposals.

Based on this general reorganisation mandate, and taking into account the legal requirements, technical and financial resources and local circumstances, it is first necessary to establish principles for the appropriate reshaping of the area in question. This is done in one or more separate meetings to which the bodies representing public interests are invited along with other bodies responsible for representing spatially relevant interests in the procedure area. The purpose of the procedure and the procedure objectives stated in the land consolidation decision (section 3.1.3) are explained and the invited representatives are asked to contribute their ideas. Any goal conflicts that emerge between planning objectives should be dealt with at the same meeting and a decision made (ideally by mutual agreement) on how to address them in the procedure. If the land consolidation authority goes into these discussions with an open mind as to the outcome, it is more likely to achieve the general acceptance that is essential for continuing the procedure.

So that the land consolidation authority can explore the options for any requested provision of land for public purposes (section 40 of the Land Consolidation Act) and include them in its reorganisation plan as necessary, the municipality and other bodies representing public interests must disclose their plans at an early stage and at the latest in this meeting. Binding agreement should be reached with sectoral planning authorities as to the documents to be provided. The meeting outcomes are recorded in minutes.

If a decision for or against an environmental impact assessment in the planned land consolidation has not been made at the preparatory stage (section 3.1.2), that decision must also be made at the latest in this meeting.

3.2.2.2 Preparation of the draft plan

The draft plan establishes the basic structure of the future field layout and the framework for the procedure area in terms of infrastructure and the use and development of the land. Preparation of this plan is a responsible task that challenges the planner's creativity, as the outcome will determine the outward appearance and underlying organisation of the planning area for many decades. The final plan should not only comprehensively implement the objectives of the procedure, but should also take into account the concerns of third-party developers as far as possible.

The process of compiling the draft plan begins during the preparation of the land consolidation procedure and continues through the following steps:

- Establishment of the principles for reshaping the area
- Assessment of the landscape and ecology in the planning area

- Planning of facilities and of measures to be undertaken
- Qualitative assessment of interventions in nature and the landscape and the planning of necessary compensation measures
- Finally, plan approval or plan acceptance.

The draft plan is based on topographic maps or aerial photographs at a scale of 1:5000 or larger and in digital form (section 4.2.3). These show the spatial, economic and ecological situation in the land consolidation area and are supplemented by the available sectoral plans and third-party plans relevant to the land readjustment procedure.

Because of the complexity of and spatial interdependencies between the facilities and measures to be planned, preparation of the draft plan must be approached systematically. Central importance is attached in land consolidation procedures today to avoiding interventions in nature and the landscape and to the scope and quality of any compensation measures. This is evident in present-day standards for road and river development and the general avoidance of draining. Landscape development measures are a fixed part of the land consolidation repertoire.

The planner must fully address the technical foundations of the plan and the circumstances in the procedure area. These comprise:

- Serviceability of the rural road network and traffic flow patterns; the planning objective here is a multifunctional road network and the shaping of a multifunctional agricultural landscape (Bertling, Kriese, Lütkemeier 2015) (section 4.4.3.1)
- Principles relating to the use and development of the land (section 4.4.1)
- Interrelationships in the use and development of the land between the draft plan and plan execution (section 4.4.2)
- Land development engineering measures on water bodies (section 4.4.3.5)
- Landscape preservation measures in land consolidation (section 4.4.4)
- Measures to reduce soil erosion (water and wind) (section 4.4.4.3)
- Soil improvement objectives and measures (section 4.4.4.4).

In view of the need to take into account environmental protection concerns, central importance is attached to the ecological survey and assessment of the reorganisation area. The survey results are recorded in a ‘landscape and ecology survey map’. The results of the ecological assessment are recorded in a ‘landscape and ecology assessment map’; these can also be combined in a single map if it does not compromise readability.

3.2.2.3 Environmental impact assessment and impact mitigation under nature conservation law

The measures to be carried out in a land consolidation and the required construction and modification of common and public facilities usually have an impact on nature and the landscape in the land consolidation area. Various assessments therefore have to be done in preparation of the plan under section 41 of the Land Consolidation Act:

- A general **environmental impact assessment (EIA)** under the Environmental Impact Assessments Act (*Gesetz über die Umweltverträglichkeitsprüfung*; UVPG 2021)
- An area-specific assessment for facilities and measures in the land consolidation procedure that are located in Natura 2000 areas (Habitats Directive assessment)
- A species conservation assessment to establish that construction of the common and public facilities does not have a negative impact on strictly protected species
- An assessment of the admissibility of interventions in nature and the landscape and their ecological compensability.

An environmental impact assessment (EIA) is an integral part of the procedure for preparation and approval of the plan under section 41 of the Land Consolidation Act; it is embedded in the procedure for preparation of the plan covering the common and public facilities and has the purpose of deciding the admissibility of the project. The EIA determines whether the project will have an impact on people, animals, plants and biodiversity, soils, water, the air, the climate and the landscape, cultural heritage assets and other assets. Further details on preparing and carrying out the environmental impact assessment and on the survey and assessment of nature and the landscape in the procedure area can be found in section 4.5.1.

The **impact mitigation** provisions (*Eingriffsregelung*), also referred to as impact compensation provisions (*Eingriffs-Ausgleich-Regulung*), under the Federal Nature Conservation Act (*Bundesnaturschutzgesetz*; BNatSchG 2009) comprise an instrument under nature conservation law to avoid or at least minimise the negative impacts of interventions in nature and the landscape. The aim is to conserve the current state of nature and the landscape in a project area despite planned reorganisation measures. Interventions in nature and the landscape are defined as changes affecting the shape or use of areas, or changes in the groundwater level associated with the active soil layer, which may significantly impair the performance and functioning of natural systems or significantly impair the landscape. In land consolidation, the following in particular may constitute such interventions:

- Constructing, enlarging or significantly modifying any kind of built structure, including roads, other vehicular and pedestrian areas, lines and poles, and sports and recreational facilities
- Drainage of land and any permanent lowering or raising of the water table if it may have a lasting adverse effect on living conditions for animals or plants
- Ploughing up grassland
- Removing field margins, hedges, avenues, solitary trees and any kind of woody vegetation in farmland
- Widening, significantly modifying, creating or removing water bodies within the meaning of the Water Act (*Wassergesetz*) of the state concerned

The following do not generally constitute an intervention:

- Maintenance measures on dikes, dams and other flood defences or restoring an existing area to its proper condition following damage.

Under German nature conservation law, interventions in nature and the landscape are preferably to be avoided. If that is not possible, landscape management measures must be implemented. These are known as compensation measures (*Ausgleichsmaßnahmen*) in the case of in-kind offsets and substitution measures (*Ersatzmaßnahmen*) in the case of out-of-kind offsets. Whether an intervention is admissible and in what form it must be offset has to be determined for each particular measure. Details are provided in section 4.5, figure 4.5-4.

The party causing an intervention must take precautions at all stages of project planning and implementation to refrain from causing any avoidable adverse effects. Where adverse effects cannot be avoided, the reasons must be documented and effective ecological compensation or substitution measures implemented. This adds to the burden of validation and proof in land consolidation. The possibility provided for in the Federal Nature Conservation Act of making substitution payments for interventions in nature and the landscape is not generally used in land consolidation, as it is always possible in a land consolidation to implement compensation or substitution measures for any such interventions. If a suitable ecological compensation or substitution measure really is not feasible for an admissible intervention within a land consolidation procedure, it is still possible to make use of compensation banking (see section 5.7). In practice, however, territorial authorities that use compensation banking to discharge their offsetting obligations 'top up' their compensation pools with the aid of the land consolidation authority in ongoing land consolidation procedures.

The extent of the necessary ecological offsetting measures is determined using standardised habitat type-based scoring methods (*Biotopwertverfahren*) that are specific to each German state. These are standardised methods for scoring habitat types and land use types that are mainly used to comply with the impact mitigation provisions under the Federal Nature Conservation Act and in environmental impact assessments (see section 4.5). By applying such a method, the party causing an intervention can demonstrate to the nature conservation authority that the compensation and substitution measures it plans for offsetting the intervention are sufficient and appropriate.

In the methods used for ecological assessment, a points system is usually used in which interventions in an individual habitat are quantified in 'eco-points', the points are added together over all interventions and the resulting total is matched up against the eco-points assigned to ecological compensation measures. The ecologist compares the 'before' status with a projected 'after' status reflecting implementation of the project including planned offsetting measures. If the 'after' eco-points total at least equals the 'before' total, then the statutory compensation obligation is satisfied.

All such methods work in the same way. The only significant difference between the various methods in use relates to the underlying list of habitat types and land use types and in some cases to the number of points assigned to each habitat type.

In terms of planning, compliance with the impact compensation provisions is recorded in text and map form in the accompanying landscape conservation plan. The accompanying landscape conservation plan is part of the plan under section 41 of the Land Consolidation Act.

3.2.2.4 Coordination with the board of the body of participants

The plan has to be drawn up in agreement with the board of the body of participants (section 41 (1) of the Land Consolidation Act). Accordingly, suggestions and concerns raised by the board must be taken into account in the land consolidation authority's decisions. Agreement does necessary require unanimity in all points, but it does mean sufficient discussion with the aim of reaching agreement.

The complexity of the process requires an iterative approach in which the land consolidation engineer repeatedly coordinates the plan details with the board of the body of participants and other bodies charged with planning that are involved in the project; any well-founded counterproposal affects other measures and may frequently lead to further changes in the draft plan (see section 4.5, figure 4.5-5).

When preparation of the plan under section 41 of the Land Consolidation Act is complete, the land consolidation authority is required to provide the board of the body of participants with a full briefing on its content at a final meeting. Any remaining differences of opinion must be resolved here where possible. Minutes must be taken of the meeting, recording in particular any parts of the plan on which opinions still differ and the underlying considerations.

In consultation with the board of the body of participants, the finished draft plan should also be presented to all participants in an information event.

3.2.2.5 Coordination with the bodies representing public interests

The land consolidation authority is required to draw up the plan under section 41 of the Land Consolidation Act in consultation with the bodies representing public interests, including the farmers' association. This coordination must be sought throughout preparation of the draft plan. As far as possible, differences of opinion should be resolved before the hearing (section 3.2.2.8). The plan under section 41 of the Land Consolidation Act must indicate whether facilities and determinations are subject to plan approval or are merely included for information purposes. Its constituent parts must be sufficiently clear to enable the bodies involved to determine whether and to what extent their concerns are affected by the plan.

In the event that, for reasons arising from the purpose of the land consolidation, plan approval for another project is to take place together with approval of the plan under section 41 of the Land Consolidation Act, then the other plan is incorporated into the land consolidation plan and approved with it by the higher land consolidation authority. The project developer must prepare the planning documents in accordance with applicable sectoral law and submit them to the land consolidation authority in good time for them to be incorporated into the plan approval procedure. If two or more independent projects coincide, a joint hearing is held for both projects in accordance with the Land Consolidation Act. When deciding in respect of the projects, the higher land consolidation authority must take into account the sectoral law applicable to them in the plan approval decision.

If new facilities or rights are to be created in the plan under section 41 of the Land Consolidation Act or alterations are to be made to existing public facilities for which the body of participants does not bear the cost, agreements on contribution to the costs incurred must be negotiated with the relevant entities in advance. Such agreements may also cover technical implementation and private-law relations between the parties concerned.

3.2.2.6 Public consultation

If the plan under section 41 of the Land Consolidation Act is subject to a mandatory environmental impact assessment, the land consolidation authority makes the draft plan available for public inspection in the municipalities involved in the land consolidation (section 9 (3) in conjunction with section 19 of the Environmental Impact Assessments Act). When and where the plan is made available must be announced by public notice.

The land consolidation authority takes into account any justified objections to the plan by amending it accordingly.

3.2.2.7 Preparation of the plan under section 41 of the Land Consolidation Act

On completion of the draft phase, the draft plan consists of the following:

- A cover sheet
- A map for the plan covering the common and public facilities
- The accompanying landscape conservation plan, with all information required to assess interventions in nature and the landscape, and the landscape report
- Individual maps illustrating important details
- Standard technical drawings of facilities
- Where necessary, individual technical drawings of specific facilities
- The list of facilities subject to plan approval; cross-referencing between the map and the plan is established by a numbering scheme for all facilities and measures that are the subject of legal decisions, including compensation and substitution measures
- The documents prepared for the EIA and the Habitats Directive assessment, if applicable
- The explanatory report, including the required information for impact mitigation under nature conservation law, the environmental impacts and the Habitats Directive compatibility of the plan under section 41 of the Land Consolidation Act
- Agreements and minutes
- A cost calculation and a financing plan.

The **map for the plan under section 41 of the Land Consolidation Act** (often simply referred to as a 'roads and waters map') is the core element of the plan. It is a graphic representation documenting the initial state and the reshaping of the land consolidation area. The map is required to indicate the location of facilities, their relationships to each other and to the topography, the facilities present, and the public-law situation regarding facilities subject to plan approval. The map usually has a scale of 1:5000. Individual maps and enlarged detail maps may be provided for the purposes of clarity and to illustrate important details. The part of the map that is subject to plan approval – the part in which the plan has administrative effect – incorporates the facilities to be created, altered or removed in the land consolidation procedure, where appropriate with stipulations for their construction (such as road widths, standard construction methods, road surface type and planting widths) and for the land reorganisation (such as topographic boundaries, areas of woodland to be converted to a different land use and areas for afforestation). This also includes the impact mitigation requirements resulting from the environmental impact assessment (sections 3.2.2.3 and 4.5) and all other landscape management measures planned in the common interest.

Fig. 3.2-4: Detail from the map for the plan under section 41 of the Land Consolidation Act

The map also includes, for information purposes, facilities that will remain unaltered, third-party planning procedures in progress on a different legal basis, and other pertinent information such as the planned tillage direction in each field block.

Fig. 3.2-5: Map for the plan under section 41 of the Land Consolidation Act with third-party plans and facilities to be retained

The **list of facilities subject to plan approval** specifies, for each facility, the determinations not amenable to map-based representation; in particular, these include information on future ownership, on maintenance and on compensation obligations under nature conservation law.

The **explanatory report** summarises the supplementary information provided as an aid to understanding the plan. It explains and states the reasons for the plan in generally understandable form. In particular, it must show that the various land use claims in the land consolidation area have been carefully and appropriately weighed against each other.

The explanatory report also contains the information of relevance to decision making on the environmental impacts of facilities, such as a description of the project stating its location, nature and scope, the amount of land needed, a description of the facilities and measures with which significant adverse environmental impacts are to be avoided, mitigated or offset as far as possible, any substitution measures, a description of any expected significant adverse environmental impacts, an overview, with maps, of the main alternative solutions that have been examined and the main reasons for selecting planning alternatives, the assessment of significant impacts and the compensation and substitution measures planned. This description of the environmental impacts is intended to enable the higher land consolidation authority to make a final assessment in this regard. In the case of a Habitats Directive assessment, the explanatory report is to be supplemented with an assessment of any adverse impacts on a Special Area of Conservation (SAC) under the Habitats Directive or Special Protected Area (SPA) under the Birds Directive.

3.2.2.8 Hearing on the plan under section 41 of the Land Consolidation Act

The land consolidation authority invites the bodies representing public interests and the farmers' association to a hearing with a notice period of one month (section 41 (2) of the Land Consolidation Act). Notice periods are calculated in accordance with the provisions of the German Civil Code. Recognised nature conservation organisations are not bodies representing public interests but they do have a right to participate under section 63 (2) of the Federal Nature Conservation Act and must be involved in the procedure.

The invitation must be accompanied by an excerpt from the draft plan for comment (section 41 (2) sentence 4 of the Land Consolidation Act). This must contain all determinations affecting the draft plan in text and map form. The excerpt must be self-explanatory. It must be stated in the invitation that the draft plan can be inspected in its entirety at the land consolidation authority.

The hearing has time-barring effect, meaning that objections against the draft plan must be raised at the hearing in order to avoid being barred in the remainder of the procedure (section 41 (2) sentence 2 of the Land Consolidation Act). This time-barring effect must be stated in the invitation and at the beginning of the hearing.

In the hearing, the land consolidation authority presents the draft plan and discusses any objections raised with the above-mentioned parties. The outcomes of the public consultation under section 9 (3) of the Environmental Impact Assessments Act and, if applicable, the outcomes of the Natura 2000 or Habitats Directive assessment must also be discussed.

Minutes are taken of the meeting and sent to the parties by the land consolidation authority.

3.2.3 Approval or acceptance of the plan under section 41 of the Land Consolidation Act

3.2.3.1 The plan approval decision

The plan under section 41 of the Land Consolidation Act has to be officially approved by the higher land consolidation authority (plan approval decision – section 41 (3) of the Land Consolidation Act).

Before the plan approval decision is issued, the higher land consolidation authority examines the planning documents submitted by the land consolidation authority together with the proceedings and outcome of the hearing procedure. It also examines the public consultation and the proper involvement of the recognised nature conservation organisations. Furthermore, the higher land consolidation authority verifies that the formal requirements have been complied with, that all bodies representing public interests and the board of the body of participants have had the opportunity to comment and that objections to the draft plan under section 41 of the Land Consolidation Act have been properly discussed.

If an EIA has been carried out, the higher land consolidation authority appraises, on the basis of the documents submitted by the land consolidation authority, the direct and indirect impacts of the project on the factors listed in section 2 of the Environmental Impact Assessments Act. The explanatory memorandum to the plan approval decision must indicate that the environmental impacts of the planned facilities have been appraised and that the outcomes have been taken into account in the interests of effective precautionary environmental stewardship and incorporated in the draft plan. The results must be put on record.

If an opinion of the European Commission has been obtained in accordance with section 34 (4) of the Federal Nature Conservation Act, the higher land consolidation authority must take that opinion into account when weighing project approval.

The formal requirements to be observed in plan approval are laid down in supplementary administrative regulations (see, for example, PlanFestRichtl 2002).

As part of the plan approval decision, the higher land consolidation authority decides on any objections over which no agreement was reached in the hearing. Requirements and conditions may be attached to the plan approval decision.

If specific public-law matters are not conclusively determined, or if specific facilities, built structures or other arrangements are taken out of the plan approval decision, the plan approval decision indicates the fact and states that a separate decision will be made in that regard. The deferred plan approval must be made before construction starts on the facility concerned.

Plan approval under section 41 (3) of the Land Consolidation Act has the effect of establishing the admissibility of implementation, having regard to all affected public interests. As a result of the plan approval decision, no other administrative decisions such as consent issued under public law, grants, permissions, authorisations or planning approvals are required (known as *formelle Konzentrationwirkung* – literally, 'formal concentrating effect'). Plan approval stipulates with legal effect, and thus conclusively, on all relationships under public law between the project developer and those affected by the plan under section 41 of the Land Consolidation Act (*materielle Konzentrationswirkung*, literally 'substantive concentrating effect'). However, the plan can only stipulate on facilities that come under the purpose of the land consolidation.

Plan approval or plan acceptance relates to the common facilities to be created under section 39 of the Land Consolidation Act, including all measures subsequently to be taken, and to the alteration, relocation or removal of existing facilities. It also relates to public facilities if they serve the purpose of the land consolidation or it is necessary to stipulate on them. The authority's planning freedom is constrained in substantive terms

by the objectives of the reorganisation procedure set out in the land consolidation decision (section 3.1.3), the limits of the land consolidation area, the requirement that public and private interests must be duly weighed and the requirement that all problems and conflicts caused or made worse by the project must be resolved. Plan approval includes the environmental impact assessment in accordance with the Environmental Impact Assessments Act (UVPG 2021) and compliance with the impact mitigation provisions under the Federal Nature Conservation Act (BNatSchG 2009); it also includes any species conservation assessment under EU law.

The plan approval decision is formally served upon the developer and the board of the body of participants, together with instructions on the right to appeal (section 41 (6) of the Land Consolidation Act). It is customary for the bodies representing public interests, including the farmers' association and recognised nature conservation organisations, to be notified in writing of the plan approval decision. However, they have no right of action against the decision.

Under section 9 (3) of the Environmental Impact Assessments Act, the land consolidation authority must publish the decision on approval or dismissal of the project on any environmental grounds that comprise part of the plan approval decision. Section 9 (2) of the Environmental Impact Assessments Act stipulates that the plan approval decision must be made available for inspection by the public.

3.2.3.2 Plan acceptance

If no objections are raised and none are expected, or any objections raised are settled retroactively, the plan may be *accepted* by the higher consolidation authority without a preceding formal plan *approval* procedure (section 41 (4) sentence 1 of the Land Consolidation Act). The Land Consolidation Act delegates to the land consolidation authority the plan acceptance assigned in the Act to the higher land consolidation authority. According to prevailing opinion, plan acceptance has the same effect in public law as plan approval; it therefore has full 'concentrating' effect as described in the preceding section.

Plan acceptance is not formally served upon but is informally communicated to the board of the body of participants and the bodies representing public interests, including the farmers' association and the recognised nature conservation organisations. If, contrary to expectations, objections are raised to the plan acceptance and cannot be resolved, the plan acceptance must be annulled and a plan approval procedure carried out.

Plan approval or plan acceptance is not necessary in the case of facilities subject to minimal or no alteration in the land consolidation. Cases of negligible importance are cases where the rights of others are not affected or where agreement is reached with the parties concerned; there must also be no intervention in nature and the landscape within the meaning of the Federal Nature Conservation Act.

3.2.3.3 Entry into force of plan approval or plan acceptance

The plan approval decision is binding when formally served on the parties.

The approved or accepted plan under section 41 of the Land Consolidation Act forms the basis for the forthcoming reorganisation of the land consolidation area; it constitutes the basis under planning law and permission under building law for construction of the common and public facilities by the body of participants. As soon as the developer is in possession of the required land, the construction measures can begin.

The rights of participants are unaffected by approval of the plan under section 41 of the Land Consolidation Act; their rights are only stipulated upon with legal and

conclusive effect in the land consolidation plan. With regard to the affected first and second-order participants, therefore, the plan under section 41 of the Land Consolidation Act does not enter into effect and become legally contestable until it is incorporated into the land consolidation plan (section 3.2.6) and the land consolidation plan is published.

3.2.4 Geodetic work packages in land consolidation

The reshaping of the reorganisation area requires a considerable amount of surveying work. From early in the preparation stage, the preparatory socioeconomic analysis and investigations of the planning area make use of photogrammetric and remote sensing data.

When assessing the initial situation, the spatial, economic and ecological dimensions are captured by analysis of basic geodata from the state survey service; in addition, it is necessary to incorporate sectoral planning projects relevant to the land readjustment procedure, both with regard to their location in the land consolidation area and the land requirement necessary to implement each project. Later in the procedure, soil quality is determined as part of valuation, where necessary with on-site verification of the official soil appraisal, assignment to value classes and land use classes, and generation of the valuation map. The digital valuation maps then form the basis for calculating and documenting the values of each participant's original plot(s) in the original plots register.

A further benefit of processing data digitally in land consolidation is that the results can be transferred to the cadastral register without additional work. The data should be linked into the state survey service's official coordinate system in any case. This may require the planning, investigation, marking and establishment of a new geodetic control network within the state reference system.

The basic data for the plot surveys is generated in several steps:

In the first step, the perimeter of the land consolidation area is investigated, determined and surveyed. The area of the land consolidation area is thus conclusively established.

The second step is to delineate and survey the plan covering the common and public facilities. Geodetic determination of the boundary points can also be performed in the photogrammetric stereo model or using remote sensing data.

As the third step, the valuation is transferred to the new plots and the 'level 1' allocation map (*Zuteilungskarte Stufe 1*) is generated. This is used to calculate the values of the blocks and generate the 'block subdivisions list' (*Blockteilverzeichnis*). The original plots register and the block subdivisions list can then be used to calculate the land contributions and the compensation entitlement for each participant.

In the fourth step, the compensatory land allocations are calculated. Following the preferences hearing, the allocations are calculated, the coordinates of the boundary points of allocated parcels are determined and the 'level 2' allocation map (*Zuteilungskarte Stufe 2*) is generated.

The fifth step consists of issuing the implementation order, or in the case of provisional transfer of possession, of setting out the new boundaries in the field, and delineation, demarkation and surveying of the new plots.

In the final step, the records are generated for correcting the cadastral register. These are the point and planimetric survey records (in future as ALKIS objects – see also section 4.2.3). The maps and documentation are also generated for archiving purposes for the municipality or municipalities.

How the geodetic work packages fit in with the various phases of a land consolidation can be seen in figure 3.2-6 (after Kötter; Fehres; Thomas et al. 2020), cross-referencing the land consolidation work process shown in figure 3.0-1.

Fig. 3.2-6 Geodetic work packages in implementation of a land consolidation

Work phase	Tasks to be completed	Survey and cadastral tasks (with approximate time frame in the procedure)
1. Preparation and delimitation of a planning area	Preparatory socio-economic analyses and studies of the planning area Exploratory talks	(As necessary) photogrammetric or remote sensing data for the purpose of surveying the topographic situation in the land consolidation area
2. Initiating and ordering the land consolidation procedure	Coordination between authorities (section 5 (2) and (3) of the Land Consolidation Act)	
	Informing those likely to be affected (section 5 (1) of the Land Consolidation Act)	
	Ordering the land consolidation procedure (section 4 of the Land Consolidation Act)	Determining the boundary of the land consolidation area (section 56 of the Land Consolidation Act)
	Establishing the constituent organs of the body of participants (sections 16 to 26 (e) of the Land Consolidation Act)	
3. Review of the current situation	Ascertain the spatial, economic and ecological conditions	Analysis of the basic geodetic data from the state survey service and any sectoral plans
	Identify third-party plans	Planning, investigation, marking and establishment of a new geodetic control network in the state reference system as basis for subsequent surveying of the plots
	Obtain data from the land register and cadastral register concerning the affected plots (sections 12 to 14 and 30 of the Land Consolidation Act)	
	Identify those concerned and their rights to the plots (section 11 of the Land Consolidation Act)	
	Determine the value of and ascertain the plots (sections 27 to 32 of the Land Consolidation Act)	Determination of local soil quality, where necessary with on-site verification of the official soil appraisal, assignment to value classes and land use classes, and generation of the valuation map; calculation of original plot values and documentation in original plots register (valuation of original plots)
4. Reorganising the land consolidation area	Develop the principles for reorganisation (sections 37 and 38 of the Land Consolidation Act)	
	Drawing up a plan for common and public facilities and its conclusion or approval (section 41 of the Land Consolidation Act)	Either: Delineation and surveying of the plan covering the common and public facilities Or:

<table>
<tr><td></td><td>Consultation with the participants of the land allocation (preferred planned date) (section 57 of the Land Consolidation Act)</td><td rowspan="10">Geodetic determination of boundary points in the photogrammetric stereo model or using remote sensing data.

Generation of allocation maps (level 1); valuation of new plots; determination of the land contribution; determination of participants' compensation entitlements

Calculation of allocations and of boundary point coordinates of allocated parcels; generation of allocation maps (level 2)

Staking out of new boundaries on site: delineation, (where required) demarkation and surveying of the new plots

Generation of records for the cadastral register: point and planimetric survey records (in future as objects in the ALKIS land register information system)

Request to land registry and cadastral registry to correct and certify the entry into force of the new legal status

Correction of other public records

Generation of maps and records and submission to the municipality/municipalities for archiving (section 150 of the Land Consolidation Act)</td></tr>
<tr><td></td><td>Drafting and publication of the reorganisation plan (section 58 of the Land Consolidation Act)</td></tr>
<tr><td></td><td>Preparation and publication of the land consolidation plan (section 59 of the Land Consolidation Act)</td></tr>
<tr><td rowspan="6">5. Implementing the land consolidation plan</td><td>Implementation order (section 61 and accordingly Section 63 of the Land Consolidation Act)</td></tr>
<tr><td>Arrangements for the transfer of property (sections 65 and 66 of the Land Consolidation Act)</td></tr>
<tr><td>Construction of common and public facilities (section 42 of the Land Consolidation Act)</td></tr>
<tr><td>Correction of public records (sections 79 to 81 of the Land Consolidation Act)</td></tr>
<tr><td>Decisions on legal actions (section 140 of the Land Consolidation Act)</td></tr>
<tr><td>Financial settlement of the procedure (sections 151 and 152 of the Land Consolidation Act)</td></tr>
<tr><td>6. Completion of the land consolidation procedure</td><td>Concluding determination (section 149 (1) of the Land Consolidation Act)

Delivery of concluding determination to the body of participants (section 149 (2) of the Land Consolidation Act)

Archiving of the procedure documents</td></tr>
</table>

3.2.5 Preparatory work for preparation of the land consolidation plan

The plan covering the common and public facilities provides the planning framework and infrastructure for the reorganisation of the participants' land to be carried out in accordance with the land consolidation plan.

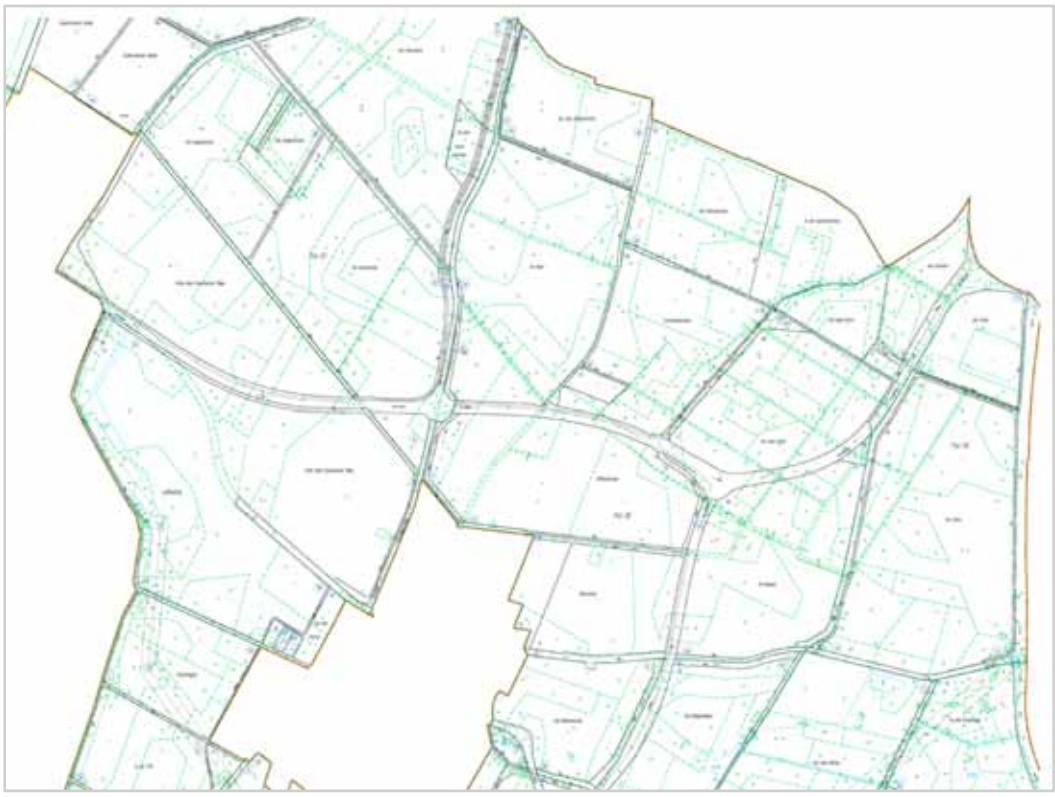
However, a sufficiently accurate planning basis is lacking at this stage for work to continue, as the plan covering the common and public facilities (generally on a scale of 1:5000) only has draughting accuracy (in the decimetre range). What is needed is a geometric basis that allows the new plot boundaries and areas to be determined down to the nearest centimetre and square metre and meets the geodetic standards of a modern cadastral register. For this purpose, the approved plan covering the common and public facilities is set out in the field and it is verified that the facilities can indeed be constructed as planned. The planned facilities are either already set out in the field at this stage or merely specified by geometric parameters or coordinates. If the future boundary points of the planned facilities have already been marked out, they are then surveyed to cadastral standards and calculated. If the boundaries have been verified on site by geometric parameters (the 'waypoint' method), it is only necessary to survey the reference points; determining the coordinates of all dependent boundary points from these is then a desk exercise.

As a rule, before work begins on surveying the setting-out plan covering the common and public facilities, a new geodetic basis for the cadastral register is established in the project area in consultation with the cadastral registry and the state survey service.

The results of surveying the approved plan covering the common and public facilities are used to generate the new cadastral map, although at this stage this only contains the surveyed objects and the points specified with coordinates (level 1 allocation map); these are the boundary points of the set-out network of roads and water bodies and those of the perimeters of landscape conservation measures that have already been specified, building points, cable or pipeline inflection points and cable poles, boundary points to be adhered to in the land reorganisation and topographic or other points significant for the allocation decisions in the land consolidation plan. The boundary points of the perimeter of the land consolidation area must also be surveyed to cadastral standards once the boundary of the land consolidation area has been determined, any shortcomings in demarkation have been resolved and the area boundary has been formally established in an administrative act.

The plot valuations recorded on the old cadastral maps must now be transferred to the new map basis (level 1 allocation map). This used to be done by hand; today it is carried out using mathematical procedures. For the transfer of the valuations from the cadastral map to the new allocation map, ground control points must be determined and also surveyed in the new geodetic system when surveying the plan covering the common and public facilities. If the procedure area includes villages or parts of villages, the level 1 allocation map also contains all boundary points agreed with participants in the reorganisation of the built-up areas, other boundary infrastructure and all building points.

Fig. 3.2-7: Detail of a level 1 allocation map



3.2.5.1 Transfer of the valuation results to the new field blocks

The final results of the cadastral map-based valuation must now been transferred to the level 1 allocation map in order to determine the values of the new plots. This requires the boundary points both of the old plots and of the soil class subunits to be available in digital form. They are digitised in vector format from the valuation map. This transfer from the original plots to the new plots is a complicated technical and mathematical process. As the geodetic basis of the old cadastral map will usually be deficient (due to different reference system(s), mapping errors, inaccuracy of the mapping method, drawing errors, map paper deformation, etc.), the data cannot just be transferred unseen into the allocation map with its highly accurate boundary point coordinates based on the new survey work. When transferring the data by hand, any divergence between the old and the new material has to be corrected by small-scale adjustments based on previously selected identical points.

Mathematical transfer is performed using a modified (two-dimensional) Helmert transformation or higher-order transformations. This requires the previously determined ground control points (from the survey work for the plan covering the common and public facilities); the point density needed depends on the quality of the cadastral record and individual experience.

It is now possible to carry out the valuation of the new field blocks. The areas of the soil unit subdivisions within the field blocks are determined and then multiplied by the respective value unit from the valuation framework. Next, the resulting figures are added together for each block and recorded in the corresponding document (the 'blocks list'). The sum total of the values of all blocks is the 'redistribution mass' (*Verteilungsmasse*). As the parcels for common and public facilities are allocated 'without value' in the land consolidation plan, these are not usually subject to valuation.

Finally, the new cadastral district subdivisions have to be delineated and the official field block and road names entered into the allocation map.

All the information needed to determine the land contribution(s) is now available.

3.2.5.2 Determining the land contribution

Land is needed for the new common and public facilities. The land for common facilities is provided from old facilities of the same type that will cease to exist and additionally by levying on participants a general land contribution (also known as a 'road contribution') in proportion to the ratio of the value of their old plots to the value of all land in the land consolidation area (section 47 of the Land Consolidation Act). This land requirement also includes areas needed for ecological offsetting measures for interventions in nature and the landscape. It is calculated as the difference between the original plot value of all plots included in the procedure and the redistribution mass remaining after surveying for the plan covering the common and public facilities. To apportion it among all participants, a percentage quotient is calculated as follows:

(original plot value – redistribution mass) / original plot value = quotient in %

The land contribution also has to cover areas or value units that participants may have to be granted in excess of their 'share' because their compensatory land allocation has shortcomings that are to be compensated in land. Shortcomings in a compensatory parcel may be irregular shape, lack of turning space at the headland of the parcel and obstacles in the form of electricity poles or individual trees. Such shortcomings constitute factors that reduce the natural soil fertility of the compensatory land allocation and therefore have to be compensated in land. In addition, additional allocations of land to participants are frequently unavoidable in a land reorganisation due to blocks that cannot be changed in size. This land requirement also has to be calculated in advance and included when calculating the land contribution. Finally, a land reserve may be set aside for contingencies. Any land surplus or deficit from resurveying the land consolidation area is likewise taken into account in the land contribution. Such a difference on surveying arises from the fact that the size of the land consolidation area as calculated from the survey results is not identical with the size resulting from adding together the plots from the cadastral register that are included in the procedure. This relates to the historical development of the cadastral register and the new geodetic basis established during surveying. The land requirement determined in this way has to be provided by all participants, without compensation.

Fig. 3.2-8: Determining the land contribution under section 47 (1) of the Land Consolidation Act (example)

		Value units (VUs)	Note
1	**Original plot values**		
1.1	Total value of all original plots in the entire land consolidation area	4,472,828	
1.2	Total value of original plots of all sub-areas*	268,952	
1.3	Total value of original plots in the land consolidation area excluding sub-areas	**4,203,876**	1.1 minus 1.2
2	**Redistribution mass**		
2.1	Value of the redistribution mass in the entire land consolidation area	4,320,004	
2.2	Total value of the redistribution mass of all sub-areas	227,365	
2.3	Value of the redistribution mass in the land consolidation area excluding sub-areas	**4,092,639**	2.1 minus 2.2
3	**Land requirement for common and public facilities**		
3.1	Land requirement for common and public facilities already delineated	111,237	1.3 minus 2.3
3.2	Land requirement for common and public facilities which are included in the plan under section 41 of the Land Consolidation Act but whose location will not be determined until allocation planning	6,961	
3.3	Land requirement for common and public facilities which are included in the plan under Section 41 of the Land Consolidation Act but the construction of which requires the provision of value units from the redistribution mass	3,999	
3.4	Land requirement for expected additional allocations under section 44 (2) of the Land Consolidation Act	1,079	
3.5	Expected land requirement for common and public facilities	**123,276**	Sum of 3.1 to 3.4
4	**Redistribution mass to be used to meet the land requirement**		
4.1	Total value of original plots according to 1.3	4,203,876	
4.2	Total value of the parcels exempted from contributing to the land requirement	98,001	
4.3	Value of the mass to be used to meet the land requirement	**4,105,875**	4.1 minus 4.2
5	**Land contribution (deduction ratio)**		
5.1	Expected land requirement	3.0 %	3.5 divided by 4.3
5.2	Moderate contingency factor	0.3 %	Section 47 subsection (1) of the Land Consolidation Act
5.3	Final deduction ratio for meeting the land requirement for common and public facilities	**3.3 %**	

* A separate calculation based on the above method is to be carried out for each sub-area with a different ratio to the general land deduction.

The land consolidation authority must exercise great care in determining the land contribution because an incorrectly determined land contribution could prevent successful completion of the reorganisation procedure. If the calculated land contribution is too small, a deficit will appear in the redistribution mass towards the end of the allocation planning process; allocation planning usually then has to be discontinued and the land contribution recalculated. In some cases, work can continue using land acquired (for other purposes) from participants who, under section 52 of the Land Consolidation Act, have waived compensation in land in favour of monetary compensation; the cost of this would have to be met proportionately by all participants. If the calculated land contribution is too large, using the excess in calculating the participants' respective compensation entitlements would be tantamount to an expropriation, which is unlawful in land consolidation and would result in the land consolidation plan being annulled if challenged in court.

The land contribution is determined by the land consolidation authority in the land consolidation plan and as such does not require consultation with the board of the body of participants; it is nevertheless advisable to inform the board of the body of participants about the size of the land contribution and the factors determining it.

Land required for public facilities is to be provided first of all from old facilities of the same type that will cease to exist and then the remainder from instances where participants accept monetary compensation in place of compensation in land (section 52 of the Land Consolidation Act) in favour of the public body responsible for the facilities, together with land contributed by the latter to the procedure. In addition, under section 40 of the Land Consolidation Act, land may be "contributed on a comparatively small scale" from the land not required for the compensation of participants, if necessary via an increase in the land contribution under section 47 of the Act. According to supreme court rulings on the Land Consolidation Act, a charge on participants or an increase in the land contribution (in favour of all public facility providers taken together) in the amount of 1.5% of the procedure area qualifies as still being "on a comparatively small scale". For land provided under section 40 of the Land Consolidation Act, the public providers concerned must pay an appropriate sum to the body of participants, usually corresponding to market value. This sum of money, which is accounted for under 'own contributions from the body of participants', thus reduces the size of the land consolidation contributions otherwise to be provided by participants (section 4.8.1).

The size of the land contribution is around 5% of the original plot values in an initial consolidation and less than 2.5% in subsequent consolidations; in sub-areas where the land requirement is exceptionally large or small, the contribution can be set at a different level to the remainder of the procedure area (sections 47 (2) and (3) of the Land Consolidation Act). Unless exempted, all participants must provide a share of the land contribution as its use is in their general interest, notably due to the construction of common facilities. If that is not the case in a particular instance, individual participants may be exempted in whole or part from contributing their share (section 47 (3) of the Land Consolidation Act).

Provision of the land contribution does not constitute an expropriation or compulsory purchase. This is because the land contribution primarily benefits participants: the newly constructed facilities result in a general increase in the value of the compensatory plots and participants become co-owners of undivided fractional shares (*ideelle Miteigentümer*) of the common facilities.

If the land requirement for public projects cannot be met by following the above principles, either the procedure must switch to a procedure under section 87 of the Land Consolidation Act (land consolidation for a project of public interest) – provided that the remaining criteria for such a procedure are met (see section 5.1) – or the provision of land must be restricted to the quantity available.

3.2.5.3 Determination of compensation entitlements

Under section 44 (1) of the Land Consolidation Act, participants are each entitled to receive land of equal value in compensation for their plots of land included in the procedure while taking into account the land contribution to be provided under section 47 of the Act. Once the land contribution has been determined, each participant's individual compensation entitlement is calculated as follows:

$$CE_i = OPV_i – (OPV_i \times LC/100)$$

where CE_i is the compensation entitlement of participant (i), OPV_i the original plot value of participant (i) and LC the percentage land contribution.

The compensation entitlement for original plots that have been exempted from the land contribution is equal to their original plot value (OPV).

Where a participant's original plots are in two sub-areas A and B with different land contributions reflecting differing development needs, the compensation entitlements for the parcels in those sub-areas are determined separately and then added together to obtain the final compensation entitlement.

If a participant has waived compensation in land under section 52 of the Land Consolidation Act or entered into other arrangements, either with the body of participants or directly with other participants, then this is taken into account by increasing or decreasing the compensation entitlement for the participant concerned.

3.2.5.4 Preferences hearing

Before preparation of the land consolidation plan, landowners and holders of heritable building rights (see section 2.2.3) must all be heard with regard to their ideas and preferences for the reorganisation of the land (section 57 of the Land Consolidation Act). This is known as the preferences hearing (*Planwunschtermin*). If a plot is let, it may be expedient for the landowner to take the tenant along to the hearing, because this is the best opportunity to balance landowners' interests with tenants' generally farming-related preferences regarding the reorganisation of the farmland. To benefit as much as possible from a land consolidation, farmers should decide beforehand on their future business plans and if necessary seek advice. If the interests of landowner and tenant prove irreconcilable, the owner's preferences for the land consolidation authority's allocation decision take precedence over those of the tenant.

The preferences hearing is a 'must'; omitting a participant can lead to annulment of the land consolidation plan if the participant files a complaint on grounds of not having been heard. Irrespective of how the hearing is organised in procedural terms, it should be approached not as a mandatory formal act, but as an opportunity to incorporate the individual preferences of the parties concerned as input into the procedure, as this is pivotal to the success of the land reorganisation. The hearing must therefore be carefully prepared. The following must be available at the hearing:

- The participants' register and documents obtained in the meantime verifying participants' rights
- The valuation results, valuation map and original plots register
- The compensation entitlement calculation for each participant (section 3.2.5.3)
- Overview maps showing the colour-keyed tenure status of the larger farms (distinguished according to ownership and lease) ('tenure maps')
- The plan covering the common and public facilities with accompanying landscape conservation plan (section 3.2.3)
- If already available, the new level 1 allocation map.

Preparation of the hearing also includes decisions on timing. The team conducting the hearing will decide in advance on the order in which participant are to be heard, the total time needed, the thematic agenda and the structure of the minutes.

It is essential that the following matters be dealt with in the hearing:

- The ownership and letting status must be verified and discussed
- Powers of representation and attorney must be clarified
- Owners must each be heard regarding their preferences for the reorganisation of their land
- Any legal representations must be put on record (on matters such as rights to be abolished, division of co-ownership, waivers of compensation in land under section 52 of the Land Consolidation Act and so on).

Any participants who waive all or a portion of their compensation in land may be granted monetary compensation in its place. Such a waiver may also be in favour of another participant (such as the municipality or a sectoral planning authority) in order to meet the land requirement for certain public measures. Acceptance of land compensation waivers should be put on record by the land consolidation authority before preparing the land consolidation plan. If the land consolidation authority has a waiver on record and the waiver is irrevocable, a bar on disposition is entered in the land register at the authority's request and the monetary compensation is then payable immediately by the body of participants – or in the case of a waiver in favour of a third party, by the third party – before the land consolidation plan enters into effect (section 52 (2) and (3) and section 53 (1) of the Land Consolidation Act). The bar on disposition is intended to ensure that participants who have waived compensation in land for their land holdings are no longer able to avail themselves of that land until the waiver has been taken into account in the land consolidation plan.

The decision directing that a land consolidation procedure is to be carried out does not restrict general land transactions in the procedure area. All participants can buy or sell plots of land as if no land consolidation were being contemplated. Following any transfer within the land register, the land consolidation authority is notified and adjusts its registers and lists accordingly. However, purchasers must accept the consequences of the land consolidation procedure as so far implemented (section 15 of the Land Consolidation Act); the same applies for any party who causes rights to plots of land to be established while the procedure is in progress. Legal successors are thus tied to

binding legal representations given by their legal predecessor, such as the latter's acceptance of the valuation results or of the published land consolidation plan. This helps to expedite the entire land consolidation.

Until the new legal status enters into force (with the implementation order), participants continue to have the right of alienation in respect of the plots of land they contribute to the procedure (the 'original plots'). After that, the right of alienation switches to the compensatory plots. At most, difficulties are caused for land transactions in the time from the publication of the land consolidation plan and transfer of ownership to the entry into force of the new legal status, as this is a period of time when the original plots still exist in legal terms, but the transactions entered into by the parties in economic terms relate in many cases to the compensatory parcels. In such instances, it is essential that the land consolidation authority be involved in any planned land transactions (sale, mortgaging, etc.).

Also at the preferences hearing, the land consolidation authority will present its own ideas for the reorganisation, which by this stage may have crystallised as far as a preliminary draft allocation. It should nevertheless be clear to all involved at the time of the preferences hearing that it is no more than a hearing in which the participants express their preferences and that, with a view to equal treatment of all participants, such preferences cannot have any binding force for the land consolidation authority. In isolated instances, it may be expedient for a binding agreement to be made in advance of the compensatory land allocation. This most frequently comes into play when agreements permitting construction are needed for the purpose of completing important new road links in advance; such arrangements should remain the exception, however.

3.2.6 The land consolidation plan

After these preliminaries, the land consolidation authority can start work on the land consolidation plan. This work consists of planning the land allocations, preparing the land consolidation plan with all parts of the final settlement framework and publishing the plan.

3.2.6.1 Draft allocation

Following the preferences hearing and calculation of the land contribution and of the compensation entitlements, the land consolidation authority begins planning the land allocations, determining in terms of location and value where participants each receive their compensatory land allocation(s). Based on the calculated compensation entitlements, the level 1 allocation map and the parties' preferences, the compensatory allocations are computed and the coordinates calculated for the new boundary points (section 3.2.4).

Delimitation of the new parcels and their apportionment to individual participants are at the discretion of the land consolidation authority. The following principles must be observed in the exercise of this discretionary power:

- All participants are entitled to receive land of equal value in compensation for the land they contribute (section 44 (1) sentence 1 of the Land Consolidation Act).

- The equal value criterion must be met in the compensatory land allocation not only in terms of value units from the formally adopted valuation, but also with regard to other factors that have a substantial influence on the use and exploitation of the land (with regard, for example, to shape, size and distance from the farmstead; section 44 (1) and (2) of the Land Consolidation Act). This criterion does not apply to individual plots, but in an overall analysis for each land holding listed under a reference number in the original plots register. Individual shortcomings in a participant's compensatory allocation can also be offset by advantageous factors, but not by general benefits from land consolidation for which the participant has to provide a land contribution and monetary contributions.
- Compensatory land allocations must be provided in plots that are as large as possible, are accessible by a road suitable for vehicular traffic and have any necessary arterial drainage (for surface water) (section 44 (3) of the Land Consolidation Act).
- Farmyards, built land and certain other facilities may only be altered subject to specific conditions and usually only with the consent of the parties concerned (section 45 of the Land Consolidation Act).
- Compensatory land allocations should be structured for maximum possible benefit while sharing the benefits as appropriately as possible among all participants. This follows partly from section 44 (2) and (3) of the Land Consolidation Act, partly from the requirement that public and private interests must be duly weighed and also from the equal treatment principle under article 3 of the German Basic Law. The latter principle is not satisfied by the mere fact of all participants receiving compensation of equal value.

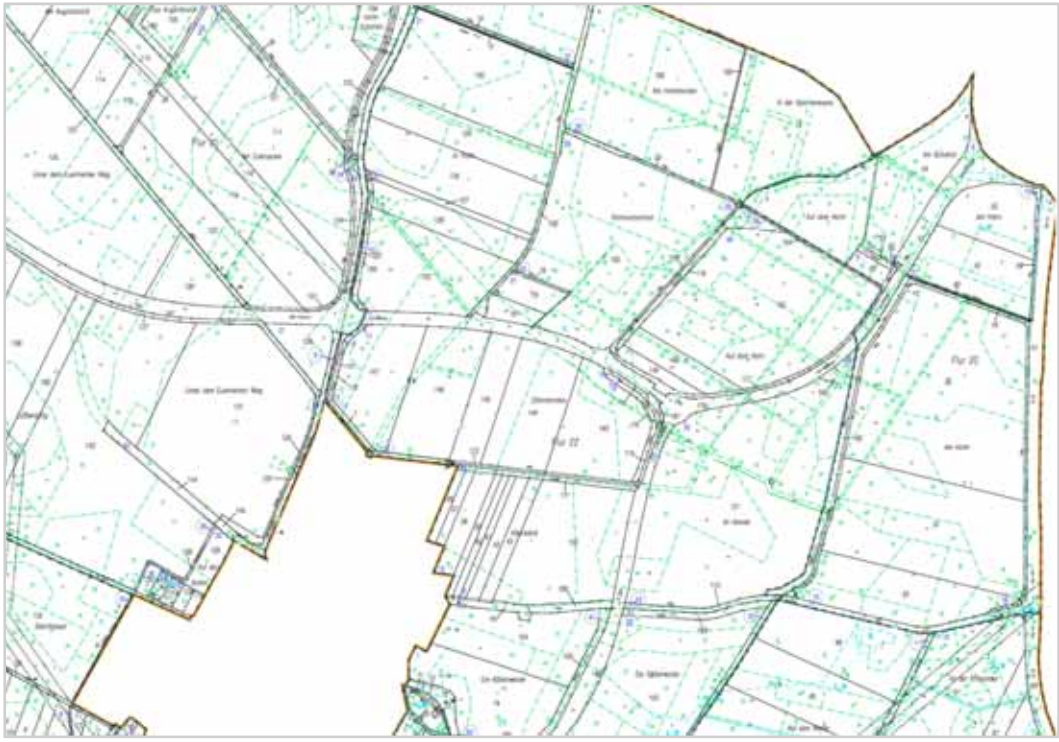
In accordance with the above principles, the land consolidation authority assigns the compensatory land allocations for individual participants to the blocks available for distribution, computes them in proportion to each participant's compensation entitlement and incorporates them in the land consolidation plan. This is usually an iterative process targeting the optimum allocation of compensation entitlements to blocks (taking into account the expressed preferences and avoiding under-allocations and over-allocations for individual participants). Given the multitude of possible alternatives, this is a task suitable for assignment to a project team, and that is frequently also what happens in practice. However, it is important for allocation planning to be centrally coordinated by the project manager and for the draft allocation plan to be a consistent whole. This process of allocating land of equal value in compensation for the original plots does not constitute an expropriation or compulsory land swap, but a reshaping of land ownership that is provided for in statute law; statutory land readjustment is an instrument for determining the substance of the right to property (see, for example, Schwantag; Wingerter 2008, and Thomas 2009). At the appointed time for the legal transfer, the compensatory land allocation takes the place of the original plot or plots.

Ever since information technology began to be used in land consolidation (see, for example, Thomas 2014b), there has been no lack of attempts also to automate the process of producing the draft allocation plan and thus deciding which participants are allocated what land and where. From the above considerations, it should be clear that

this decision-making process cannot be left to software alone. At best, computer software can generate alternatives for project decisions, and in particular for allocation decisions based on a predefined 'multi-criteria' decision tree (see, for example, Demetriou; Stillwell; See 2012). The decision itself should nevertheless be made by the project manager in person.

Once the draft allocation plan is ready, the final plot boundaries are determined by precise computation of the parcel areas (level 2 allocation map) and the coordinates of the boundary points are calculated; in many cases, the delineation elements for the boundary points are also calculated at this stage for the new parcel boundaries to be set out in the field.

Fig. 3.2-9: Detail from a level 2 allocation map showing the new parcel boundaries



3.2.6.2 Preparation of the land consolidation plan

The central settlement framework in a land consolidation is the land consolidation plan. In it, the land consolidation authority compiles the outcomes of the procedure in a single place (section 58 of the Land Consolidation Act). The land consolidation plan sets out the reorganisation to be carried out in the procedure for the parties concerned in a large number of coordinated provisions. In addition to the compensatory land allocations for (individual) participants, it stipulates on monetary compensation and equalisation payments, on land contributions and the obligation to provide land consolidation contributions and on legal relationships pertaining to compensatory plots and common

and public facilities or applying between participants. The land consolidation plan includes the plan covering the common and public facilities and the accompanying landscape conservation plan (section 58 (1) of the Land Consolidation Act). As well as the developer and the body of participants, approval of the plan under section 41 of the Land Consolidation Act also has binding effect on and can be contested by other affected parties (see section 3.2.3.3).

Authority to implement the plan under section 41 of the Land Consolidation Act is granted through the land consolidation plan, with implementation to take place at the point in time specified in the implementation order under section 61 of the Act (section 3.3.1).

The outcomes are compiled in the land consolidation plan, which consists of the following:

- The text part of the plan
- Participants' register
- The results of the valuation
- Original plots register
- Calculation of the land contribution and compensation entitlements
- Allocation maps
- Compensatory allocations register
- The plan under section 41 of the Land Consolidation Act
- Official declarations, agreements, contracts and expert opinions.

The compensatory allocations register (*Abfindungsnachweis*) contains, among other things, a list of the individual participants' compensatory parcels by area and value, the withheld land contribution, the ratio for the obligatory land consolidation contributions, any equalisation payments to be received or paid, with reasons, and all compensatory arrangements on matters such as outbuildings to be removed, wells to be filled in or hedges, trees, etc. to be surrendered. Participants can see the location and delimitation of the allocated parcels from the allocation map made available for inspection together with the land consolidation plan and on request can have them explained on site (section 59 (1) sentence 2 of the Land Consolidation Act).

The stipulations contained in the land consolidation plan are mainly of a declaratory nature. That is, the plan does not itself put into effect the reorganisation of the procedure area to be carried out in the land consolidation procedure, but merely establishes it in law. From the point at which the land consolidation plan becomes incontestable, separate administrative acts are required under sections 61 *et seq.* of the Land Consolidation Act in order for the reorganisation to be implemented (see section 3.3.1).

The land consolidation plan also stipulates on ownership of the common facilities and their maintenance (section 42 (2) of the Land Consolidation Act) unless ownership is assigned under other legislation (such as the Federal Trunk Roads Act (*Bundesfernstraßengesetz*) or state-level legislation on water, roads and paths). Ownership and maintenance of farm roads and other pieces of land designated for common use are usually assigned to the body of participants or another suitable entity. The latter option is advisable if the body of participants is not intended to remain in existence. However, assignment to another entity is only possible with the entity's

consent. Landscape preservation features are assigned, according to importance, location and utility, to a public provider or the body of participants. Such features can also be assigned to individual participants, but only with appropriate conditions attached; such conditions should be entered in the land register. Water bodies are designated as cadastral parcels and assigned to the owners or parties responsible for maintenance provided for in the water or roads legislation of the state concerned. If facilities are constructed in advance (see section 3.3.3), their future maintenance should always be secured before construction begins, preferably by means of an agreement in anticipation of the land consolidation plan.

The maintenance costs for common facilities are borne by the party responsible for maintenance as specified in the land consolidation plan. Maintenance costs tend to be lower following land consolidation. If the body of participants has to have maintenance work performed during or after the land consolidation, it can also meet the cost by levying land consolidation contributions.

For determinations made in the common interest of the parties concerned or in the public interest, the land consolidation plan has the same effect as municipal bye-laws. After the end of the land consolidation procedure, such determinations may, with the consent of the municipal authority exercising supervisory control, be modified or annulled by municipal bye-laws if they have outlived their purpose or if public interests so require (section 58 (4) of the Land Consolidation Act). This also allows maintenance costs subsequently to be shared appropriately among the parties that benefit. In all other respects, cost sharing continues to follow the general rules under legislation on local authority levies in the state concerned, which also apply outside of land consolidation procedures.

The text part of the land consolidation plan links together the various other parts. In addition, the land consolidation plan includes numerous other documents which contain the basis for decisions rather than decisions as such, or in which (for information purposes) the “results of the procedure” are “compiled” (section 58 (1) sentence 1 of the Land Consolidation Act.

In legal terms, the stipulating part of the land consolidation plan is an omnibus administrative act; it is made up of a large number of coordinated determinations stipulating on public-law and shaping private-law relationships and in part benefiting and in part placing obligations on the parties concerned. Under section 58 (4) of the Land Consolidation Act, determinations in the common or public interest, such as on the dedication and maintenance of rural roads, have the same effect as municipal bye-laws.

If it serves the purpose of the land consolidation, the land consolidation plan can move municipal boundaries; this also applies to county (*Kreis*), administrative division (*Bezirk*) and state (*Land*) boundaries that coincide with municipal boundaries. Any such boundary changes require the consent of the territorial authorities or states concerned (section 58 (2) of the Land Consolidation Act).

The land consolidation plan is prepared by the land consolidation authority. Due to the large variety of frequently complex and interdependent individual decisions to be made, it is a challenging task in planning and legal terms. The land consolidation plan (or more precisely, the draft plan) requires approval from the higher land consolidation authority (section 58 (3) of the Land Consolidation Act); approval is not an administrative act but an instrument of sectoral supervision. It ensures that the plan complies with the principles and objectives for reshaping the land consolidation area in the reorganisation

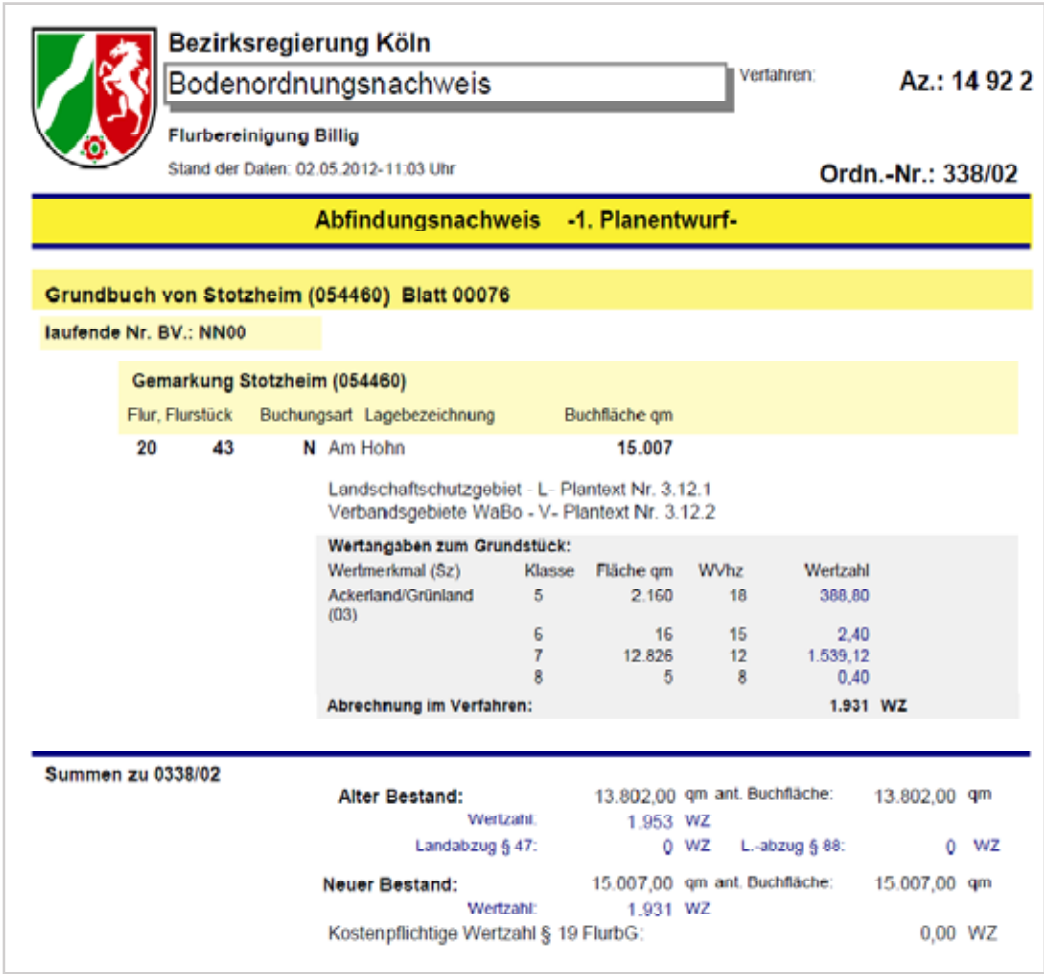
procedure (sections 3.1.3 and 3.2.2.1); because of the interlocking nature of the numerous parts of the land consolidation plan, errors in one part can have serious consequences for the whole comprehensive framework.

3.2.6.3 Publication of the land consolidation plan

The land consolidation plan must be made known to the parties concerned and the new field layout explained on site (section 59 (1) of the Land Consolidation Act).

Publication of the land consolidation plan does not have to take any specific form; it generally takes place by making the plan (text part, maps and registers) available for inspection by participants and by formally serving on each participant a personalised extract from the compensatory allocations register.

Fig. 3.2-10: A personalised extract from the compensatory allocations register on publication of the land consolidation plan



Bezirksregierung Köln

Bodenordnungsnachweis

Verfahren: Az.: 14 92 2

Flurbereinigung Billig

Stand der Daten: 02.05.2012-11:03 Uhr

Ordn.-Nr.: 338/02

Abfindungsnachweis -1. Planentwurf-

Grundbuch von Stotzheim (054460) Blatt 00076

laufende Nr. BV.: NN00

Gemarkung Stotzheim (054460)

Flur	Flurstück	Buchungsart	Lagebezeichnung	Buchfläche qm
20	43	N	Am Hohn	15.007

Landschaftsschutzgebiet - L- Plantext Nr. 3.12.1
Verbandsgebiete WaBo - V- Plantext Nr. 3.12.2

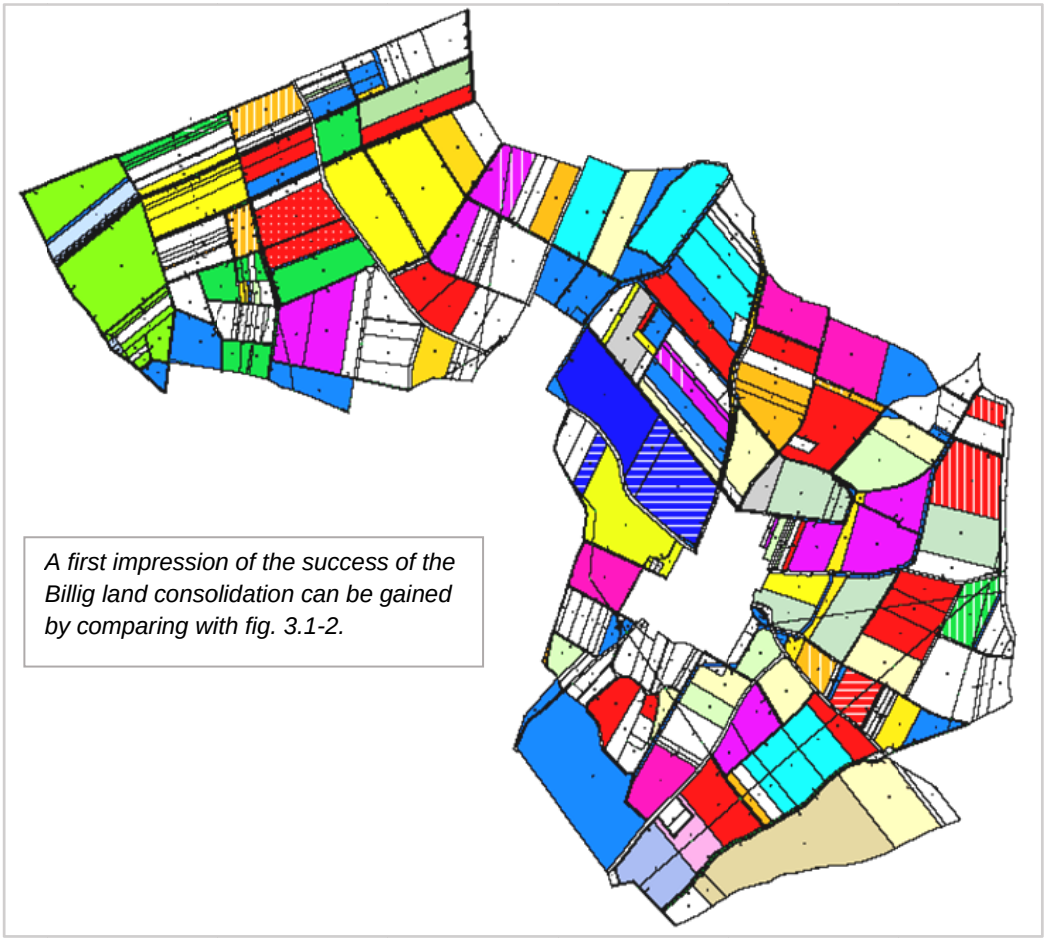
Wertangaben zum Grundstück:

Wertmerkmal (Sz)	Klasse	Fläche qm	WVhz	Wertzahl
Ackerland/Grünland (03)	5	2.160	18	388,80
	6	16	15	2,40
	7	12.826	12	1.539,12
	8	5	8	0,40
Abrechnung im Verfahren:				**1.931 WZ**

Summen zu 0338/02

Alter Bestand:	13.802,00 qm	ant. Buchfläche:	13.802,00 qm	
Wertzahl:	1.953 WZ			
Landabzug § 47:	0 WZ	L.-abzug § 88:	0 WZ	
Neuer Bestand:	15.007,00 qm	ant. Buchfläche:	15.007,00 qm	
Wertzahl:	1.931 WZ			
Kostenpflichtige Wertzahl § 19 FlurbG:			0,00 WZ	

Fig. 3.2-11: Map of land ownership in the Billig land consolidation following reorganisation of the plots (source: Bezirksregierung Köln)



While the plan is open for viewing – which may be for several weeks if there are many participants – the officials responsible for preparation of the land consolidation plan should be on hand to provide information and answer questions. Due to the large number of parties concerned (generally in the hundreds and in some cases even in the thousands), it is advisable to schedule viewing dates for the parties by participants' reference numbers or by alphabetical name order. Other affected parties (such as downstream riparian landowners along water bodies and holders of other rights) should also be informed – in a data protection-compliant manner – of the opportunity to view the land consolidation plan in order for it to become binding on them.

3.2.6.4 Hearing on the published land consolidation plan

At this hearing, any party who does not agree with determinations in the land consolidation plan must raise an objection ('plan objection') for the record of the land consolidation authority, otherwise the objection will be disregarded (section 59 (2) of the Land Consolidation Act); objections may also be permitted to be lodged in writing within a specified objection period.

The parties concerned must be invited to the hearing, with the time-barring effect of section 59 (2) of the Land Consolidation Act indicated in the invitation. Participants are usually sent a written notification to attend, together with an extract from the compensatory allocations register. Additionally, they and the remaining parties concerned are invited by public notice. In all other respects, publication of the land consolidation plan is governed by state-specific rules of procedure. For parties who do not lodge an objection, the land consolidation plan becomes incontestable at the end of the hearing or the end of the objection period.

The hearing is generally held as a single hearing for all parties concerned. Following a general statement by the land consolidation authority, for practical purpose the remainder of the hearing serves solely to record objections. If the land consolidation authority expects a very large number of objections, the hearing may be spread over several days; in such cases, it is advisable to split down the total number of parties to, say, 200 reference numbers per day.

Reasons for objections are usually recorded in separate meetings, at which in many cases it is possible for the parties' objections to be resolved. The land consolidation authority must examine the remaining objections in accordance with section 60 of the Land Consolidation Act and remedy those which are justified. It will then be necessary to rethink and modify the land consolidation plan to a greater or lesser extent depending on the nature and scope of the deficiencies found and to what extent third-party compensation is involved. The land consolidation authority may also make other changes that it deems necessary at the same time, even if they affect the compensatory land allocations of participants who have not objected.

The land consolidation authority compiles a supplement to the land consolidation plan containing the changes to the plan to be made in accordance with section 60 (1) of the Land Consolidation Act and announces the changes to the affected parties in accordance with section 59 of the Act. This will usually resolve most objections, while others remain unresolved, in some cases with modified reasons. Parties who have not previously objected may now also do so if they are affected by the supplement to the plan. The land consolidation authority then examines such objections as still remain in the same way as before; any necessary changes are compiled in a further supplement to the plan and announced to the affected parties, and so on until all objections have been resolved or deemed to be unfounded in the opinion of the land consolidation authority.

Under section 60 (2) of the Land Consolidation Act, the land consolidation authority submits the remaining unfounded objections, generally all together, to the reviewing authority (see section 4.6.3.1).

3.3 The implementation phase

The implementation phase consists of all work necessary to realise the arrangements for reorganisation of the procedure area that have so far been developed in draft or plan form.

3.3.1 Implementation order and advance implementation order

If the land consolidation plan has become incontestable in its entirety, meaning that there are no longer any objections to it or objections have been submitted to the reviewing authority for decision (see section 4.6), the land consolidation authority orders

the plan's implementation in an administrative act, the **implementation order** (*Ausführungsanordnung*). The implementation order:

- Implements the transition (of ownership) to the new status in law
- Implements the transfer (of possession) in actual fact
- Places the body of participants in a position to implement the determinations and stipulations of the land consolidation plan (including the plan covering the common and public facilities and accompanying landscape conservation plan)
- Finally, provides for correction of the public records, which have become incorrect due to the entry into force of the new legal status.

The implementation order and the precise point in time at which the new legal status enters into effect must be made known by public notice (section 62 (1) of the Land Consolidation Act).

Once the new legal status has entered into effect, legally effective dispositions of the original plots can no longer be made. Dispositions can now only be made in respect of the new plots designated in the land consolidation plan. Cadastral surveying work, and in particular plot divisions, can now only be carried out on the basis of the new plots. Responsibility for performing such surveys then lies with the cadastral registry or a publicly appointed surveyor (*öffentlich bestellter Vermessungsingenieur*). The cadastral surveying data (*Vermessungsschriften*) must be submitted to the land consolidation authority. This enters the survey results into the land consolidation-specific IT system database, such as the LEFIS system. More on that in section 4.2.3.

It is advisable not only to make the implementation order known by public notice, but also to bring the published implementation order to the attention of notaries and official surveying offices operating in the region.

Implementation of the land consolidation plan can be ordered before it becomes incontestable if the land consolidation authority has submitted remaining objections to the reviewing authority in accordance with section 60 (2) of the Land Consolidation Act and a prolonged delay of implementation is likely to be severely detrimental. This is referred to as an **advance implementation order** (*vorzeitige Ausführungsanordnung*; section 63 (1) of the Land Consolidation Act). However, the remaining objections must not be likely to result in fundamental revision of the stipulations in the land consolidation plan. The land consolidation authority must therefore make this assessment carefully and responsibly. If a land consolidation plan implemented on the basis of an advance implementation order is modified and the modification is incontestable, then the modification has retroactive effect in legal terms from the date specified in the implementation order. How the modification is implemented in actual fact is specified by the land consolidation authority in transitional provisions. The parties concerned must be notified of the modification (section 63 (2) of the Land Consolidation Act).

In practice, most land consolidations today are implemented on the basis of an advance implementation order so that the great majority of participants are not deprived of the benefits of reorganising the land consolidation area – in many cases for some years – due to a few remaining objections. Implementation orders under section 61 of the Land Consolidation Act are more the exception.

The implementation order or advance implementation order is usually combined with an immediate execution order (*Anordnung der sofortigen Vollziehung*) under section 80 of the Code of Administrative Court Procedure (*Verwaltungsgerichtsordnung*; VwGO 1991).

Without delay after the (advance) implementation order enters into effect, the land consolidation authority sends a copy of the administrative act to the cadastral registry, the land registry and the real property transfer tax office of the competent inland revenue service (*Finanzamt*). This is because, once the new legal status has entered into force, legally effective dispositions of plots and rights to plots in the land consolidation area can only be made in respect of the new plots designated in the land consolidation plan.

Once the implementation order has been issued, modifications to the land consolidation plan are only possible in exceptional circumstances and subject to strict conditions (section 64 of the Land Consolidation Act). After the concluding determination (*Schlussfeststellung*; section 3.3.6), the land consolidation plan is no longer open to modification except for determinations that under section 58 (4) of the Land Consolidation Act have the same effect as municipal bye-laws; such determinations can be amended in case of need by majority vote of the elected municipal council. Correction of clerical errors, miscalculations and similar mistakes in the land consolidation plan continues to be possible at any time, including after completion of the land consolidation (section 132 of the Land Consolidation Act).

3.3.1.1 Transition of ownership

At the point in time specified in the implementation order, the legal status provided for in the land consolidation plan takes the place of the prior legal status. For this purpose, the lawmakers have made use of a construct from German civil law (specifically, from the law of obligations, law of property and inheritance law) where one asset is replaced by another, known as *dingliche Surrogation*, or *in rem* subrogation. This has direct effect *in rem* and does not require a separate act of transfer. The transition takes place outside of the land register by operation of law.

In legal terms, the transition of ownership and other rights to the plots takes place at the specified point in time. All other entitlements arising from the land consolidation plan are also established on the effective date, including, in particular, the entitlement to construction of the planned common facilities and to the stipulated equalisation payments and monetary compensation payments.

An integral part of implementing the land consolidation plan consists of safeguarding the rights of third parties. This is because the compensatory land allocation also takes the place of the original plots as regards all rights to the latter and as regards any legal relationships pertaining to them that are not annulled. Public encumbrances that run with the land, such as mandatory contributions to water, soil and dyke associations or development charges for owners of adjoining property under the Federal Building Code or under legislation on local authority levies in the state concerned, transfer to the new plots designated in the same location unless otherwise specified in the land consolidation plan; the same applies to private encumbrances that run with the land.

Third-party rights to the original plots are transferred to the compensatory plots by operation of law on entry into force of the new legal status; the transfer of such rights to the new plots to be brought about by the land consolidation authority therefore has only declaratory effect.

Rights to a plot may be annulled or established if the purpose of the land consolidation so requires (section 49 (1) of the Land Consolidation Act) or to avoid uncertainty about their legal substance. Such an annulment or establishment of rights has constitutive effect (in contrast to the solely declaratory effect of the transfer) and must therefore be stipulated in the land consolidation plan.

In the case of monetary compensation for individual participants, the land consolidation authority must, acting *ex officio*, secure the rights of creditors in accordance with the special provisions in sections 72 to 76 of the Land Consolidation Act. In order to secure the rights of creditors in the compensatory land allocation, it is sometimes necessary to separate out parcels from a participant's compensatory land allocation so that suitable cadastral units can be designated as security.

In rem subrogation also applies to public-law matters such as taxes and other public encumbrances that transfer to the compensatory plots. The land consolidation contributions also constitute a public encumbrance on the compensatory plots. In the case of building plots, the obligation to provide contributions remains in place unless otherwise specified in the land consolidation plan. The (residual) debt of a contribution burden may be capitalised and paid off in a single amount in order to avoid unnecessary administrative effort.

The assessed values of plots in accordance with the Valuation Act (*Bewertungsgesetz*; BewG 1991) for the taxation of private and business real property under the Real Property Tax Act (*Grundsteuergesetz*) remain in force until revaluation by the revenue administration. Changes arise solely where parties have received monetary compensation in whole or part as a result of waiving compensation in land under section 52 of the Land Consolidation Act. For them, the valuations must be updated as soon as ownership has transferred. The revenue administrations in some of the German states aim in future to update the assessed values annually in the case of plots for which monetary compensation has been granted in a land consolidation procedure.

For new plots designated in the land consolidation plan as compensatory land allocations under sections 44, 48 or 49 (1) or as common facilities under section 42 (2) of the Land Consolidation Act, the transition of ownership to the new plots is not subject to real property transfer tax (*Grunderwerbsteuer*) under section 3 no. 1 of the Real Property Transfer Tax Act (*Grunderwerbsteuergesetz*; GrEStG 1997). In the case of an over-allocation in private ownership with a monetary value exceeding €2,500, the recipient must pay the statutory real property transfer tax. The same applies to allocations of land for settlement purposes under section 55 of the Land Consolidation Act. Liability for real property transfer tax is incurred at the point in time as specified in the implementation order when the legal status provided for in the land consolidation plan takes the place of the prior legal status. Details of tax matters relating to land consolidation are covered in ARGE Landentwicklung (2002).

3.3.1.2 Transfer of possession

Possession of the new plots is normally transferred together with ownership under the implementation order (section 61 of the Land Consolidation Act) or advance implementation order (section 63), in that participants are simultaneously assigned possession. As a sort of 'mass switcharound' of participants from old to new plots, transfer of possession is organisationally one of the most difficult stages of the land consolidation procedure. The land consolidation authority and its staff need to be especially ready to help and broker compromises in order to deal with any problems that arise in the transition.

The substantive transfer of the plots is governed by transitional arrangements specified when assigning possession (sections 62 (2) and 66 of the Land Consolidation Act). Based on the land use on the original plots and the crops growing on them, these transitional arrangements specify dates for the transfer of possession and general provisions for handover, temporary continued use and/or removal of tree stands and other vegetation, built structures and pasture fences. They can also require participants to temporarily tolerate construction works carried out on the new plots by the body of

participants. Because the transfer date needs to be selected with due regard to regional cultivation and harvesting patterns, the transitional arrangements must be discussed in detail with the board of the body of participants and the local farmers' association representative. The transitional arrangements are made available for inspection by participants at the municipal administrations of the municipalities involved in the land consolidation and/or at the premises of the board of the body of participants. When and where they are available for inspection has to be made known by public notice (section 62 (3) of the Land Consolidation Act); in some cases they are printed in full in the official notice, even if they run to many pages.

Like the land consolidation plan, the transfer of possession and the transitional provisions contain numerous coordinated determinations, in part benefiting and in part placing obligations on a large number of participants. Due to interdependencies between the individual arrangements made, transfer of possession can usually only enter into effect simultaneously for all parties concerned. That not only requires an immediate execution order under section 80 of the Code of Administrative Court Procedure, but also makes it more difficult to remedy any legal shortcomings in the transfer of possession. Because objections lodged or actions brought by individual parties cannot usually be resolved by simply annulling the stipulation affecting them, as is possible in a bilateral legal relationship, but only by simultaneous consequential stipulations for all others affected by the annulment or modification, it may be impossible – or disproportionate – to remedy individual shortcomings at short notice. Accordingly, appeals against the provisional transfer of possession are mostly unsuccessful, especially when they are about compensation matters; complaints of this kind belong in the appeals procedure against the land consolidation plan and, if justified, should be resolved by a supplement to the plan (see section 3.2.6.4). The solutions reached with regard to transfer of possession in such plan supplements are implemented, or implemented in advance, by supplementary orders to the transfer of possession. Such supplementary orders are subject to the same legal requirements as a provisional transfer of possession.

With regard to the order for transfer of possession, a party cannot plead interference with possession (*Besitzstörung*) under section 862 of the German Civil Code unless there is such a huge mismatch between the contributed land and the land received in compensation that the party's farm can no longer effectively remain in business.

As the new plots usually have different boundaries to the old, they often still have to be made ready for cultivation by creating entryways or crossings, for example, or by fencing in grassland. Where such plan-specific land preparation measures (*Planinstandsetzungsmaßnahmen*) are necessary in order to provide compensation of equal value, they are the responsibility of the body of participants. Finally, the demarkations of the original plot boundaries must be removed as they can get in the way of tilling in the new boundaries. Unless otherwise specified in the land consolidation plan, they may only be removed by the recipients of the new plots once the new legal status has entered into effect. This should therefore be dealt with in the transitional provisions in the case of an advance transfer of possession.

Transfer of possession in a land consolidation more or less inevitably places many parties at a temporary disadvantage or inconvenience. This may take the form of a temporary shortfall in the compensatory land allocation that is only rectified in a supplement to the plan or of the land being temporarily made more difficult to farm. In the first instance, the temporary disadvantage is compensated for in full under section 51 (1) of the Land Consolidation Act, either in money or by other means such as temporarily providing alternative land. In the second instance, compensation is only provided to the extent that the inconvenience is significantly greater than similar inconveniences incurred

by other participants; below this threshold, which varies from procedure to procedure, the general inconveniences that go with transfer of possession are deemed to be offset by the benefits of the land consolidation and have to be borne without compensation.

3.3.1.3 Keeping of the official register of plots of land

From the entry into force of the new legal status until submission of the land consolidation plan documents to the cadastral registry, the land consolidation plan serves as the official register of plots of land within the meaning of section 2 (2) of the Land Register Code (Grundbuchordnung; GBO 1994). The land consolidation authority is therefore the keeper of the official register of plots of land for the land consolidation area during this time. Entitled parties may request extracts from the land consolidation plan from the land consolidation authority. These are charged at cost. The land consolidation authority prepares the necessary surveying documents for any cadastral surveying work, which at this stage of the procedure is carried out on request by the cadastral registry or a publicly appointed surveyor, and after completion of the work incorporates the cadastral surveying data into the land consolidation plan as the official register of plots of land. It also issues notifications of changes in the cadastral register (Fortführungsmitteilungen) and any notifications of parcel division (Abschreibungsunterlagen); further details are provided in section 4.2.3.3.

3.3.2 Setting out of the new plots in the field

Directly after approval of the plan under section 41 of the Land Consolidation Act, the planned facilities are set out in the field unless they have already been marked out in preparation of the level 1 allocation map. The planned facilities are either already marked out with boundary stones in the field or – usually the more expedient approach – merely specified by geometric parameters or coordinates. Next, the marked out boundary points of the planned facilities are surveyed in accordance with cadastral requirements so that they can later be incorporated into the cadastral register without additional work. Even if the points are only marked by wooden stakes, it makes sense at this point already to generate boundary point coordinates in the official reference system that are suitable for transfer to the cadastral register.

The coordinates of the boundary points of the new plots generated when preparing the land consolidation plan (section 3.2.6.2) are set out in the field either in the course of provisional transfer of possession under section 65 (1) of the Land Consolidation Act (section 3.3.3) or in conjunction with the presentation of the land consolidation plan (section 59 of the Act) (section 3.2.6.3). As a rule, the points are marked out with boundary markers.

In some German states, the requirement to mark out with boundary stones can be waived with the landowner's consent. This consent can be obtained at the preferences hearing.

3.3.3 Provisional transfer of possession

Once the land consolidation plan has been published, the land consolidation procedure takes on a momentum of its own. Most parties now want to see the status put into effect that everyone has been working towards over the past few months. In concrete terms, this means the parties finally want to take possession of their consolidated and favourably laid-out plots of land, and to be able to access them on good new roads. On the face of it, there is a legal obstacle to this in that the land consolidation plan is not final and incontestable for as long as individual participants

have objections pending against the plan or its determinations and the land consolidation authority has not finished dealing with them.

For this event, section 65 of the land consolidation act provides for 'provisional transfer of possession' (*vorläufige Besitzeinweisung*):

The land consolidation authority may order provisional transfer of possession if it is likely to take a long time to deal with objections filed following publication of the land consolidation plan but the parties need to start farming their compensatory parcels and work urgently needs to start on constructing the common and public facilities. This transfer of possession can also take place before final completion of the land consolidation plan. Before it can be ordered, section 65 of the Land Consolidation Act requires that boundaries of the planned compensatory parcels have been marked out in the field with wooden stakes or marked out with border stones and the land consolidation authority has final records of the area and value of the new parcels. Only then is it possible to determine the ratio of each compensatory land allocation to the entire redistribution mass. So the parties know what they are and are not allowed to do when possession is transferred to the new plots, they must be notified of the new field layout no later than when the provisional transfer of possession is ordered together with transitional provisions; this takes place by making the allocation map and transitional provisions available for public inspection and/or by explaining the new layout to the parties on site, which has to be done on request in any case.

In individual cases, transfer of possession can even take place before the land consolidation plan has been prepared and published; this requires a 'provisional order' under section 36 of the Land Consolidation Act. Under section 36 of the Land Consolidation Act, the land consolidation authority is authorised to make use of land for necessary construction measures even before the general or provisional transfer of possession (under section 61 or 65 of the Act). There have to be urgent reasons for such an order to be made and it is consequently usually accompanied by an immediate execution order. Its main use is for advance construction of common facilities. To this end, the facilities to be constructed in advance have to be legitimised by plan approval or plan acceptance under section 41 (5) of the Land Consolidation Act, and the purpose of the land consolidation plan must make it urgently necessary for them to be constructed before the general transfer of possession. For foregone cultivation or other (temporary) disadvantages or inconveniences caused by the provisional order, the affected parties have a right to monetary compensation (sections 36 (1) and 51 (1) of the Land Consolidation Act) or to the temporary provision of alternative land. If the condition of the plot(s) to be made use of is significant to valuation or to setting compensation, the land consolidation authority must perform the valuation in good time, if necessary with expert help, and confirm it in accordance with section 32 of the Land Consolidation Act.

3.3.4 Construction of common facilities

Unless otherwise agreed or specified in the land consolidation plan, construction of the common facilities to be created in the land consolidation procedure is the responsibility of the body of participants (sections 18 (1) and 42 (1) of the Land Consolidation Act). The same applies for other construction measures for implementation of the land consolidation, meaning the plan-specific land preparation measures necessary in order to provide participants with compensation of equal value. Construction of public facilities is up to the responsible authority. If the land consolidation plan is not yet final and incontestable, the responsible authority must obtain the consent of the land consolidation authority before starting construction (section 34 of the Land Consolidation Act; see section 3.1.3).

Fig. 3.3-1 Construction work for implementation of a land consolidation plan (photo: Thomas; Mitschang)

The legal basis and condition precedent for construction measures by the body of participants is plan approval or plan acceptance under section 41 of the Land Consolidation Act; the body of participants also has to be in possession of the land on which the facilities are to be constructed. All of the facilities to be constructed and the construction works to be carried out must be set out in terms of their main engineering and design details in the plan approval, where applicable as supplemented by the land consolidation plan. If the stipulated construction measures are not carried out, or the work is deficient or not in accordance with the plan, the affected parties may proceed against the body of participants in an objection (*Ausbaubeschwerde*) or action (*Ausbauklage*) concerning the construction measures.

Construction of the common facilities finally puts in place the necessary infrastructure improvements in the farmland and woodland.

Fig. 3.3-2: A view of individual completed common facilities provides an impression of the improvements achieved (photo: Bezirksregierung Arnsberg; KBL)

In large land consolidation procedures, the construction programme to be undertaken by the body of participants is often so extensive that it takes years to complete. Work should be timed in such a way that the parties benefit as soon as possible while minimising the (temporary) disadvantages and inconveniences. It is therefore customary in practice to construct facilities needed to link up with access routes into the land consolidation area, as well as any bridge structures, before transfer of possession in the land consolidation; however, this necessitates provisional orders under section 36 of the Land Consolidation Act.

Registration, execution and financial settlement with regard to construction measures by the body of participants are stipulated on in detail by administrative regulations of the German states, supplemented by the German Construction Contract Procedures (*Verdingungsordnung für Bauleistungen*) and other regulations on the award of public construction contracts. The body of participants normally puts out the construction works to tender and awards them to the bidder with the best offer. Following contract award, a construction contract is entered into. This requires the approval of the land consolidation authority. The body of participants will generally commission an engineering firm with **construction oversight** or **construction management and control**, where it represents the body of participants as an expert vis-à-vis the contractor. This is to be distinguished from **construction supervision**, which is the responsibility of the land consolidation authority and relates to ensuring that the contractor and developer comply with the law during construction.

Technical rules on construction of common facilities include guidelines on rural road construction (*Richtlinien für den ländlichen Wegebau*) published by the German Association for Water, Wastewater and Waste (DWA 2016/2018) and within these in particular DWA's additional technical contract terms and guidelines for the paving of rural roads (*Zusätzliche Technische Vertragsbedingungen und Richtlinien für die Befestigung ländlicher Wege*; ZTV-LW 1999). Construction measures involving water bodies are governed in some German states by state-specific rules such as the 'Blue Guideline' (*Blaue Richtlinie*) in North Rhine-Westphalia on near-natural maintenance and development of watercourses (BlaueRichtl 2010); in all other respects, good engineering practice applies.

3.3.5 Correction of public records

3.3.5.1 Correction of the cadastral register

Land consolidation authorities and cadastral registries in Germany today keep and exchange all records and maps in digital form. Land registers are also increasingly automated. This requires a different workflow for the correction of public records than that provided for in sections 79 to 82 of the Land Consolidation Act and compared with earlier administrative practice; details can be found in section 4.2.3.

Today, the cadastral register has to be corrected first. As a rule, this should take place directly after entry into force of the new legal status, with the land consolidation authority submitting the request together with the necessary inventory data and cadastral surveying data in data formats specified in agreement with the cadastral registry. In response, the cadastral registry corrects the cadastral register and marks any parcels

that are subject to appeal; for these parcels, the information is incorporated (for information purposes) in the cadastral register only provisionally pending decision of the appeal.

The cadastral registry confirms the data transfer to the land consolidation authority and sends notifications of the changes in the cadastral register (*Fortführungsmitteilungen*) to the land registry.

3.3.5.2 Correction of the land register

On entry into force of the new legal status, a transfer of rights has taken place outside of the land register; the public records are now incorrect and the land consolidation authority must cause them to be corrected.

For this purpose, the land consolidation authority first sends to the inland revenue service the documents required under section 80 of the Land Consolidation Act, except for information on the entries in divisions II and III of the land register. The extracts from the land consolidation plan are supplemented with information on taxable land allocations, on compensation in money for unavoidable land gains and on other taxable acquisitions. A list of transactions of relevance for real property transfer tax is also included. This takes the place of the officially required notifications of sale (*Veräußerungsanzeigen*). The inland revenue service sends the land consolidation authority the clearance certificates (*Unbedenklichkeitsbescheinigungen*) needed for correction of the land register. These state that the acquisition is not taxable or that the assessed real property transfer tax has been paid by the recipient of the land allocation; details on preparation of the correction of the land register can be found in section 4.2.3.3.

Correction of the land register can now proceed.

The land consolidation authority requests the land registry to correct the land register, attaching the following to the request:

- Confirmation of entry into force of the new legal status
- A certified extract of the land consolidation plan, listing:
  - The owners of the plots in the land consolidation area
  - The original plots and rights together with the compensatory allocations designated for them
  - The land allocations and the common and public facilities
- Rights to be struck out, rights to be transferred to the new plots and new rights to be registered
- The clearance certificates issued by the inland revenue authority.

German land registers today are already kept using digital land register systems (FOLIA/EGB or SolumSTAR), but the present-day IT systems do not allow for full and direct digital data interchange between land consolidation authorities and land registries. The land consolidation authority requests the land registry to correct the land register by providing the inventory data in analogue form; in some German states, it also attaches

the data in digital form in a data format agreed with the judicial administration. Next, the land registry incorporates the inventory data and the changes in divisions II and III into the land register folios and sends registration notices to the land consolidation authority. It is advisable for the land consolidation authority to double-check the registration notices to ensure that the determinations in the land consolidation plan have been incorporated in the land register completely and without errors. The land registry provides the cadastral registry with digital data records to complete the entries in the cadastral register.

Future arrangements for data interchange between the land consolidation authority, cadastral registry and land registry for the correction of public records are discussed in section 4.2.3.

If the land consolidation authority has not yet caused the land register to be corrected, participants whose rights are not expected to be affected by appeals against the land consolidation plan can apply for advance correction of the land register. The land consolidation authority then requests the land registry to correct the land register in advance by entering the new plots for the reference numbers concerned. Other than confirmation of entry into force of the new legal status, the request only has to be accompanied by the records on the applicants' original and new plots.

The procedure for such applications for advance correction of the land register under section 82 of the Land Consolidation Act is the same as for the general correction of the cadastral register and land register; this also applies if changes in the land consolidation plan and decisions on appeals have to be incorporated into the public records following entry into force of the new legal status.

3.3.5.3 Correction of other public records

Following entry into force of the new legal status, various other public records also have to be corrected as they are now incorrect; this relates to the following:

- Water rights, recorded in waters registers at water authorities (governed by the water legislation of the state concerned)
- Nature conservation areas, landscape protection areas, natural monuments, protected landscape features, protected habitats and national parks, recorded in registers at nature conservation and landscape conservation authorities (governed by the nature conservation legislation of the state concerned)
- Building encumbrances, recorded in a building encumbrance register at the building permit authorities (governed by the respective state building code)
- Listed buildings, recorded in a monuments register at the authority responsible for monuments (governed by the relevant state's monuments legislation).

A number of other land-related registers also need to be corrected that are not among the public records, including, for example, the contributions registers of soil, water and dike associations and of hunting and fishing cooperative associations. The land consolidation authority provides the data needed for correcting these registers at the request of the supervisory authority for the associations concerned.

To assist the competent nature conservation, landscape preservation, water and forestry authorities in discharging their supervisory responsibilities, these are sent plans of the facilities constructed in the land consolidation on correction of the public records (unless this has already been done at an earlier stage of the land consolidation).

3.3.6 Concluding determination

The concluding determination formally concludes the land consolidation procedure. It establishes with binding effect that the land consolidation plan has been implemented and that the parties concerned are no longer entitled to any claims that ought to have been considered in the land consolidation procedure (section 149 of the Land Consolidation Act). In addition, it establishes that the body of participants has completed its tasks in the land consolidation. The body of participants normally ceases to exist once the concluding determination becomes incontestable. If the body of participants still has responsibilities to discharge, such as paying off loans or maintaining common facilities, then it must remain in existence either temporarily or on a permanent basis. As long as it remains in existence, it may levy contributions from the land consolidation participants under section 19 of the Land Consolidation Act in order to meet its costs. The conduct of its affairs may also be transferred to the municipality; the land consolidation authority's supervisory powers then transfer to the municipal supervisory authority (section 151 of the Land Consolidation Act).

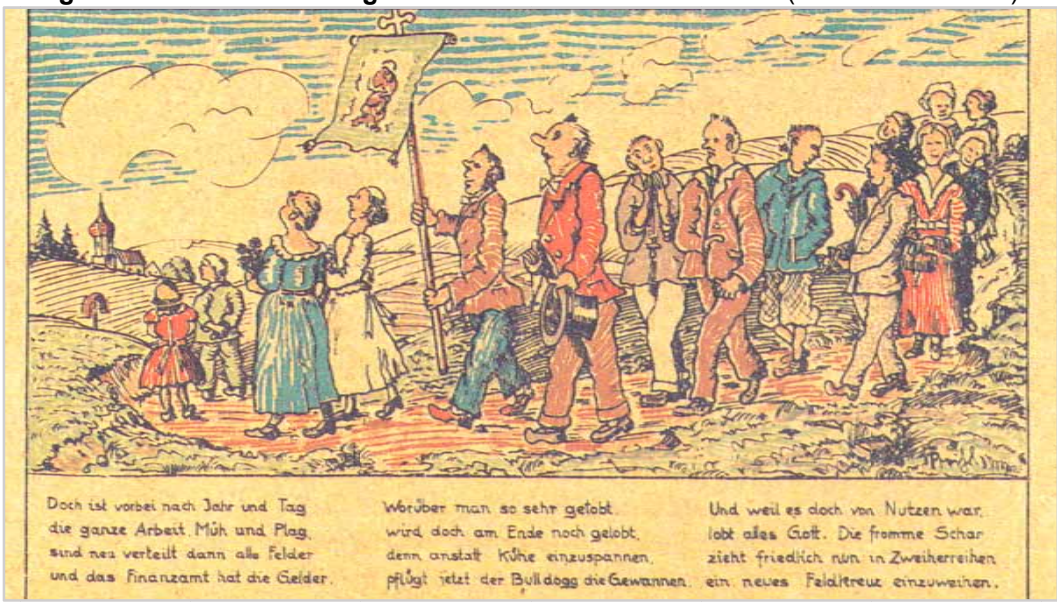
If the municipality attends to common matters (such as maintaining roads, waters and other facilities under common use or in the common interest), the regulations on municipal management, municipal supervision and the related appeals procedure apply with the necessary modifications. The municipality responsible for administration of the common facilities must ensure that they are properly maintained by the parties responsible for their maintenance. Costs incurred by the municipality for the administration of common affairs are borne by the parties concerned. The obligation to pay contributions and costs constitutes a public encumbrance on the plots of land in the former reorganisation area. Collection of contributions and costs is enforced in the same way as municipal levies.

After the concluding determination has entered into effect, parties can no longer be heard with claims under the Land Consolidation Act. The land consolidation authority has no power, either *ex officio* or on application, to retroactively change decisions made in the land consolidation procedure. It is only possible for land consolidation documents to be corrected *ex officio* under section 132 of the Land Consolidation Act for clerical errors, miscalculations and obvious mistakes in minutes of proceedings, the land consolidation plan, orders, resolutions and notices. This also applies to insignificant errors in the land consolidation plan as a result of inaccuracies in surveying documents. Manifest inaccuracies in public records are corrected in accordance with the applicable regulations.

If its work is declared complete in the concluding determination, the body of participants is disbanded (section 149 (4) of the Land Consolidation Act).

In many cases, the body of participants marks the end of a land consolidation with a church service and village fête combined with the inauguration of a commemorative stone.

Fig. 3.3-3: Commemorating the end of a land consolidation (source: F. Proisch)



After a year and a day,
all the troubles have gone away.
Redistributed are the fields,
and the taxman has the yields.

After many a rant and a brawl,
in the end came praise after all.
Where once the plough was pulled by ox,
today a Bulldog tractor works the crops.

All was good in the end
and praises to heaven they send.
So here comes the devoted band
to place this new cross in the land.

Fig. 3.3-4: Participants have commemorated the land consolidation and its importance for the development of the region for themselves and future generations with a plaque on a stone erected in the procedure area

3.3.7 Archiving of the results

Under section 150 of the Land Consolidation Act, a transcript of the concluding determination and certain land consolidation records frequently needed as subsequent sources of information (the text part of the land consolidation plan, allocation maps and the registers of new plots and of the common and public facilities) must be sent to the municipality or its supervisory authority for safekeeping. Submission of these documents should be made a matter of record. The original documents relating to the main administrative decisions in the land consolidation are given to state archives.

4 In-depth treatment of individual steps in the course of a land consolidation procedure

A number of work processes already discussed in chapter 3 require more in-depth consideration. Most of all, as well as looking at the underlying methodology, it is useful to see the connections with other rural development activities and from there to derive and gain an understanding of the resulting organisational requirements.

4.1 Development strategies, goal setting and approaches for land consolidation procedures

As a statutory land readjustment measure, land consolidation influences land tenure and land use structures in the land consolidation area and hence, both directly and indirectly, the development of the municipal community where the land consolidation is carried out. This means that right from the outset, at the preparatory stage, the objectives and measures to be implemented in a land consolidation must be developed and coordinated with the region concerned. For this purpose, the Land Consolidation Act provides in the preparation phase for a meeting for information of the parties concerned and a hearing of bodies representing public interests (see section 3.1.2). If carried out at the later planning stage, an information campaign of this kind would be too narrowly focused on agricultural land consolidation and would neglect other potential benefits to be had from integral land consolidation. A cross-sectional approach is therefore aimed for when preparing regional development measures today. One instrument that is well-suited for this purpose is the Integrated Rural Development Concept (IRDC) (*integriertes ländliches Enwicklungskonzept*, or ILEK) or, in the case of development measures extending over several municipal territories, the Regional Development Concept (*regionales Entwicklungskonzept*, or REK).

4.1.1 Cross-sectional approach in an Integrated Rural Development Concept

An Integrated Rural Development Concept (IRDC):

- Pursues an inter-agency approach that aligns the development concept derived from the analysis
  - (i) with the needs of the demographic and socioeconomic situation
  - (ii) with the principle of sustainability.
- This is best achieved through active public participation.

An IRDC marks the beginning of a long-term rural development process and provides a guiding framework for public and private planning, measures to be taken and investment and thus the basis of local development for the next 15 to 20 years.

Fig. 4.1-1: Building blocks of an IRDC

Building blocks of an Integrated Rural Development Concept
Location in the region and delimitation of the analysis area for the IRDC
Review of local/regional circumstances
Strengths and weaknesses analysis
Action areas; guiding vision for the region
Development strategy and development goals
Projects and measures (with prioritisation and funding)
(If applicable) evaluation concept

In the implementation phase, an IRDC can:

- End with individual pilot or beacon projects
  or
- Transition to a regional management body that organises the coordination and funding of development measures for the next few years
  or
- Form the basis for land consolidation measures with the goals identified in the IRDC.

4.1.2 Necessity of active public participation

Public participation and local stakeholder involvement are an essential prerequisite to and an integral part of concept development. The IRDC process must elicit, maintain and further build consensus, trust, openness to dialogue, open communication and transparency in decision making.

Fig. 4.1-2: Members of the public at an on-site meeting with municipal representatives (photo: MUNLV)

In a social system based on democratic and pluralistic values, an important role is played by civil society characterised by independent, politically and socially engaged citizens. Partnership between the state or municipality and the public is an increasingly important element of societal development. This is especially the case when rural

development measures affect the immediate surroundings and living conditions of the rural population.

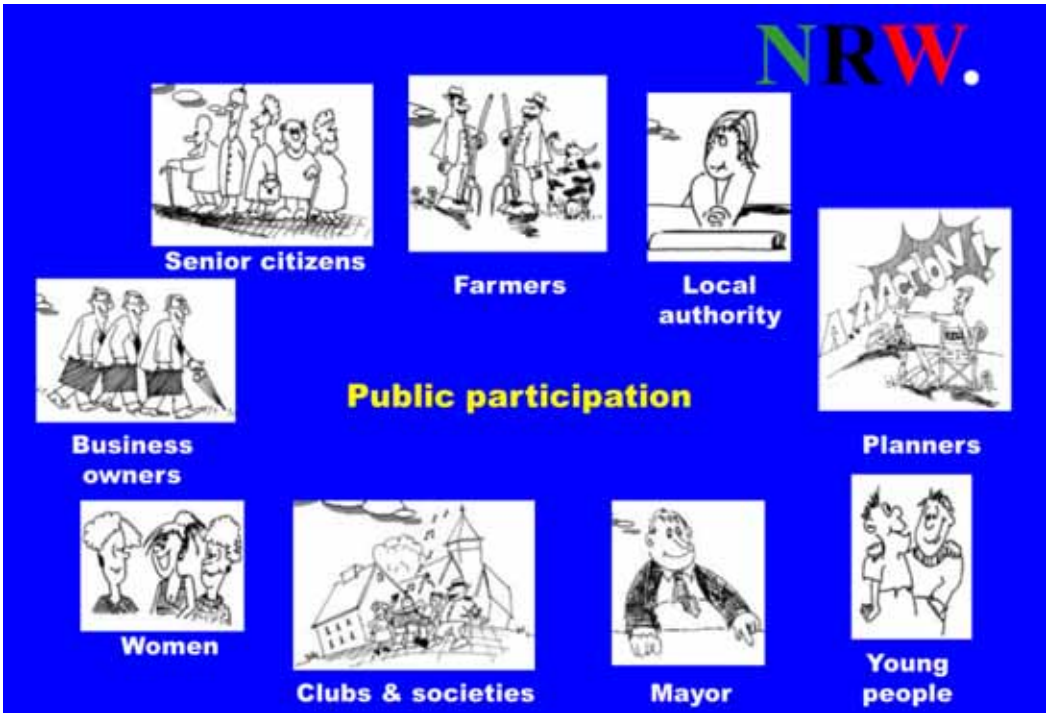
Integrated rural development can only succeed with a healthy combination of bottom-up impetus and top-down policy guidance. In the process, it is important for all interests and points of view to be given equal weight, including when representatives have opposing political standpoints.

The relevant stakeholders in a region can be identified with the aid of this non-exhaustive checklist:

- Interested members of the public (women and men, young people and senior citizens, people with disabilities)
- Local politics and administration (elected municipal and county council and councillors, mayor, municipal and county administration, relevant sectoral authorities, public transport operators, water and energy utilities and waste disposal services)
- Associations and institutions (farmers' association, rural women's association, youth associations, religious communities, nature conservation and environment protection organisations, social advocacy organisations, chambers of craft trades, chambers of industry and commerce and the tourism association)
- Business (farms, catering establishments, craft trades, retailers, the services sector and regional companies)
- Education providers (pre-schools, schools, higher education institutions, family education centres and vocational training centres).

As a fundamental rule, informal groupings are just as important as civil society organisations and public bodies.

Fig. 4.1-3: Public participation: invitation to get involved



Support from the municipal political leadership – with outspoken advocacy in the political arena – is pivotal to the success of the process. Coordination and management of an IRDC should generally be in the hands of the head of the municipal administration, which means it should be a top management priority and be supported by an interdepartmental and inter-agency steering committee. In larger municipalities and towns, it is helpful to establish a staff unit under the mayor; unless a regional management body is established, this unit can also be given responsibility for the subsequent implementation of projects and measures once they have been decided.

4.1.3 Organising broad participation in the IRDC process

Forms of participation and how work is organised for the development of an IRDC depend on the expected scope of the IRDC process, the problems to be addressed and the size of the territory. The relevant stakeholders must nevertheless be able to participate and raise their concerns at all phases of preparing and implementing the processes.

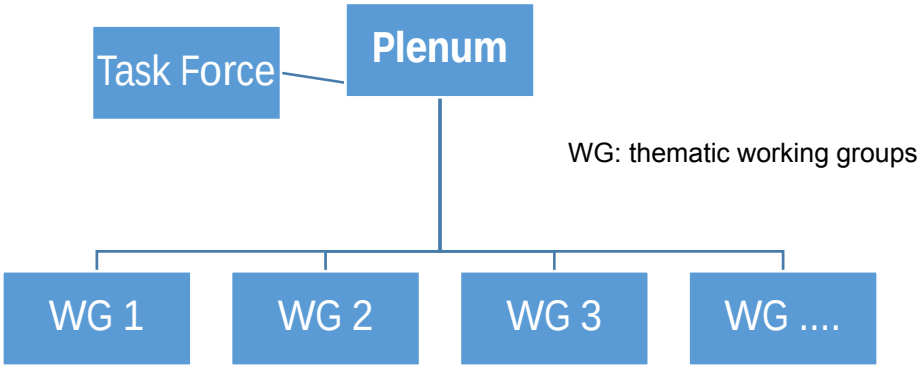
The **kick-off phase** comprises:

- Analysing regional strengths and weaknesses
- Identifying potential action areas
- Developing specific measures
- Organising workable structures.

Fig. 4.1-4: Kick-off meeting for an IRDC process (photo: MUNLV)

This can be done most effectively in a regional kick-off meeting. Because of the expected large number of participants, this needs to be carefully prepared and professionally chaired, preferably by outside experts; the latter point also applies to the steering of the remaining IRDC process. The purpose of the meeting is to discover what are the most important issues for the region and what action areas the participants will be dealing with. Ideally, thematic working groups should already be formed and their chairpersons appointed as part of the meeting. The work of the working groups and their interim and final results are then regularly discussed in the plenum.

Fig. 4.1-5: Working relationship between plenum, working groups and steering group



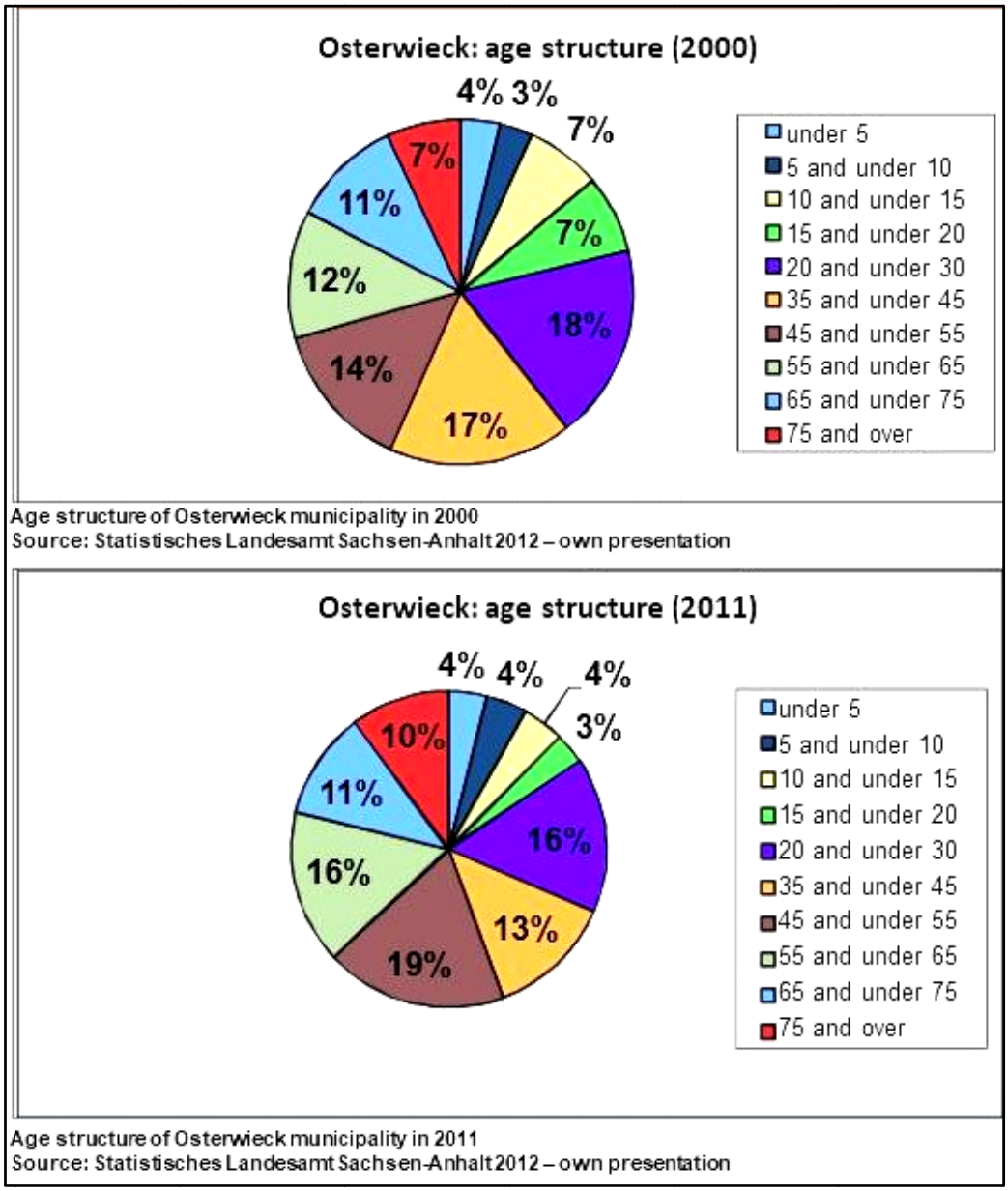
In the analysis phase, the working groups – based on a summary status review – work through the action areas specified in the kick-off meeting in a strengths and weaknesses analysis and develop them into recommendations for action.

Examples of issues usually addressed in the various action areas are set out in the following.

Demographic change in the community

- The spatial area under analysis; context of the local community in the region (e.g. urban, rural, location, centrality and spatial type)
- Current demographic situation and projections for the area, including regional distribution by district
- Strengths and weaknesses analysis (e.g. facts and figures on retail, trade and industry, agriculture, local employment, local prosperity, importance of renewable energy, education venues, family friendliness, intergenerational equity, welcomingness and tourist value)
- Degree of inter-municipal cooperation.

Fig. 4.1-6: Importance of demographic change in the community
(source: EHG Osterwieck & Huy)



Community and civic engagement

- Role of volunteering and civic engagement in the community
- Cooperation with and support for clubs and societies
- Clubs and societies as stewards of local and cultural history and providers of village amenities
- Role of the church or churches and other religious communities.

Fig. 4.1-7: Clubs, societies and religious festivals promote cohesion in the community

Potential, economic strength and value creation in the community

- What is the situation regarding retailing, trade and industry, as well as support for them?
- How do they contribute to the availability of local employment opportunities?
- Role of agriculture and, where applicable, forestry in the community/region?
- Tourism sector and tourism promotion; what tourist potential is there in the area and the region?
- Do nature and the environment hold potential for regional value creation?

Basic services

- Municipal administration services
- Basic services (retailers, tradespeople, banks, post offices, etc.)
- Healthcare (doctors, pharmacies and availability of other health services)
- Fire service and flood control.

Fig. 4.1-8: Provision of basic services
(source: www.landentwicklung.de/ziele/ilek-siegtal)

Municipality …	Eitorf		Hennef		Windeck	
a): % of the localities b): % of the population	a)	b)	a)	b)	a)	b)
with food shops	3 %	55 %	4 %	53 %	9 %	47 %
with a butcher's shop	5 %	60 %	4 %	49 %	7 %	48 %
with a bakery	3 %	57 %	7 %	56 %	9 %	50 %
without any form of immobile food supply	93 %	32 %	92 %	43 %	88 %	45 %
with a restaurant or café	21 %	80 %	25 %	80 %	34 %	78 %
with a post office	2 %	49 %	2 %	47 %	4 %	36 %
with a bank	2 %	49 %	5 %	56 %	7 %	48 %
with a family doctor	2 %	49 %	3 %	50 %	7 %	48 %
with a pre-school	12 %	78 %	15 %	67 %	13 %	57 %

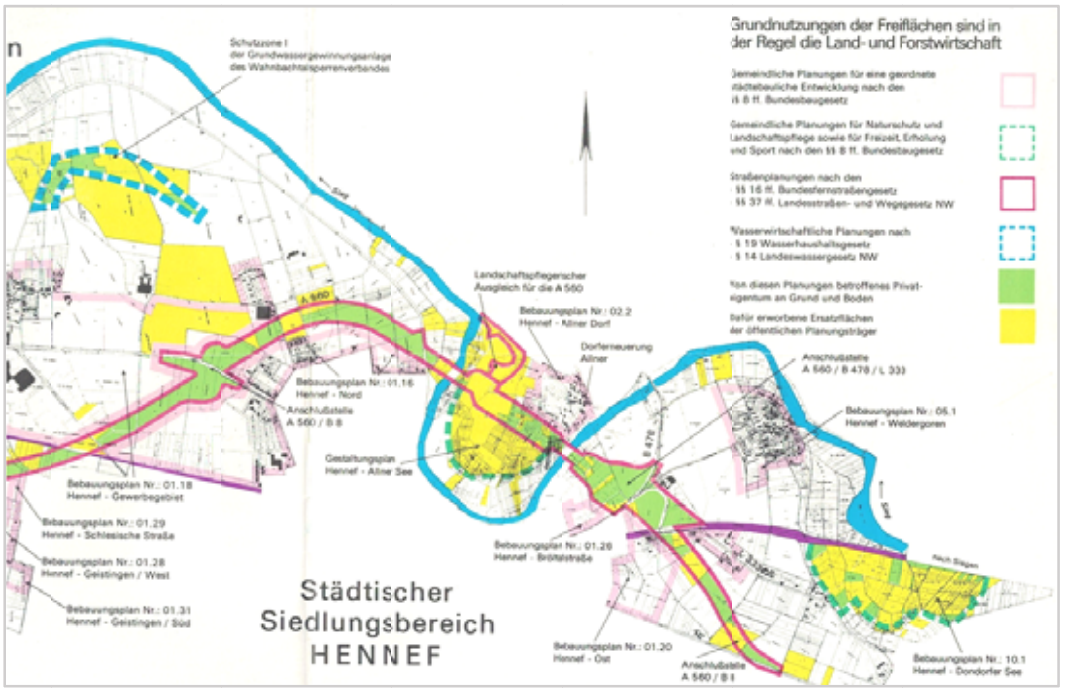
Infrastructure to meet local needs
- Road and track network, including maintenance
- Water supply and sewage disposal
- Electricity and gas supply
- Broadband provision
- Public transport and mobility
- Housing infrastructure (e.g., spatial distribution, housing market, quality of housing supply, neighbourhood management, accessibility)
- Farmland and woodland agrarian infrastructure.

Education, childcare, families and senior citizens
- Family friendliness and gender equality
- Childcare and day care facilities
- School boards and school locations
- Youth services (recreational provision for children and adolescents)
- Care of the elderly.

Recreational facilities in the community
- Sports facilities
- Cultural amenities (such as museums and libraries)
- Senior citizens' groups
- Youth clubs
- Village halls.

Housing development in the community
- Preparatory and binding land-use plans
- Land management
- Village development and village renewal
- Construction activity and housing supply
- Any vacant housing?

Fig. 4.1-9: Key facts on spatial development potential (detail for the town of Hennef) (source: BezReg Köln)



Local land-use planning areas under section 8 et seq. of the Federal Building Code

Planned areas for nature conservation and landscape preservation and or leisure, recreation and sports under section 8 et seq. of the Federal Building Code

Planned roads under section 16 et seq. of the Federal Roads Act and section 37 et seq. of the North Rhine-Westphalia Roads and Paths Act

Water resources plans under section 19 of the Federal Water Act or section 14 of the North Rhine-Westphalia Water Act

Property directly affected by public land needs

Areas already acquired by public planning authorities

Unmarked areas are reserved for farming and forestry

Nature conservation, environment protection and climate change mitigation

- Condition of nature and environment in the region
- Type and extent of protected areas, ecological networks and biodiversity
- What is the situation regarding extreme natural and environmental phenomena?
- Water management, including for housing areas

- Disaster response, including flood protection
- What is the general situation with regard to soil erosion?
- Are climate change mitigation and adaptation measures in place?

This list of action areas is not exhaustive and must be adapted to the situation; action areas may also already be linked together at the analysis phase. It is important for the thematic working groups to look beyond their own thematic area and coordinate the IRDC with existing development concepts in the region and other plans in neighbouring communities.

For communities that are still predominantly agricultural, it is generally useful to establish a separate agriculture working group to explore and analyse the particular situation of agriculture in the community or region together with farm production and working conditions.

Agriculture

- Role of agriculture in the community
- Share of agriculture in regional gross value added
- Farmland working and production conditions
- Farmland accessibility (farm roads and connecting roads to and from outside)
- Farmland ownership and tenure structures
- Large-scale farming and environment-friendly farming methods
- Legal status and current condition of land improvement infrastructure
- Jobs in agriculture-related and non-agricultural sectors
- Agriculture and soft tourism (such as farm experience holidays)
- Extension of the agricultural value chain into upstream and downstream sectors with crafts and trades
- Impact of climate change mitigation, environment protection and nature conservation on agricultural production conditions
- Importance of industrial and energy crops in the region
- Agricultural contribution to water conservation and ecological networks
- Necessary climate change adaptation measures
- Impact of public infrastructure projects (trunk roads, other roads, railways, flood control infrastructure, energy supply, pipelines, etc.) on local working and production conditions
- Market access and marketing channels for agricultural products
- Is there a market for organic produce?
- Regional marketing approaches.

An important point for an agriculture working group is that the subject matter should be addressed in a cross-sectional manner with a view to the above action areas – that is, taking in the entire socioeconomic and environmental context in the region. This also applies if there are already expectations that land consolidation will be restricted to conventional agricultural structure objectives; in such cases, the possibility should be left open for individual land development measures to be implemented ‘while we are at it’.

The outcomes of the IRDC – at least partly – define the objectives and measures to be implemented in a land consolidation procedure while also giving indirect pointers as to the choice of legal instruments out of the toolbox available in the Land Consolidation Act.

4.1.4 From action areas to a development vision with specified development goals

At the end of the analysis phase, working in close consultation with the municipal policymaking bodies, the plenum adopts a vision for the community or region containing a development strategy that is operationalised with development goals, projects and measures. The projects and measures should be prioritised by mutual agreement of the IRDC stakeholders and their financial feasibility verified (BMVEL 2005).

4.2 Interaction between the land register, cadastral register and land consolidation

From the preparation of a land consolidation to the correction of public records, close collaboration is necessary between the authorities and institutions involved in the land consolidation procedure. A special part is played here by cooperation between the land consolidation authority, the cadastral registry, the land registry and the revenue authority. This cooperation is governed in Germany by state-specific joint administrative regulations issued by the competent state government ministries. An example is the North Rhine-Westphalia decree on cooperation in land consolidation (ZusArbErl FlurbG 2016).

In addition, section 108 of the Land Consolidation Act stipulates that no fees, taxes, charges or rates may be levied for measures serving the implementation of land readjustment procedures. Public authorities do not charge each other for their activities in connection with the land consolidation; further details are provided in section 4.8.

The joint administrative regulations are also designed to ensure digital, end-to-end data interchange to maintain consistency between the land register, cadastral register and land consolidation data at all times.

4.2.1 The land register in Germany

The land register (*Grundbuch*) is a public register recording plots of land, land rights, their ownership and associated encumbrances and restrictions. It is kept in accordance with the requirements of the Land Register Code (*Grundbuchordnung*; GBO 1994).

A land register folio (*Grundbuchblatt*) is structured as follows:

Title: The title (*Aufschrift)* states the local court (*Amtsgericht*) district, the land register district and the number of the folio.

Inventory: The inventory (*Bestandsverzeichnis*) describes the plot(s) of land with data from the official cadastral register. This includes the cadastral district (*Gemarkung*), cadastral district subdivision (*Flur*), cadastral parcel (*Flurstück*) and, for information purposes, the location, general land use and area. Each plot in a land register folio is given a serial number. All parcels registered under one and the same serial number constitute a 'plot' (*Grundstück*) in the legal sense of the word.

Division I: Division I (*Abteilung I*) contains information on ownership on the plot(s) registered in the land register folio. It also lists the names of the owner, the registration date and the reason for registration. Reasons include conveyancing, inheritance or bid award in a foreclosure auction. Owners can be natural or legal persons. In the case of

joint ownership, their joint ownership relationship is stated (such as 'fractional' or 'undivided').

Division II: Division II contains all encumbrances and restrictions that do not belong in Division III. Encumbrances include easements (easements *per se*, limited personal servitudes, rights of habitation and rights of residence), usufruct, real burdens and heritable building rights. Restrictions include real rights of preemption, priority notices and objections. Restrictions on disposition have the effect that dispositions can only be made with the involvement of third parties, as in the case of restrictions relating to insolvency, receivership, foreclosure auction, executorship, subsequent heirs, redevelopment or land reallocation. In land consolidation, a restriction on disposition arises when a landowner agrees with the land consolidation authority to waive compensation in land under section 52 of the Land Consolidation Act (see sections 3.2.5.4 and 4.2.3).

Division III: This records liens such as mortgages and land charges, including security land charges and annuity land charges, together with the creditors of the liens.

So that the history of entries and changes remains traceable at all times, old entries are not deleted when registering changes but redded-out. This means every line of the superseded entry is underlined in red or the entire text block struck through with a red line.

The legal substance of the above rights, encumbrances, restrictions and liens follows from the provisions of the German Civil Code (*Bürgerliches Gesetzbuch*).

The transfer of ownership in real property (plots of land and apartment ownership) is governed by sections 925 *et seq*. of the Civil Code. Transfer of ownership in plots of land is effected by a formal, unconditional agreement – declaration of conveyance (*Auflassung*) – and its registration in the land register. A transfer of ownership is not complete until entered in the land register. The land register is continually updated.

Entries in the land register are subject to a presumption of accuracy (*öffentlicher Glaube*) under section 892 of the Civil Code. The land register is therefore presumed to be accurate and complete in favour of a purchaser acting in good faith. However, this only protects the acquisition of rights by legal transaction. With regard to the inventory part of a land register folio, the presumption of accuracy is limited to data from the official register of plots of land, meaning the parcel number. It does not extend to the data on size, location and general land use. The official register within the meaning of section 2 (2) of the Land Register Code is the cadastral register (see below). There is no direct right of appeal against incorrect entries. A complaint can only achieve the registration of an *ex officio* objection or in exceptional instances *ex officio* deletion.

However, a person placed at a disadvantage by an inaccuracy in the land register has a right to correction of the land register under section 894 of the Civil Code. Nevertheless, this can only be done with the approval of the registered right holder or by an enforcement action against the registered person. The right to correction *in rem* is not subject to the statute of limitations.

The land register administration has addressed the need for digital data interchange between land registries, cadastral registries and land consolidation authorities. In 2008, the judicial administration, which is responsible for land register matters, decided to discontinue the previous FOLIA/EGB and SolumSTAR IT systems for keeping the land register and to develop a new, object-based digital land register and install it as a (nationwide) land register database (*Datenbankgrundbuch*, or 'dabag'); the development process and the gradual transfer of data are still pending completion.

A complete land register folio for plots held by a landowner involved in a land consolidation procedure is shown with explanatory notes in Appendix 9.3.

4.2.2 The cadastral register in Germany

The cadastral register (*Liegenschaftskataster*) and the land register together form the basis of the system for implementing the constitutional guarantee of real property. Cadastral registers are kept by cadastral registries in accordance with state-level legislation in each of the German states; a cadastral register contains all areas of land in a state. The present-day cadastral register developed from tax cadastres established on the basis of the first parcel-level land surveys for the purposes of levying real property tax in the early 19th century. Today, the cadastral register serves as the official register of plots of land for the land register. It also provides the geodata infrastructure, is fundamental to other sectors of public administration and the economy and makes available basic geodata. Soil appraisal values provided by the revenue authorities are incorporated as a layer (*Bodenschätzungskarte*, or soil appraisal map) in the cadastral map (*Liegenschaftskarte*). Most of the German states have made this data an obligatory part of the cadastral register, thus also making it part of the multipurpose cadastral register.

Further elements to ensure that the cadastral register is up to date comprise reporting and information obligations for public authorities, landowners and authorised users. Inspection, information and usage rights with regard to the cadastral register are restricted by data protection rules on the disclosure of personal data.

Since 2015, cadastral registers have been kept using the ALKIS official cadastral register information system. An updated version of ALKIS is planned for 2023 with the addition of geodata sets on land use and land cover.

The cadastral register is continually updated. This mainly takes place due to changes in the actual land use of cadastral parcels or new buildings. If the delineation of parcels in the cadastral register is to be marked or changed in the field, this is implemented as a measure under public law that ends with the issuing of the administrative act for boundary determination and demarkation. This work is permitted to be carried out, according to state-level law, by the cadastral registry, publicly appointed surveyors or other surveying authorities (such as land consolidation authorities). Cadastral surveying unites surveying and legal expertise, which provides the basis for keeping the cadastral register in a manner that is technically validated and in accordance with the legal requirements.

Performance of the administrative responsibilities by the privileged operators, the use of contemporary methods and the legislated maintenance of the register as a basic information system all ensure that the cadastral register meets present-day needs.

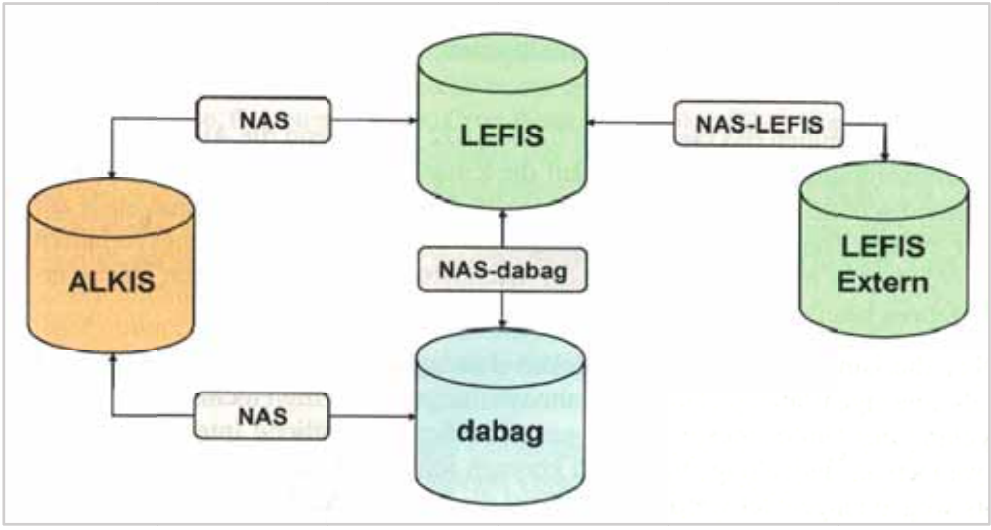
4.2.3 Cooperation between authorities and registries during land consolidation

From preparation of the land consolidation procedure to the correction of public records, regular data interchange takes place between the agencies involved (cadastral registry, land registry and land consolidation authority). This ensures that the land consolidation authority is kept informed of all changes in the land register and cadastral register during the course of the procedure. The interchange of operational data and information between the agencies also makes it necessary to ensure interoperability between the IT systems involved. The land consolidation administration has addressed this need with a specialised system known as LEFIS

(***L**and**E**ntwicklungs**F**ach**I**nformations**S**ystem* – 'Land Development Information System'). This IT system, which implements the land consolidation-specific work and administration processes in digital form, is also used for end-to-end data interchange with the cadastral registry and land register administration via a specially developed interface called NAS (*normbasierte Austauschschnittstelle*, or 'standards-based exchange interface'). NAS is a standard interface based on international standards issued by the International Organization for Standardization (ISO) and the Open Geospatial Consortium (OGC). Data models are consequently specified in a system-independent manner, which greatly simplifies data interchange between the various institutions.

For this purpose, the cadastral register objects and object attributes modelled in ALKIS (see section 4.2.2) have been incorporated together with their formatting in LEFIS and supplemented with land consolidation-specific requirements; for further details, see Fehres (2015) and Wizesarsky (2012 and 2020).

Fig. 4.2-1: Data interchange and communication between land consolidation authority, land registry administration and cadastral registry (Fehres 2020)



Data interchange takes place with the official cadastral register information system (ALKIS) and the land register database (dabag) via a standards-based exchange interface (NAS).

Operational cooperation between the above-mentioned agencies in the course of a land consolidation is governed by joint administrative regulations between the ministries responsible for the agencies (see, for example, ZusArbErl. FlurbG 2016) and is divided into three phases:

- The preparatory phase
- The phase from formal initiation of land consolidation to entry into force of the new legal status
- The phase from formal entry into force of the new legal status to formal conclusion of the land consolidation.

4.2.3.1 The preparatory phase

- During preparation of the procedure, the land consolidation authority contacts the cadastral registry and informs it about the nature and scope of the forthcoming land consolidation procedure. The cadastral registry provides photogrammetric or remote sensing data on the future land consolidation area. If this is not available or not up to date, the land consolidation authority arranges for an aero-photogrammetric survey of the land consolidation area. The situation review at the preparatory stage (section 3.1.1) also includes joint analysis of the available information on the geodetic reference network used by the state survey service and the geodetic quality of cadastral surveys in the future procedure area.

- The cadastral registry and the land consolidation authority coordinate on the necessity, nature and scope of work involving the state reference network as the basis for subsequent plot surveys.

- Also at this stage, the land consolidation authority already requests extracts for the planned land consolidation area from the ALKIS cadastral register information system so that the land consolidation area can be suitably delineated and specified down to parcel level in the land consolidation decision.

4.2.3.2 The phase from formal initiation of land consolidation to entry into force of the new legal status

- The land consolidation authority sends the land consolidation decision to the land registry, the cadastral registry and the revenue authority in order to notify them of the decision to carry out a land consolidation procedure, including the land included in the procedure (section 4 of the Land Consolidation Act). As a result of this notification, the land registry and cadastral registries are required to notify the land consolidation authority of any changes to the data on an ongoing basis.

- The cadastral registry marks all parcels in the ALKIS database that are included in the land consolidation procedure. It also initiates an inventory data updating process and then makes the inventory data available to the land consolidation authority.

- The land registry marks the plots subject to the land consolidation in the documents-and-correspondence folders (*Grundakten*) associated with the relevant land register folios.

- Immediately after the land consolidation decision enters into force, the land consolidation authority and the cadastral registry coordinate their mutual work processes for the remainder of the procedure. In particular, they need to agree on the following:

  - The planned technical procedure for the land consolidation

  - Details of data interchange, including the timing of data transfer and data formats
  - Cooperation on building surveys on original plots
  - Reservation of cadastral district subdivision numbers and point numbers in the cadastral register that the land consolidation authority can then use when resurveying the land consolidation area
  - Transfer of data on actual land use and characteristic topography
  - Planned dates for the transfer of possession, publication of the land consolidation plan and entry into force of the new legal status.

- The land consolidation authority receives the ALKIS secondary data for the land consolidation area from the cadastral registry and incorporates the data into the LEFIS land development information system to generate the original plots register. For valuation of the plots, the official soil appraisal values are incorporated in the same way and processed to form the basis of the valuation map (see section 3.2.1.2).

- The cadastral registry provides the surveying documents in order for the boundary of the land consolidation area to be determined, established and marked out by the land consolidation authority (section 56 of the Land Consolidation Act). The land consolidation authority carries out the necessary work, generates the cadastral surveying data and applies to the cadastral registry for the cadastral surveying data determining the boundary of the land consolidation area to be incorporated into the cadastral register.

- The land consolidation authority notifies the cadastral registry of any significant changes in actual land use and in the characteristic topography of the land consolidation area that it has identified in the situation review; this primarily comprises changes to roads, tracks and water bodies caused to be made by third parties. In addition, the land consolidation authority provides the cadastral registry with the remote sensing data and in particular aerial photography and laser scan data generated in the course of the situation review.

- If in the course of the procedure participants waive compensation in land under section 52 of the Land Consolidation Act (see section 3.2.5.4), the land consolidation authority, immediately after putting the waiver on record, requests the land registry to register a restraint on disposition (section 52 (3) of the Land Consolidation Act). The land registry notifies the land consolidation authority that the restraint has been registered. In addition, the land consolidation authority sends the revenue authority a notification of the economic transfer of the plot of land for tax assessment purposes. After payment of monetary compensation in accordance with section 53 of the Land Consolidation Act, the land consolidation authority sends a notification to the revenue authority for tax assessment of the sale.

- The land consolidation authority notifies the cadastral registry and the revenue authority of the date of publication of the land consolidation plan (section 59 of the Land Consolidation Act) and of the provisional transfer of possession (section 65 of the Land Consolidation Act).

4.2.3.3 The phase subsequent to entry into force of the new legal status

- The land consolidation authority sends the (advance) implementation order to the land registry, the cadastral registry and the revenue authority in order to notify them of the date of entry into force of the new legal status (sections 61 to 63 of the Land Consolidation Act). From this point onwards, the cadastral register ceases to serve as the official register of plots of land, with the land consolidation taking the place of the cadastral register for this purpose (section 81 of the Land Consolidation Act). Surveying work, and any alterations to cadastral parcels, can now only be carried out on the basis of the new plots. The surveying documents for such surveying work are made available to the survey operator by the land consolidation authority. The land consolidation authority incorporates the cadastral surveying data generated in the surveying work into the land consolidation plan and the LEFIS land development information system.

- Following entry into force of the new legal status, or on an agreed date, the land consolidation authority requests the cadastral registry to correct the cadastral register (section 81 of the Land Consolidation Act), certifying in the request the suitability and accuracy of the cadastral surveying data in accordance with cadastral requirements. In the case of an advance implementation order, the land consolidation authority additionally sends the cadastral registry the parcel numbers of any parcels that are subject to appeal.

- After receiving the request, the cadastral registry corrects the cadastral register and marks any parcels that are subject to appeal. For these parcels, the correction of the cadastral register is provisional pending decision of the appeal.

- Prior to correction of the land register, the land consolidation authority sends the documents required under section 80 of the Land Consolidation Act to the revenue authority for tax assessment, excluding information on entries in divisions II and III of the land register. The extracts from the land consolidation plan – relating to the plots of land – are supplemented with the following information:

    - Designation of the plots that may be liable to real property transfer tax (where applicable with the addendum ‘in part’)
    - The sizes of the plots concerned, the assessed monetary amount and the value of any other valuable consideration
    - The legal basis for the allocation (including in the case of allocations made free of charge).

  On this basis, the revenue authority determines whether taxable allocations have been made. In tax-exempt cases, the revenue authority sends the land consolidation authority confirmation (in the form of an

Unbedenklichkeitsbescheinigung, a clearance certificate) that registration of the transition of ownership in the land register is cleared for tax purposes; in taxable cases, a clearance certificate is not issued until the assessed real property transfer tax has been paid.

- The land consolidation authority now requests the land registry to correct the land register as described in section 3.3.5.2; the clearance certificates are sent with the request. Plots still subject to appeal are left out when correcting the land register.
- Following correction of the land register, the land registry sends the land consolidation authority the registration notices and makes data available for the cadastral registry to update the cadastral register.
- If a participant in the land consolidation procedure applies for advance correction of the land register under section 82 of the Land Consolidation Act in the period between the date stated in the (advance) implementation order and the official request for correction of the public records, the land consolidation authority requests the land registry to correct the land register for the reference number concerned. The land registry sends the land consolidation authority and the cadastral registry a notice confirming the registration. Such corrections are not incorporated into the cadastral register until the general correction of the cadastral register.
- The land consolidation authority notifies the cadastral registry and the land registry of the concluding determination (section 149 of the Land Consolidation Act).
- If the revenue authority has been involved in the valuation process in the person of an official agricultural expert (*Amtlicher Landwirtschaftlicher Sachverständiger*, a revenue authority official), it generates an appraisal map (*Schätzungskarte*) under section 10 of the Soil Appraisal Act (*Bodenschätzungsgesetz*; BodSchätzG 2007) and formally concludes the reappraisal under section 11 of that Act. If valuation for the land readjustment procedure has been carried out by an outside expert, the revenue authority conducts a reappraisal under section 11 of the Soil Appraisal Act following correction of the cadastral register. The cadastral registry confirms the correction of the cadastral register to the revenue authority by sending notifications of changes in the cadastral register (*Fortführungsmitteilungen*).

4.2.4 The treatment of discrepancies in the cadastral records and remedying them in land consolidation

For plots in the land consolidation area, plot sizes are generally based on the cadastral register entries (section 30 of the Land Consolidation Act). This means the individual boundaries of the original plots and their area are not determined and confirmed. Any participant who asserts that the information in the cadastral register is inaccurate has the burden of proof.

However, during the valuation of original plots (section 3.2.1.2), differences may become evident between the area resulting from digitisation and the area recorded in the cadastral register. This mostly goes back to the creation of cadastral maps during the original cadastral surveys, separation of common property or past land reallocation or land consolidation procedures. If such differences are within the officially permitted tolerances, section 30 of the Land Consolidation Act applies. If they exceed the tolerances, the cadastral registry is requested to investigate the discrepancy and rectify any errors.

In the case of water bodies owned by riparian landowners, the middle of the water body is the property boundary; this is governed by water law in the state concerned. Ownership of a water body by a riparian landowner can be recorded in the cadastral register in various ways: Either a single parcel is defined for the water body and the adjoining land plots are each assigned their attributable portion of that parcel, or two parcels are defined and recorded in the cadastral register and one each assigned to the adjoining plots. Occasionally, however, the full area is recorded for both adjoining land parcels. In valuation, the situation recorded in the cadastral map is nevertheless adhered to unless other circumstances dictate differently.

Discrepancies can also arise, however, due to natural changes in water bodies from silting or bank erosion. In such cases, under water law, ownership of the water body and adjoining plots follows the actual situation. The changes are taken into account in land consolidation when calculating the original plots once the water body has been surveyed together with the new line traced by its banks and then entered in the valuation map.

With regard to the boundary of the land consolidation area (section 56 of the Land Consolidation Act), surveying work has to be done in accordance with the requirements of the cadastral register. The run of the boundary on the ground, including the demarkation of plot boundaries, is compared with the records in the cadastral register.

- If the run of the boundary on the ground matches the cadastral record and the demarkation found in place accurately indicates the boundary, then nothing more needs to be done. If the demarkation is inaccurate because a boundary marker is missing or has been moved or damaged by some outside influence, the boundary point is re-demarkated or re-erected with formal involvement of the affected landowners.
- If there is a discrepancy between the run of the boundary on the ground and the cadastral record, it is necessary to investigate the reasons; this will generally be due to a survey error.
- In the case of a survey error identified when determining the boundary of the procedure area, the land consolidation authority investigates the cause. It is then necessary for the legitimate boundary line to be determined with the involvement of the adjoining landowners (both inside and outside the land consolidation area), marked out, and recognised by the landowners in a boundary meeting. The land consolidation authority then sends the resulting cadastral surveying data to the cadastral registry for incorporation in the cadastral record.

If the adjoining landowners are unable to agree on the legitimate boundary line, there is a confusion of boundaries (*Grenzverwirrung*) that can only be resolved by a court in civil proceedings. As the further continuation of the land consolidation procedure cannot be made conditional on such a matter being clarified, the usual outcome is that the plots affected by the confusion of boundaries are excluded from the procedure. The boundary of the land consolidation area then has to be altered accordingly by a decision supplementing the original land consolidation decision. Under section 8 (1) of the Land Consolidation Act, a simplified procedure applies for this purpose: "The consolidation authority may by order effect minor alterations of the land consolidation area […]. Public notice of such an order shall not be required. The landowners affected by any such alteration shall be notified."

4.3 Land valuation in land consolidation

So that each participant in the land reorganisation can be compensated with land of equal value (section 27 of the Land Consolidation Act), and in order to safeguard the rights of third parties, it is necessary to carry out a valuation of the land.

The valuation relates to the plots of land brought into the land consolidation by the participants (the 'original plots'). However, the compensatory land allocations are also based on the valuation of the original plots, so the results of the valuation of the original plots are also used for the allocation of the new plots.

Valuation is based on the situation as of the 'valuation date', which under the Land Consolidation Act is the date on which the new legal status supersedes the prior legal status (see section 3.3.1.2). In cases of provisional transfer of possession (see section 3.3.3), it is based on the date on which the provisional transfer takes effect.

The method of valuation under section 27 of the Land Consolidation Act

> *Section 27 To ensure that the participants are allocated lots of equal value, the value of the original plots shall be assessed. The valuation shall be effected by valuing the plots of each participant in relation to all the plots situated in the consolidation area.*

Under section 28 of the Land Consolidation Act, the relative value of land used for agriculture is assessed as a rule on the basis of the lasting gains that the land can yield to any farmer, irrespective of distance from the farmstead or the village, if farmed in a customary and ordinary way. The valuation is to be based on values from a soil appraisal in accordance with the Soil Appraisal Act (*Bodenschätzungsgesetz*) of 16 October 1934. A major revision of the law on soil appraisals took place with the Soil Appraisal Act of 20 December 2007 (BodSchätzG 2007).

Valuation covers:

- The value of the soil
- Where applicable, elements deemed essential parts of the land, such as buildings, other structures and long-standing growth such as hedges, trees, etc., if they are to change ownership in the course of the land reorganisation
- The valuation of certain land rights where necessary for the reorganisation.

A seminal description of the methods of valuation in land consolidation that remains valid today can be found in Hahn (1960) and BMELF (1982).

In the land valuation, binding exchange values are established for the plots in the land consolidation area. Methodologically speaking, it is a valuation method based on relative soil values. What matters are not absolute values in the sense of monetary amounts, but the relative values of individual plots or parts of plots. The results of valuation are expressed in dimensionless value units (VUs; *Wertzahlen*) and recorded for each participant in the original plots register (*Einlagenachweis*). These figures are used as the basis for determining the individual compensatory land allocations. However, they are also important for other decisions in the course of the land consolidation procedure, for example:

- For holding participants liable for contributions under section 19 of the Land Consolidation Act (land consolidation contributions) needed to pay for the costs of implementation where these are not covered by government grants or other parties (such as the municipality)
- To determine the land contribution to be made by each participant by way of a non-monetary contribution for the construction of common and public facilities (section 47 of the Land Consolidation Act)
- For equalisation payments in the event of over and under-allocations in the compensatory land allocation
- In the case of land consolidation for projects of public interest (see section 5.1), where the participants contribute the land needed for the project by means of a land deduction (*Landabzug*) according to the ratio of the value of their original plots to the value of all plots in the land consolidation area.

The land values are determined by dividing the plots in the procedure area into valuation classes, which are assigned specific numbers of value units per unit area according to their land condition and suitability for use.

Figure 4.3-1 below shows an example of the value ratios between different soil classes and the area to be added or deducted if a plot is transferred from one value class to another in the compensatory land allocation.

Fig. 4.3-1: Coefficients for transfer from one soil class to another (abstract example)

		To soil class					
		1	**2**	3	4	5	6
		1.0000	0.9500	0.8400	0.7600	0.6600	0.5600
From soil class	**1**	1.0000	**1.0526**	1.1905	1.3158	1.5152	1.7857
	2	0.9500	1.0000	1.1310	1.2500	1.4394	1.6964
	3	0.8400	0.8842	1.0000	1.1053	1.2727	1.5000
	4	0.7600	0.8000	0.9048	1.0000	1.1515	1.3571
	5	0.6600	0.6947	**0.7857**	0.8684	1.0000	1.1786
	6	0.5600	0.5895	0.6667	0.7368	0.8485	1.0000

Thus the soil value …

- … of 1.0 ha in soil class 1 corresponds to the value of 1.0526 ha in soil class 2
- … or of 1.0 ha in soil class 5 corresponds to the value of 0.7857 ha in soil class 3, etc.

Soil valuation in land consolidation in Germany is done on different measurement bases according to whether it is:

- Land used for agriculture
- Land used for forestry
- Development land and building land.

4.3.1 Valuation of plots of land used for agriculture

The measure of value for agricultural land in Germany is the **natural soil fertility** (*natürliche Ertragsfähigkeit*) of the land to be valued. Valuation therefore has to be based on the lasting gains that the land, by virtue of its natural soil fertility and if farmed in an ordinary manner, can yield to a farmer irrespective of distance from the farmstead or village (section 28 of the Land Consolidation Act). As natural soil fertility does not normally change over the duration of a land consolidation procedure, there is no need to go into detail here regarding the valuation date, which is otherwise of relevance in the valuation of real property.

In Germany, the valuation methodology for agricultural land evolved from the methods used to assess land for tax purposes in the early 19th century. Until the end of the 19th century, land was valued in consolidation procedures on the basis of what can be expressed in modern terms as the 'net long-term yield' (*nachhaltig erzielbarer Reinertrag*). As well as natural fertility factors, this also included economic factors influencing yield. That was appropriate for a system of assessing farms for tax. But the same approach was not suitable for land consolidation involving an exchange of plots of land; the values obtained by valuing plots by location could not be readily used for a reorganisation of plots. For almost 100 years now, the sole criterion for valuing land used for agriculture in land consolidation in Germany has been natural soil fertility (Thomas 1990).

The question of the suitable valuation measure for land consolidation remains subject to intensive debate to this day, with various different measures in use around the world (see Veršinskas et al. 2020): Measures of value include market price, fair value, production value, agricultural net yield and similar. Production values are marked up for plots accessible by public roads or tracks. None of these practices is convincing, and academic scrutiny shows all of them to have systemic flaws, in some cases with major practical implications. For this reason, with a view to the statutory requirements governing the compensatory land allocation for each participant (section 44 (1) of the Land Consolidation Act) and the importance of the valuation results for the land contribution and monetary land consolidation contributions, German land consolidation experts stay with 'natural soil fertility' as the valuation measure.

The natural soil fertility of agricultural land is determined by the physical and biochemical properties of the soil and by other natural location and situation factors. Soil

profiles typifying the agricultural valuation classes in the land consolidation are described (or re-described where necessary) using selected profile pits. A soil profile reflects the natural weathering of the earth's crust and differs in its characteristics according to parent material and the degree of weathering. The top layer of a soil profile is the surface soil, which on arable land is generally identical to the tillage depth; this is also referred to as the A horizon or topsoil. Surface soil is mainly characterised by dark colouration due to humus, a crumbly (in some cases cloddy) texture and intensive root penetration. On deeply rootable soils, the A horizon extends beyond the plough layer.

The A horizon is followed by the weathering horizon, termed the B horizon (subsoil). This is paler than the humous topsoil, generally still with good root penetration and in some cases enriched with iron, which lends it a reddish-brown colouration. Heavily iron-enriched subsoil combined with certain soil water conditions can result in a compaction zone.

Finally, there is the unweathered parent material comprising the C horizon (substratum).

4.3.1.1 Valuation on the basis of the soil appraisal in accordance with the Soil Appraisal Act

In Germany, the valuation of agricultural land in land consolidation is generally based on values from the official soil appraisal under the Soil Appraisal Act (BodSchätzG 2007).

Valuation of farmland under section 28 of the Land Consolidation Act

> *Section 28 (1) For land used for agriculture the proportionate value shall, as a general rule, be assessed on the basis of the lasting gains that the land can yield to any owner irrespective of its distance from the farmstead or the village, if used in a customary and ordinary way. The results of a valuation of the soil in accordance with the Soil Appraisal Act (Bodenschätzungsgesetz) of 16 October 1934 […] shall be taken as a basis for the valuation; deviations shall be permissible.*

The statutory national soil appraisal under the Soil Appraisal Act serves the purpose of fair apportionment of real property taxes, planned organisation of land use and improvement of the basis for lending (section 1 of the Soil Appraisal Act). It includes:

- Precise identification of the soil according to its properties
- Determination of its fertility.

In determining fertility, only differences in natural yield are taken into account that relate to natural fertility conditions (soil properties, terrain and climatic conditions) (section 2 of the Soil Appraisal Act). The results of the nationwide soil appraisal for all agricultural land are available for inspection by the public as a layer in the cadastral map at local cadastral registries. Sample plots with detailed descriptions and documentation of value-determining factors serve as the basis for re-appraisals.

The values from the official soil appraisal of agricultural land are based on a nationally applicable arable land and grassland appraisal framework.

Fig. 4.3-2: The arable land appraisal framework for the official soil appraisal

Ackerschätzungsrahmen

Boden-art	Ent-ste-hung	Zustandsstufe 1	2	3	4	5	6	7
S	D		41-34	33-27	26-21	20-16	15-12	11-7
	Al		44-37	36-30	29-24	23-19	18-14	13- 9
	V		41-34	33-27	26-21	20-16	15-12	11-7
Sl (S/lS)	D		51-43	42-35	34-28	27-22	21-17	16-11
	Al		53-46	45-38	37-31	30-24	23-19	18-13
	V		49-43	42-36	35-29	28-23	22-18	17-12
lS	D	68--60	59-51	50-44	43-37	36-30	29-23	22-16
	Lö	71-63	62-54	53-46	45-39	38-32	31-25	24-18
	Al	71-63	62-54	53-46	45-39	38-32	31-25	24-18
	V		57-51	50-44	43-37	36-30	29-24	23-17
	Vg			47-41	40-34	33-27	26-20	19-12
SL (lS/sL)	D	75-68	67-60	59-52	51-45	44-38	37-31	30-23
	Lö	81-73	72-64	63-55	54-47	46-10	39-33	32-25
	Al	80-72	71-63	62-55	54-47	46-40	39-33	32-25
	V	75-68	67-60	59-52	51-44	43-37	36-30	29-22
	Vg			55-48	47-40	39-32	31-24	23-16
sL	D	84-76	75-68	67-60	59-53	52-46	45-39	38-30
	Lö	92-83	82-74	73-65	64-56	55-48	47-41	40-32
	Al	90-81	80-72	71-64	63-56	55-48	47-41	40-32
	V	85-77	76-68	67-59	58-51	50-44	43-36	35-27
	Vg			64-55	54-45	44-36	35-27	26-18
L	D	90-82	81-74	73-66	65-58	57-50	49-43	42-34
	Lö	100-92	91-83	82-74	73-65	64-56	55-46	45-36
	Al	100-90	89-80	79-71	70-62	61-54	53-45	44-35
	V	91-83	82-74	73-65	64-56	55-47	46-39	38-30
	Vg			70-61	60-51	50-41	40-30	29-19
LT	D	87-79	78-70	69-62	61-54	53-46	45-38	37-28
	Al	91-83	82-74	73-65	64-57	56-49	48-40	39-29
	V	87-79	78-70	69-61	60-52	51-43	42-34	33-24
	Vg			67-58	57-48	47-38	37-28	27-17
T	D		71-64	63-56	55-48	47-40	39-30	29-18
	Al		74-66	65-58	57-50	49-41	40-31	30-10
	V		71-63	62-54	53-45	44-36	35-26	25-14
	Vg			59-51	50-42	41-33	32-24	23-14
Mo			54-46	45-37	36-29	28-22	21-16	15-10

The arable land appraisal framework divides soils by classes according to soil type, geological origin and development level; for example, L 5 D in figure 4.3-2 has the following meaning: Soil type loam of development level 5 with geological origin diluvium; its soil value index is between 50 and 57.

The soil types are divided into nine groups. A soil is assigned to a soil type according to its overall soil physical character. For example, a loamy soil with a palish substratum is to be classified not as loam, but as sL (sandy loam) or even lS (loamy sand).

The eight mineral soil types groups are divided into seven development levels. These characterise soil properties that are mainly caused by long-lasting effects of climate, past vegetation, terrain, groundwater and land use, or also bedrock, and that are mainly expressed in the thickness of the humus-rich surface soil (A horizon).

In the case of the ninth soil type, peat soils (Mo, for *Moorböden*), key factors in addition to humus type are the degree of decomposition of the organic constituents, mineral or earthy content and the groundwater level.

Fig. 4.3-3: Soil types and geological origin

Soil type		Geological origin	
S	Sand	D	Diluvium Formed in the ice age by alluvial and glacial deposits
Sl	Weak loamy sand	Lö	Loess Formed in the interglacial periods by wind drift
lS	Loamy sand	Al	Alluvium Recent alluvial valley soils
SL	Strong loamy sand	V	Weathered soils Upland soils formed *in situ* from weathering of the bedrock
sL	Sandy loam	Vg	Stony weathered soils Soils still having coarse unweathered material in the surface soil
L	Loam		
LT	Heavy loam or clayey loam		
T	Clay		
Mo	Peat soil		

(BayLA 2009)

The following basic assumptions are made in addition:

a) For the climate: average conditions, with 8 °C annual temperature and 600 mm annual precipitation
b) For the terrain: flat to slightly sloping
c) For the economic production conditions: geological conditions corresponding to the central parts of the state of Saxony-Anhalt.

The value units determined on the basis of these assumptions are **soil value indices**. Taking account of yield differences due to variation from the basic assumptions on climate, terrain and other production conditions, the soil value indices are then marked up or down to give **field value indices**.

Each class spans a value unit range (from … to), which the soil expert may narrow down in the particular case on inspecting the soil profile.

Meadows and pasture land are covered in the grassland appraisal framework, which is divided by natural yield conditions comprising soil, water and climate. As the geological properties of the soil are not as important in the valuation of grassland as they are for arable land, only five soil types are used:

Sand (S) Loamy sand (IS) Loam (L) Clay (T) Peat soils (Mo).

The appraisal framework divides soil water conditions into five levels. Grassland fertility is mainly determined by the positive or negative effect of the available water in the form of precipitation or groundwater.

Fig. 4.3-4: Soil types and soil water conditions

Soil type		Soil water conditions Level	
S	Sand	1	Best soil water conditions that always ensure excellent grass growth in terms of quality and quantity
IS	Loamy sand	2	Good soil water conditions with almost complete sweet grass cover and no risk of drying out
L	Loam	3	Normal medium soil water conditions with growth including a moderate presence of wetness indicators
T	Clay	4	Litter meadows with growth of wetness or dryness indicators (acidic, low-quality hay or short-grass meadows only usable as pastureland)
Mo	Peat soil	5	Swampy meadows or dry sheep pasture

Furthermore, the appraisal framework provides for three climate levels. The most favourable climate level, a, relates to an average annual temperature of 8.0 °C and above, the intermediate climate level, b, to an average annual temperature of 7.0 °C to 7.9 °C and the least favourable climate level, c, to an annual temperature of 5.7 °C to 6.9 °C.

The various permutations resulting from the interaction of soil, climate and water constitute the classes in the appraisal framework; for example: L II b 2: level II loam with level b climate and level 2 soil water conditions. This soil has a **grassland soil value index** between 50 and 58. Taking account of yield differences due to climate, terrain and other production conditions, the soil value indices are then marked up or down to give **grassland value indices**. Further details are provided in BayLA (2009).

Each class spans a range of value units that the soil expert narrows down on inspection in the field.

Fig. 4.3-5: Grassland appraisal framework

Grünlandschätzungsrahmen

Boden-Art	Stufe	Klima	Wasserverhältnisse 1	2	3	4	5
S	I (45-40)	a	60-51	50-43	42-35	34-28	27-20
		b	52-44	43-36	35-29	28-23	22-16
		c	45-38	37-30	29-24	23-19	18-13
	II (30-25)	a	50-43	42-36	35-29	28-23	22-16
		b	43-37	36-30	29-24	23-19	18-13
		c	37-32	31-26	25-21	20-16	15-10
	III (20-15)	a	41-34	33-28	27-23	22-18	17-12
		b	36-30	29-24	23-19	18-15	14-10
		c	31-26	25-21	20-16	15-12	11- 7
IS	I (60-55)	a	73-64	63-54	53-45	44-37	36-28
		b	65-56	55-47	46-39	38-31	30-23
		c	57-49	48-41	40-34	33-27	26-19
	II (45-40)	a	62-54	53-45	44-37	36-30	29-22
		b	55-47	46-39	38-32	31-26	25-19
		c	48-41	40-34	33-28	27-23	22-16
	III (30-25)	a	52-45	44-37	36-30	29-24	23-17
		b	46-39	38-32	31-26	25-21	20-14
		c	40-34	33-28	27-23	22-18	17-11
L	I (75-70)	a	88-77	76-66	65-55	54-44	43-33
		b	80-70	69-59	58-49	48-40	39-30
		c	70-61	60-52	51-43	42-35	34-26
	II (60-55)	a	75-65	64-55	54-46	45-38	37-28
		b	68-59	58-50	49-41	40-33	32-24
		c	60-52	51-44	43-36	35-29	28-20
	III (45-40)	a	64-55	54-46	45-38	37-30	29-22
		b	58-50	49-42	41-34	33-27	26-18
		c	51-44	43-37	36-30	29-23	22-14
T	I (70-65)	a	88-77	76-66	65-55	54-44	43-33
		b	80-70	69-59	58-48	47-39	38-29
		c	70-61	60-52	51-43	42-34	33-23
	II (55-50)	a	74-64	63-54	53-45	44-36	35-26
		b	66-57	56-48	47-39	38-30	29-21
		c	57-49	48-41	40-33	32-25	24-17
	III (40-35)	a	61-52	51-43	42-35	34-28	27-20
		b	54-46	45-38	37-31	30-24	23-16
		c	46-39	38-32	31-25	24-19	18-12
Mo	I (40-45)	a	60-51	50-42	41-34	33-27	26-19
		b	57-49	48-40	39-32	31-25	24-17
		c	54-46	45-38	37-30	29-23	22-15
	II (30-25)	a	53-45	44-37	36-30	29-23	22-16
		b	50-43	42-35	34-28	27-21	20-14
		c	47-40	39-33	32-26	25-19	18-12
	III (20-15)	a	45-38	37-31	30-25	24-19	18-13
		b	41-35	34-28	27-22	21-16	15-10
		c	37-31	30-25	24-19	18-13	12- 7

The nationwide values from the official soil appraisal of agricultural land take into account all pedological, soil physical and hydrological value-determining factors for the determination of natural soil fertility within the meaning of section 28 of the Land Consolidation Act. These value indices are adjusted in land consolidation to the regionally attainable natural fertility based on sample plots for various fertility classes. Taking this as a basis, the soil expert then determines the actual situation in the field from soil samples.

When drawing up the valuation framework for a given land consolidation procedure, it is therefore necessary to determine whether and to what extent the values from the soil appraisal, including any updating by the revenue administration, are to be modified and supplemented with local surveys for the purposes of the land consolidation. In addition, it is decided whether and to what extent the figures have to be marked up or down due to circumstances that have a lasting effect on soil fertility. Examples include terrain, hydrological regime, climate, shade from woodland or hedges, restrictions on land use or suitability for specialised crops.

The outcome is the final valuation framework for arable land and grassland for a specific land consolidation such as Land Consolidation K. In the example shown, the area consists of marginal land in a high montane location.

Fig. 4.3-6: Valuation framework for arable land and grassland in Land Consolidation K

Quality level		Valuation classes								
	CN	1	2	3	4	5	6	7	8	9
Field value index Grassland value index		60 and over	53-59	40-45	34-39	29-33	33-29	24-28	23 and less	Paved roads, wasteland
		Value units per are								
Arable land	2	11	10	9	8	7	6	5	3	1
Grassland	3	10	9	8	7	6	5	4	3	1
		Value units per are								
Woodland *	4									
		Value units per are								
Building land *	5									
		Value units per are								
Arable land with the potential for other types of use *	6									
		Value units per are								
Farmyards and buildings on farmland *	1									
	CN: Code number for coding the valuation framework in IT * Section 4.3.1.2 illustrates how the valuation classes are derived for these quality levels.									

On the basis of these valuation principles, soil experts ('soil appraisers') perform a systematic valuation of the procedure area.

Any temporary or remediable impairment of an area's natural soil fertility, such as ploughing compaction or heavy weed growth, is ignored in valuation because such conditions have no impact on long-term soil fertility; the same applies to pest infestation such as nematode infection in beet-growing areas. So that such areas can be exchanged, either the impairment must be remedied by the body of participants in land preparation measures at the construction stage of implementing the land consolidation plan, or the recipient of the compensatory land allocation must be given monetary compensation. In many cases, if the cost involved makes an impairment uneconomical to remedy, then the plots concerned have to be excluded from the land exchange.

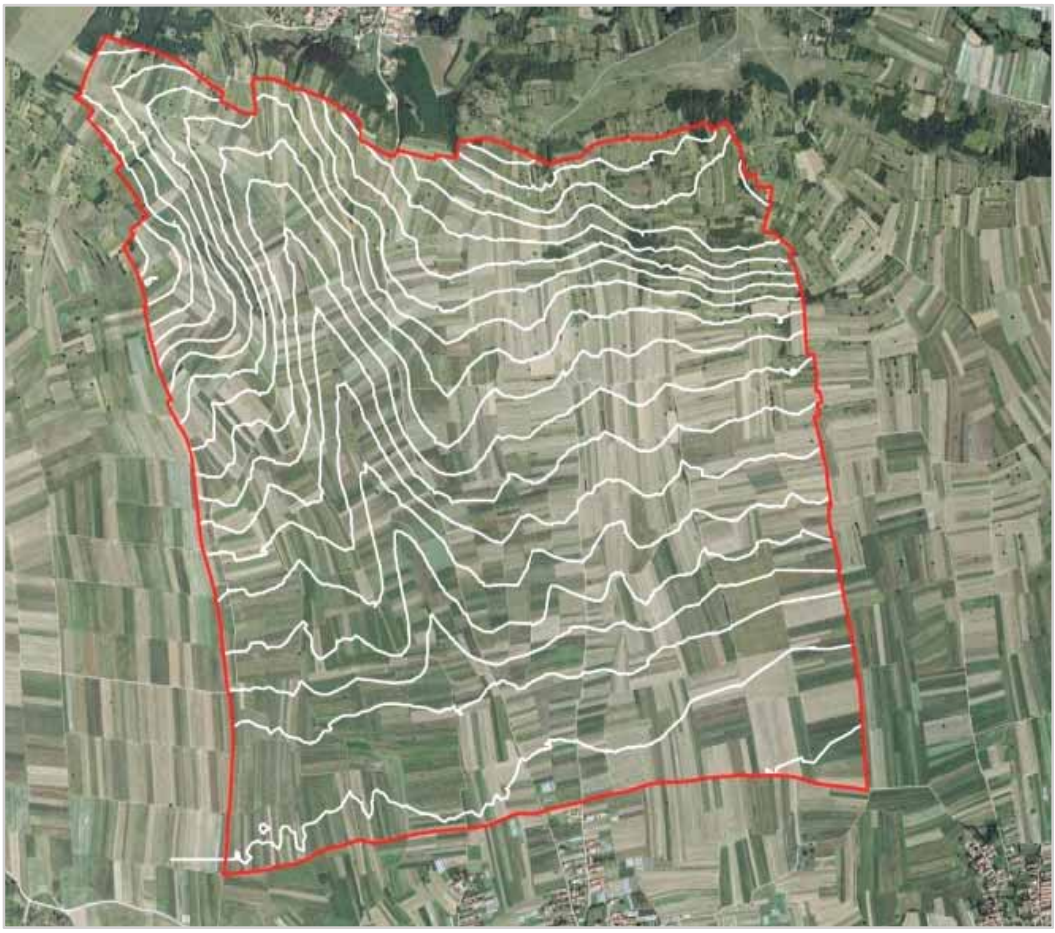
4.3.1.2 Valuation in the absence of a nationally available soil appraisal

If a comprehensive survey of pedological, soil physical and hydrological factors as described in section 4.3.1.1 is not available for the land consolidation area, then it is necessary to undertake the necessary groundwork. This must make it possible to describe the fertility of agricultural land on the basis of geological and pedological classification data accurately and without methodological discontinuities, and thus to meet the statutory rights of participants in reorganisation of the land. Where possible, this groundwork should be prepared by the same soil expert who will subsequently perform the local valuation in the land consolidation area. It should cover at least the following:

- An analysis of the relief
- Depending on the relief, a hydrological survey of surface water and groundwater
- A general description of the fundamental geological and pedological characteristics of the land consolidation area
- A pedological description, based on profile pits, of the texture of specific profiles typical of the land consolidation area
- A proposal for the arable land and grassland value classes to be incorporated into the valuation framework
- Criteria for marking value indices up or down where soil samples diverge from the reference standard

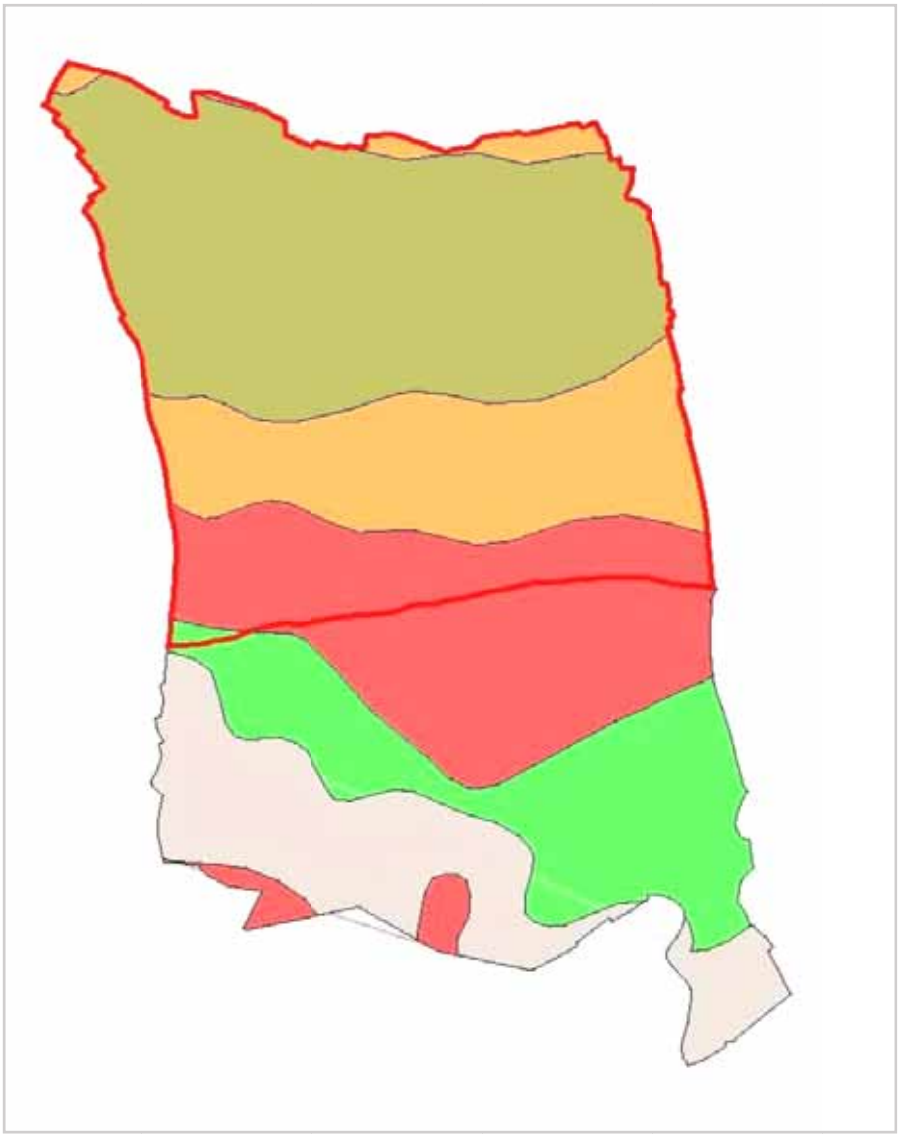
A table of average natural yields for the most common crops in the land consolidation area, broken down into the various value classes. In the absence of sufficient statistically significant data for this demanding task, the data should be obtained by asking practising farmers in the region, agricultural advisory services and the board of the body of participants. The accuracy of the data is crucial for ensuring that the plan for reorganisation of the agricultural land meets the statutory requirement for all participants to be compensated in land of equal value for the land they contribute to the land consolidation area.

Fig. 4.3-7: Orthophoto map of Land Consolidation V with contour lines



Perimeter of the land consolidation area

Fig. 4.3-8: Pedological map of Land Consolidation V



Perimeter of the land consolidation area

Пояснення:

- Alluvial soil, without carbonic acid (H_2CO_3), crumbly loam soil
- Alluvial soil, without carbonic acid, loam
- Alluvial soil, with carbonic acid, sandy
- Weathered clay soil, without carbonic acid, brown soil, medium depth
- Weathered clay soil, without carbonic acid, medium depth

Fig. 4.3-9: Profile pit to determine pedological conditions

The profile pit in this instance is described as follows:
Very moist, dark brown colouration, clayey loam, crumbly structure, medium-easy to work, oxidation process in first horizon, low carbonic acid content, groundwater at 35 cm and tending to rise.
Grassland, soil class 4.

Fig. 4.3-10: Average yields of wheat, maize and clover for value class 1 soils, from a survey of seven local experts (E)

Crop (kg/ha)	E1	E2	E3	E4	E5	E6	E7	Mean
Wheat	4 500	4 700	4 600	4 550	4 650	4 450	4 650	4 590
Maize	4 100	4 000	4 050	4 100	4 200	3 800	4 100	4 050
Clover	500	600	550	450	600	500	550	540
Total								9 180

Fig. 4.3-11: Average yields of wheat, maize and clover for value class 2 soils, from a survey of seven local experts (E)

Crop (kg/ha)	E1	E2	E3	E4	E5	E6	E7	Mean
Wheat	4 300	4 350	4 400	4 250	4 520	4 500	4 200	4 360
Maize	3 950	3 800	3 700	3 750	3 800	4 000	3 900	3 840
Clover	480	560	490	500	510	520	510	510
Total								8 710

Fig. 4.3-12: Average yields of wheat, maize and clover for value class 3 soils, from a survey of seven local experts (E)

Crop (kg/ha)	E1	E2	E3	E4	E5	E6	E7	Mean
Wheat	3 700	3 900	3 800	3 650	3 815	4 000	4 120	3 855
Maize	3 400	3 550	3 300	3 350	3 600	3 400	3 200	3 400
Clover	490	470	430	450	445	460	440	455
Total								7 710

In the case of arable land, this determination of average yields for the first to the third value class has to be repeated for all of the remaining value classes; in Land Consolidation X, seven value classes are assumed.

Comparing the average yields for the various classes then results in the coefficients for transfer from one soil class to another, as shown in the example in fig. 4.3-1.

This results in the value units for arable land of soil classes 1 to 7 in VUs per are.

The same approach is followed for grassland, although with different indicators to determine the yields.

From the above average yields per hectare, particularly for wheat and corn, it is clear that Land Consolidation X is located in an area with deep, mineral-rich alluvial soils, and that the class-to-class yield differences essentially go back to the soils' alluvial origin.

Fig. 4.3-13: Valuation framework for arable land and grassland in Land Consolidation X

Class	1	2	3	4	5	6	7 Paved roads, wasteland
Arable land (CN 2)	100	95	84	76	66	56	10
Grassland (CN 3)	60	55	45	35			10

The value of a parcel contributed to a land consolidation procedure is calculated using the following formula:

$$\mathbf{V(P_i) = P_i \times VU}$$

P_i = area of parcel i
VU = value units for the applicable class

where $V(P_i)$ is the value of the parcel, expressed in (dimensionless) value units

If a single plot contains multiple value classes as in the following example, the values for the areas under each soil unit subdivision have to be found first and then the individual soil unit subdivisions added up to give the total for the plot:

100 ares x 100 VU = 10,000 VU
50 ares x 95 VU = 4,750 VU
75 ares x 84 VU = 6,300 VU
Total over 2.2500 ha: 21,050 VU

The value of all plots with which a participant takes part in the land consolidation procedure is the total number of value units for all parcels contributed by the participant to the procedure.

4.3.1.3 Necessary revaluation of agricultural land in a land consolidation procedure

A revaluation of plots of land only comes into consideration in exceptional circumstances. Examples include where the body of participants has carried out soil improvements, or where other construction measures (cable or pipe laying, road and track construction or road recultivation) have taken place that lastingly alter the soil, before the assessment date for determining compensation of equal value (usually the date of transfer of possession (section 3.3.1.2), when participants are assigned the new parcels).

In such cases, the areas affected by the soil improvement or other changes have to be revalued because, for the recipient of the compensatory land allocation, the soil fertility in the area is no longer the same as it was when the plots were valued in the field at the initial stage of the land consolidation.

For example, if a parcel assigned to the recipient of a new plot of land previously contained a gravel track that the body of participants has recultivated and filled with topsoil as part of the construction measures in the meantime, then this must be taken into account in valuation. The area of the former track is no longer assigned the value of the lowest arable class (as it was at the time of the general valuation) but a value close to the 'undisturbed' arable land immediately adjoining the track. A figure is generally taken that is one or two classes lower than the adjoining 'undisturbed' farmland. The size of the value difference assigned in the particular case depends on the soil used for recultivation and the degree of care exercised when removing the material of the former track and backfilling with new soil.

The results of the revaluation are either confirmed retrospectively in a formal procedure as described in section 3.2.1.2 or made final on publication of the land consolidation plan (section 3.2.6.3).

4.3.2 Valuation of plots of land used for forestry

Woodland is valued in land consolidation by separately determining the land value and the standing timber value.

Land values are determined according to the long-term net yield attainable according to the woodland site. They are determined without tree cover, even though the standing timber often allows a forestry expert to make inferences about the site conditions. The land value is thus assessed according to general site conditions, soil characteristics, phytosociological characteristics and timber species suitability (Hahn 1960). As the official soil appraisal in Germany, as described in section 4.3.1, relates solely to agricultural land and hence cannot be used here as a valuation basis in land consolidation, it is particularly important to involve forestry experts for surveying and describing land classes for woodland in the valuation framework. The same experts then also carry out the on-site land valuation on the basis of the valuation framework developed with the board of the body of participants. The land valuation framework for woodland contains significantly fewer classes than that for arable land and the numbers of value units per unit area are also significantly lower than for arable land and grassland.

As an example, for woodland in Land Consolidation X mentioned earlier, the following figures are derived for woodland of soil classes 1 to 3 in VUs/are:

Fig. 4.3-14: Valuation framework for woodland in Land Consolidation X

Class	1	2	3	4	5	6	7 (paved roads, wasteland)
Woodland (W) (CN 4)	35	25	15				10

4.3.3 Valuation of development land and building land

Development land, building land (land ripe for development, zoned development land and unzoned development land) and other land with a site value exceeding its value on the basis of agricultural or forestry yield ('agricultural land suitable for non-agricultural use')* is valued at market value.

** Agricultural land suitable for non-agricultural use (begünstigtes Agrarland) is agricultural land for which there is a prospect of non-agricultural use although no specific planning intentions are evident (ImmoWertV 2021).*

Valuation of development land under section 29 of the Land Consolidation Act

> Section 29 (1) The valuation of development land, of building land and of structures shall be based on the market value.

Definition of market value under section 194 of the Federal Building Code (BauGB 2017)

> Section 194 The standardised market value is defined as the price which would be achieved in an ordinary transaction at the time when the assessment is made, taking into account the existing legal circumstances and the actual characteristics, general condition and location of the property or other object of assessment, without consideration being given to any extraordinary or personal circumstances.

Building land (*Bauland*) is defined as a plot of land for which the necessary legal and natural conditions are met for building. This status derives either from designation in a binding land-use plan or by virtue of location within a contiguous built-up area.

Zoned development land (*Rohbauland*) denotes an area that is expressly designated in a substantive land-use plan but where plots may yet have to be reorganised in order to create plots of land suitable for building and/or where the provision of local infrastructure is not yet assured.

Unzoned development land (*Bauerwartungsland*) consists of plots of land whose qualitative characteristics (legal circumstances, factual circumstances, other characteristics and location) give rise to the expectation that they will be built on in the foreseeable future.

These categories are reflected in separate value classes in the valuation framework. Municipal land-use plans are decisive in delimiting and characterising such areas. Even where there is significant variance in relative values, the boundaries of the value classes can therefore be determined from municipal land-use plans (preparatory and binding land-use plans). A decision aid for assignment to value classes is provided

by the standard ground values (section 196 of the Federal Building Code) established annually by the Committee of Valuation Experts (section 193 of the Federal Building Code). In most German states, these are available for public inspection online, for example in the state of North Rhine-Westphalia at www.boris.nrw.de. It is not usually necessary to perform on-site valuation work to value these areas in a reorganisation procedure.

As there is only limited legal scope for reorganising land with such quality characteristics in a land consolidation, valuation is carried out area by area in simplified, generalised form; only in specific instances is valuation necessary in accordance with the applicable statutory instrument, the Property Valuation Ordinance (*Immobilienwertermittlungsverordnung*; ImmoWertV 2021).

Farmyards and farm buildings in outlying areas, meaning outside of the contiguous built-up area and outside of a binding land-use plan, are not classified as building land, but are assigned to farmland as buildings permitted by way of exception in an outlying area (section 35 of the Federal Building Code); they are generally assigned to value class 1 for arable land without examining the soil quality of the ground on which the farmstead stands.

Following the method described in section 4.3.2, the following valuation framework thus resulted for Land Consolidation X. This valuation framework has no relation to the official soil appraisal covered in section 4.3.1, as it is a valuation framework for which values from the official soil appraisal are not available.

Fig. 4.3-15: Valuation framework for land consolidation procedure X (complete)

		Valuation categories						
Quality characteristic	**CN**	**1**	**2**	**3**	**4**	**5**	**6**	**7 Paved roads, wasteland**
		Value units per are						
Arable land	2	100	95	84	76	66	56	10
Grassland	3	60	55	45	35	6	5	4
Woodland	4	35	25	15				10
Building land	5	340	300	230	200	170	100	
Agricultural land suitable for non-agricultural use	6					170	100	
Farmyards and buildings on farmland	1	100						
	CN: code number for coding the valuation framework in IT							

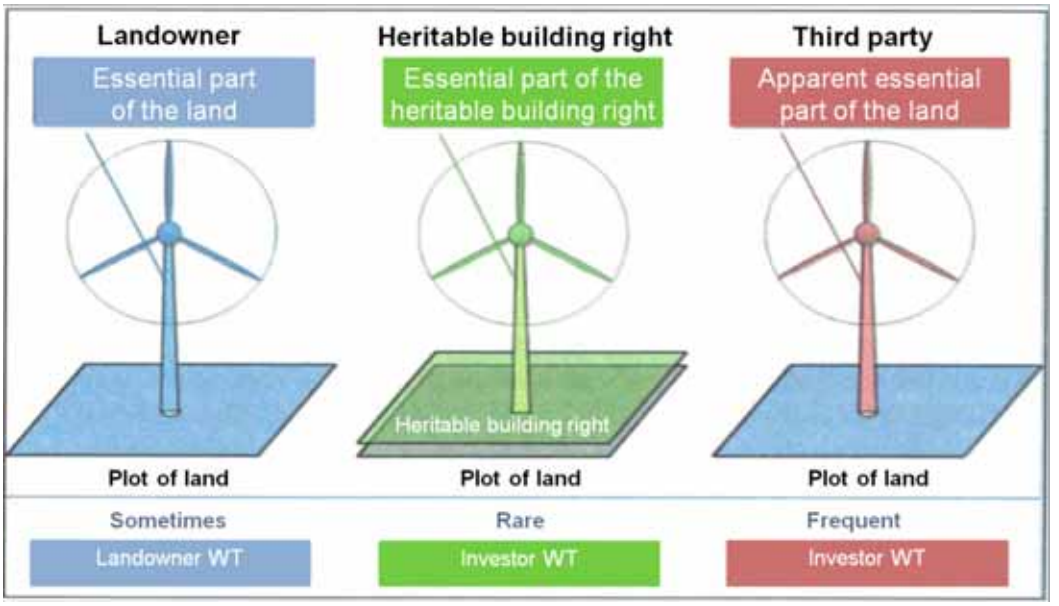
Drainage structures, such as field drains, are generally already included in the local valuation as they influence natural soil fertility. They are therefore not taken into account separately in the valuation of the affected plots.

Wind farms, solar farms and biogas plants have now been a feature of the countryside in Europe for some years. Renewable energy sources have developed over the years into important lines of business for agriculture, from which full-time and part-

time farmers are able to generate synergies in addition to their conventional arable and/or livestock farming operations.

For valuation purposes, assets of this kind represent a complex set of coordinated subcomponents, and in the case of energy generation installations are operated by business operators or business enterprises (Fischer; Biederbeck 2019). Because of this, when it comes to changes affecting plots of land used for energy generation, valuation in a land consolidation procedure involves a business valuation, especially since the owner of the land (landowner) is by no means always identical with the owner (operator) of the installation, as shown in fig. 4.3-16.

Fig. 4.3-16: Ownership situation in the case of wind turbines
(Fischer; Biederbeck 2019)



Explanation of fig. 4.3-16:
In the first case, the owner of the wind turbine and the landowner are identical. The wind turbine is deemed an essential part of the plot of land. In the second case, a 'heritable building right' (similar to a land lease, see section 2.2.3) has been established; the landowner has granted such a right to the operator. The wind turbine is deemed an essential part of the heritable building right. In the third case, ownership of the land and of the wind turbine diverges: the wind turbine only appears to be an essential part of the plot of land. This is the case when a piece of property is connected with the land only for a temporary purpose or is connected with the land by the exercise of a right over the land. A temporary purpose can nevertheless mean 20 years; for the exercise of a right, a right in rem to the land must be established in the form of a heritable building right, usufruct or easement.

The complexity of dealing with energy generation assets cannot be allowed to result in such land being excluded from a land consolidation procedure. The Working Group on Land Development – *ARGE Landentwicklung*, a working group under the German Conference of Agriculture Ministers comprising the heads of the land consolidation administrations of the 16 German states – has issued a recommendation for dealing with wind turbines that can also be applied by analogy to other energy sources (ARGE Landentwicklung 2013b).

When it comes to valuing land used for energy generation, it is necessary to distinguish between two different cases:

The **first case** relates to land that already contains a wind turbine, solar panels or a biogas plant. In this case, building permission on the basis of planning law has enhanced the value of the plots concerned for general economic purposes. Land with wind turbines, however, is agricultural land or woodland that, rather than its use as such being restricted, has merely gained an additional use option. Such land ought therefore to be valued by yield in accordance with section 28 of the Land Consolidation Act. On the other hand, farmland and woodland that is also suitable for non-agricultural use can be valued differently from the yield-based valuation. A value class can therefore be included for 'agricultural land suitable for non-agricultural use', as the German Federal Administrative Court has recognised in case law since 1991. For this reason, the Working Group on Land Development recommends that land with wind turbines should continue to be valued by yield in accordance with section 28 of the Land Consolidation Act and a realistic value for the 'agricultural land suitable for non-agricultural use' determined by marking up that value accordingly. The 2010 Property Valuation Ordinance referred to the latter category as land with "special property-specific characteristics" (*"besondere objektspezifische Grundstücksmerkmale"*). A model for the valuation of such special property-specific characteristics is provided in Thomas (1986).

In such cases, however, it is also possible and may even be necessary to apply a valuation at market value in accordance with section 29 of the Land Consolidation Act.

The **second case** relates to land that is within in a priority area in state territorial planning but on which no wind turbine has yet been constructed and no building permission has yet been issued for the purpose. In such cases, the land should be classified as unzoned development land. By analogy with the first case, classification as 'agricultural land suitable for non-agricultural use' suggests itself for valuation purposes, although naturally at a significantly lower value level.

Land values for large priority areas for wind farms or wind power concentration zones are only slightly higher than for agricultural or forestry land. Land occupied by the actual operating assets (land at the base of a wind turbine or used for the necessary access roads) is worth three to five times the value of normal farmland. The final land valuation should be based on the regional market situation for wind turbines.

In addition to valuation matters, the publication cited above (ARGE Landentwicklung 2013b) also contains numerous other recommendations for dealing with this complex subject matter at the various stages of a land consolidation, from initiation of the procedure to the concluding determination.

4.3.4 Valuation of elements deemed essential parts of the land

Elements deemed essential parts of the land (section 94 of the German Civil Code) that lastingly affect the land value must be valued separately where necessary for implementation of the land consolidation. These include buildings and structures permanently attached to the land, extractable resources, trees, perennial plantings and woodland.

In land consolidation practice, it is rarely necessary to value such elements when carrying out the land valuation; they are generally valued only in case of need, as with a changes of ownership occasioned by a land reorganisation.

Valuation of elements deemed essential parts of the land under section 28 (2) of the Land Consolidation Act

> Section 28 (2) If necessary, essential components of the plot that have a permanent influence on its value as well as any rights stipulated in Section 49 (3) shall be appraised separately.

Valuation of standing timber under section 85 no. 4 of the Land Consolidation Act

> Section 85 no. 4 Where the value of standing timber is to be assessed, the principles of the valuation of standing timber shall be applied.

Generally binding principles for the valuation of standing timber (forest appraisal principles) are set out in administrative regulations on woodland valuation (WaldR 2000). Valuation is best done by forestry experts.

If the reorganisation procedure involves large forest stands or it is even a forest land consolidation with an extensive exchange of timber stands as described, for example, in BMELF (1985), it is necessary to decide in advance how best to value the standing timber. Details on the considerations involved are covered in section 5.9.3.3.

In many cases, the value of the standing timber exceeds the land value many times over; the allocation decision in preparing the reorganisation plan is therefore determined not so much by the land values as by the compensation payments required when timber stands change hands. Knowledge of the value of the timber stands is therefore already essential when drafting the land consolidation plan. In such cases, the timber stands on the original plots and their values have to be established by the forestry expert. The results of the standing timber valuation cannot be assigned to new plots on the ground until the land consolidation plan is complete, thus incurring significant additional cost. The forest management plan (*Forsteinrichtungswerk*) maintained by the forestry authorities will help decide if valuation can satisfactorily be based on an average value per unit area.

Where possible, compensation for standing timber should consist in timber values (section 85 no. 8 of the Land Consolidation Act). There are two ways of valuing standing timber: stumpage value and stand value.

Stumpage value (*Abtriebswert*) is a theoretical value that measures the timber revenue less harvesting costs from harvesting all of the standing timber when ready for harvesting at the end of the cutting cycle; the cutting cycle varies according to tree species from 80 years for Douglas fir to 180 years for oak. Stumpage value is generally determined for stands that are nearly ready for harvesting. The net revenue is discounted to present value at the valuation date.

Stand value (*Bestandswert*) is determined from ‘age constants’. It is determined for stands that are far from harvest maturity. The method aims to strike a balance between the costs of cultivation (planting and protection in the first few years) and the expected stumpage value at the end of the cutting cycle.

An alternative that avoids large equalisation payments, which are frequently beyond the means of the participants concerned, is to allow previous owners to continue using their valuable timber stands until harvest under long-term (multi-year) utilisation arrangements. However, this requires complicated tenure arrangements between the participants involved that are at variance with the general transfer of possession in the

land consolidation (section 3.3.1.2). The problem of excessive equalisation payments can also be resolved by selective timber harvesting by the previous owner or long-term loans for the paying party. If none of these alternatives comes into question, the only solution to the problem is to change the compensatory land allocations by adjusting parcel boundaries (BAYSTMELF 1982).

Orchards and individual trees

Fruit trees, berried shrubs, grapevines, hop vines, individual trees, field shrubbery and hedges whose retention is required for nature conservation and landscape preservation purposes or other reasons must be taken over by the recipient of the compensatory land allocation. Under the land consolidation plan, the recipient of the compensatory land allocation may be required to pay an adequate reimbursement and will be required to do so in any case if there is an economic benefit to the recipient. The previous owner is to be given monetary compensation. No monetary compensation is paid for fruit trees, berried shrubs, grapevines or hop vines that are barren, ungrafted or perishing.

Valuation is carried out by expert appraisers and is at market value. The amount reimbursed by the new owner may well differ from the amount received in compensation by the surrendering owner.

As this valuation, too, is only carried out for vegetation that changes hands in the land consolidation, and can therefore only be carried out when the draft land consolidation plan has been prepared, the valuation results are established with legally binding force on publication of the land consolidation plan.

With regard to the subject matter covered in section 4.3.3 in relation to **wind farms, solar farms and biogas plants** in land consolidation, there is no need to go into the valuation of such assets here as transfer of ownership to a third party is not an option.

4.3.5 Valuation of rights *in rem* to plots of land

In land consolidation procedures, the concept of in rem subrogation (dingliche Surrogation) generally applies:

In rem subrogation under section 68 of the Land Consolidation Act

> Section 68 (1) In respect of any rights in the original plots and in respect of any legal relationships concerning those plots, as far as such rights and relationships have not been abolished, the plots received in compensation shall be deemed to be substituted for the original plots. Public encumbrances that run with the land transfer to the new plots designated in the same location.

In rem subrogation applies both to the right of ownership and to all other rights *in rem* to the plots of land.

Other rights *in rem* comprise:

- Easements (easements as such, limited personal servitudes and usufructs)
- Real burdens and land charges (mortgages and land charges, including annuity land charges)
- Real rights of preemption.

Abolition of rights under section 49 of the Land Consolidation Act

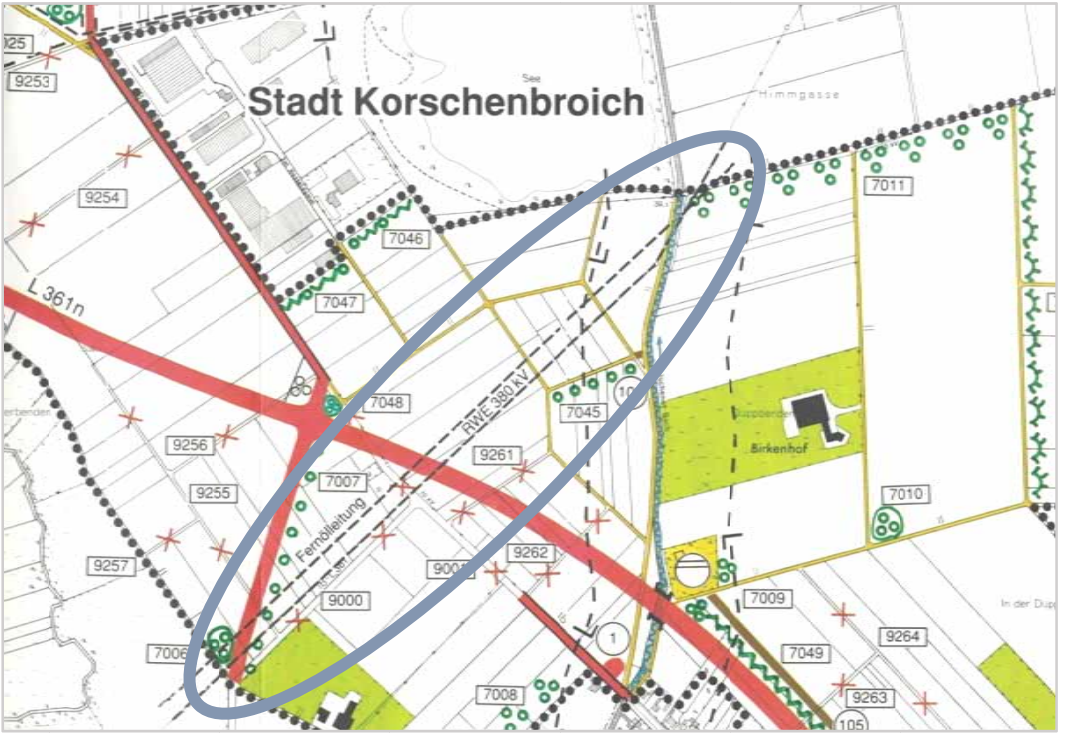
> Section 49 If necessary in pursuance of the land consolidation purpose, easements and land charges, acquisition rights in land as well as any personal rights entitling the holder of such rights to own or use a parcel or to limit the use of it, may be abolished. Holders of rights that have become dispensable as a result of the land consolidation procedure shall not be entitled to an indemnity. If any of the rights specified in the first sentence of this subsection that have not become dispensable are abolished, the holders of such rights shall be compensated either with land or with equivalent rights or, subject to their agreement, with money. Where compensation with land or with equivalent rights is impossible or incompatible with the purpose of the land consolidation procedure, the entitled parties shall be compensated with money.

If a compensatory land allocation is given in return for several original plots or rights that are affected by different legal relationships, the land consolidation authority decides which new plots take the place of the various original plots and rights.

Rights that run with the land (such as pipeline or cable easements) have to be transferred to the new plots containing the pieces of land concerned. Third-party rights to a plot of land that significantly affect its value must be valued separately in a similar way to elements deemed essential parts of the land if the land allocation necessitates compensation for no longer being subject to the right or encumbrance.

Pipeline and cable easements (in the form of an easement as such or a limited personal servitude) normally have to be valued.

Fig. 4.3-17: The pipeline and cable easements for the long-distance oil pipeline (labelled '*Fernölleitung*') and the RWE 380 kV power line shown in the map detail have to be included in valuation.



Pipeline and cable easements that cannot be dispensed with in the land consolidation and have to be transferred to new plots reduce the value of the encumbered plots. They do not affect a plot's natural soil fertility but they do affect its market value. The monetary value of the rights or encumbrances therefore has to be determined as of the valuation date and, in the case of compensatory land allocation with different pieces of land, stipulated in the land consolidation plan as an equalisation payment to be paid or received. Owners who receive compensatory land allocation with different, unencumbered pieces of land under the land consolidation plan then have to make an equalisation payment for no longer being subject to an encumbrance, because they received compensation from the beneficiary (such as a cable or pipeline operator) when the encumbrance was first established. Owners who have to accept transfer of a limited personal servitude as an encumbrance in compensatory land allocation receive an equalisation payment commensurate to the encumbrance. For this purpose, the value is marked up or down both for the width of the buffer strip and for any interference to farming operations due to above-ground assets associated with the cable or pipeline on the land concerned. In the case of overhead lines, these are the line poles or pylons. In the case of pipelines and underground cables, they are above-ground control kiosks for the pipeline or cable.

Other rights that run with the land can be dealt with in the same way. The procedure followed and the basis for determining the equalisation payments to be made and received should certainly be discussed with the board of the body of participants. It makes sense here to have the board of the body of participants decide how these rights are to be dealt with, and on any markups or markdowns, when adopting the valuation framework. The following considerations are helpful in this regard: Transferring rights that run with the land to new plots allocated in the same place is a highly labour-intensive and error-prone step in the procedure, but a good general plausibility check is to ensure that the sum total of the equalisation payments to be paid and received under the land consolidation plan is equal to zero (except for any errors due to rounding).

A model for complex land valuation problems such as agricultural land suitable for non-agricultural use, designated protected areas and rights that run with the land is provided in Thomas (1986). A good overview of the many questions and tasks involved in valuation for the purposes of rural reorganisation is contained in DVW (1997).

4.3.6 Determination of the monetisation coefficient

The main purpose of the land valuation is so that participants can be compensated with land of equal value. However, it also provides the basis for equalisation payments in the event of over and under-allocations in the compensatory land allocation. To this end, the dimensionless value units have to be translated into monetary amounts. It is therefore necessary to determine a coefficient to express the monetary value of one value unit: the monetisation coefficient. This can be done by analysing the purchase prices of agricultural land, woodland and development land. In Germany, it is done using the standard ground values that, as described in section 4.3.3, are updated annually and are nationally available online. Lacking sufficiently well documented purchase prices for farmland and woodland, the monetisation coefficient can be satisfactorily determined by interviewing knowledgeable local individuals and the board of the body of participants.

In the example of Land Consolidation X (see fig. 4.3-15), the board of the body of participants is assumed to have decided the monetisation coefficient as follows:

Monetisation coefficient: €4 per VU

This results in the following square metre prices for the first value class at the various quality levels in the valuation framework:

Fig. 4.3-18: Monetised value units for Land Consolidation X

Quality level	CN	VUs	€/m²
Arable land	2	100	4,00
Grassland	3	60	2,40
Woodland	4	35	1,40
Development land	5	340	13,60
Agricultural land suitable for non-agricultural use	6	170	6,80

The square metre prices for the other value classes at the various quality levels are found by multiplying the number of value units (VUs) by the monetisation coefficient.

4.3.7 Publication and official confirmation of the valuation results under section 32 of the Land Consolidation Act

To make the results of the valuation final and binding for the subsequent stages of the land consolidation procedure, they have to be formally announced and confirmed:

> Section 32 Any documents relative to the results of the valuation shall be made accessible to the parties concerned for inspection. The results shall be explained to them in a hearing. After due settlement of any justified objections, the results of the valuation shall be officially stated by the consolidation authority; the statement shall be made public.

This provision applies both to the valuation of land and to the valuation of elements deemed essential parts of the land. Announcement and confirmation of the valuation results can constitute a separate administrative procedure as part of the land consolidation; in simple cases, however, it can be combined (in whole or part) with publication of the land consolidation plan.

The parties concerned have a right of appeal against the official confirmation of the valuation results (see section 4.6.3.1).

4.4 Fundamental technical considerations regarding the planning and construction of common and public facilities

Over 75% of Germany's land surface is used for agriculture and forestry. Productive and environment-friendly agriculture and forestry require a network of roads and tracks that meet present-day needs. One task of land consolidation is therefore to create an interconnected, multifunctional network of roads and tracks below the network of classified public roads.

Planning roads and tracks, water bodies and landscape preservation features and carrying out land development engineering and soil improvement measures are tools of the trade that the land consolidation engineer must apply skilfully for land consolidation to achieve its purpose. The sections that follow cover relationships and interactions between the planning and implementation of measures in land consolidation to promote the general use and development of the land. For in-depth treatment of the diverse engineering and landscape management issues in road and track laying, hydraulic engineering and landscape preservation, the reader is referred to the literature and to technical standards. The same applies to requirements relating to the use and development of the land in forestry, viticulture and the cultivation of specialised crops.

Rural roads and tracks today serve a far greater range of different needs than in earlier decades. Among other things, this means that the applicable rules and regulations on planning and design have to be reviewed, supplemented and revised on a regular basis. Rapid developments in agricultural technology, the associated spread of large-scale farming since the 2000s and changing farm-to-field and farm-to-factory transportation needs also require technical rules and regulations to be reviewed and updated from time to time. This relates in particular to carriageway and formation width, road and track construction and the design of underpasses and overpasses (Helmstädter; Lorenzl 2018).

Rural road and track networks are shaped by various key factors:

- Technological developments in agriculture
- Multifunctional needs
- The nature and standard of existing transportation infrastructure
- Expected traffic forms, volumes and flows
- The nature and intensity of current and future land use
- Tenure, farm and settlement structure
- Terrain, soil, water and climate conditions
- Soil and water protection
- Natural flood retention
- Nature conservation and landscape architecture
- Recreation provision and conservation of historic monuments
- Field-to-farm and field-to-factory transportation

4.4.1 Principles relating to the use and development of the land

Measures to enhance soil fertility, facilitate the cultivation of the land and protect soils from damage and soil loss come under the headings of land development engineering and land improvement. Comprising irrigation, drainage, floodplain embankment and rural road and track construction for access to farmland, such measures serve to promote the general use and development of the land – what is referred to in German as *Landeskultur*.

Landeskultur deals with production, working and living conditions in the farming countryside. Originally exclusively directed at boosting fertility and sustained yields in agriculture and forestry, related efforts have become increasingly broad in scope over recent decades to cater to multifunctional land use needs (Frede et al. 2001). Today, we understand *Landeskultur* as meaning all planning and activities to preserve the cultural landscape and as far as possible to conserve, shape and make rational use of natural potential, and in particular soil and water. The use and development of the land is also served by conservation measures. These include conserving ecological and land improvement focus areas that are taken out of agricultural and silvicultural production and safeguarding seminatural habitats that depend on extensive farming (Baldenhofer 1999).

Land reorganisation measures under the Land Consolidation Act that are aimed at improving local conditions and circumstances for agricultural and forestry productivity thus always also involve measures relating to the use and development of the land. The relevant legal basis is found in section 37 of the Land Consolidation Act. This stipulates that the area in question is to be rearranged; scattered or uneconomically shaped plots are to be consolidated to meet modern managerial requirements and reshaped to obtain units of a more favourable location, shape and size; tracks, roads, water bodies and other common facilities are to be provided; and soil-conserving, soil-improving and landscaping measures are to be implemented along with any other measures improving the basic conditions of farming enterprises, reducing the amount of work and facilitating farm management. The land consolidation authority must carry out these assigned tasks having due regard to the structure of the landscape, to the interests of the parties concerned as weighed against each other and to furtherance of the general use and development of the land. This places the initial focus of reshaping efforts on the natural potential of the land and landscape. Conserving and protecting that potential and maintaining or restoring the natural equilibrium is consequently the prime focus of measures to enhance the use and development of the land. Ensuring an ample endowment of features that provide structure to the countryside not only enhances the scenic beauty of the cultural landscape, but also creates refuges for flora and fauna and helps prevent water and wind erosion. If a reorganisation area includes woodland, special attention must be paid – from both an ecological and a silvicultural perspective – to the farmland-woodland boundary because of its herbaceous and shrub vegetation. Woodland margins need to be preserved as they are, and providing roads and tracks to separate them from farmland is beneficial for woodland and farmland alike. The same applies when it comes to separating poor farming land (marginal land) from ecologically valuable areas.

Maintaining and improving the quality of waters is an area governed by EU law (EU WFD 2000). Restoring aquatic environments to a state that is as natural as possible and ensuring that they remain in that state for the future is among the objectives of any modern-day rural reorganisation measure.

The objectives and measures mentioned above do not stand in isolation, but are to be viewed in the context of and interact with the productive use of farmland and woodland.

Improving the use and development of the land also involves reshaping the network of rural roads and tracks. These connect one place with another and provide farms and forestry enterprises with access to farmland and woodland. At the same time, they are landscape features that structure and shape the cultural landscape, and any modifications or improvements have to be carefully blended in. In land consolidation, all of this is done in implementation of the plan under section 41 of the Land Consolidation Act and the reorganisation of tenure in the land consolidation plan.

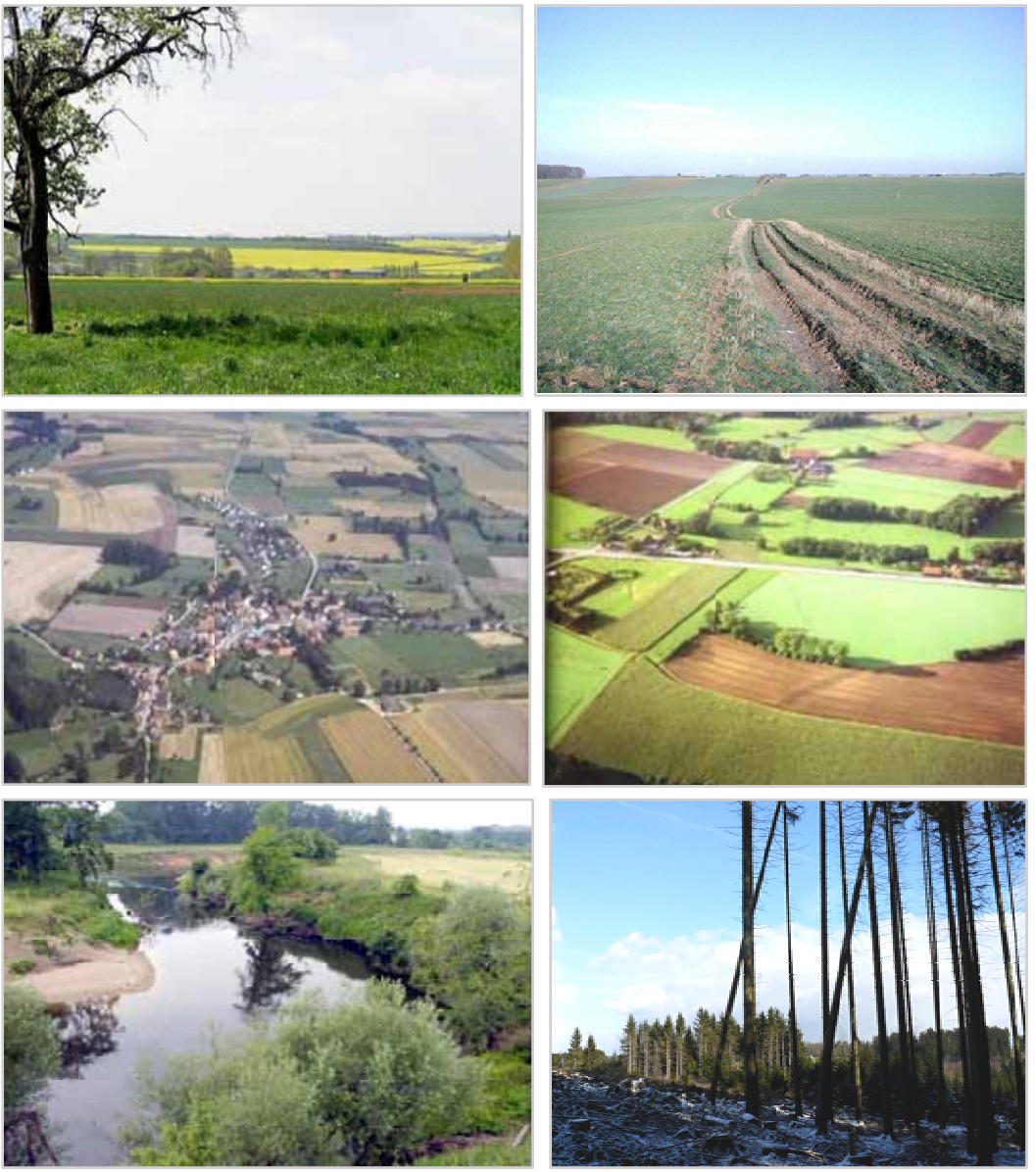
4.4.2 Interrelationships between plan preparation and plan execution in the use and development of the land

The plan covering the common and public facilities with the accompanying landscape conservation plan pursues a vision for the future development of the reorganisation area. It is a functionally and structurally coordinated planning complex that works down from the broader context to small-scale, individual measures and involves numerous interdependencies. The plan is therefore more than the sum of the individual measures to improve the use and development of the land. It also already shapes the layout to be developed in its final form in the land consolidation plan and must be drawn up so as to enable the best possible reorganisation of the farmland and woodland while preserving the conditions present in the procedure area with regard to landscape structure and the general use and development of the land. The goal is for the outcome of the reorganisation to blend harmoniously into the landscape while preserving and developing valuable landscape features.

The planning must be carried out in such a way that the intended outcome of the reorganisation will not be compromised by ‘creeping’ agricultural changes, such as embankments or hedges being removed in the course of cultivation, ploughing up of grassland, pond habitats being filled in and so forth. This also applies in implementation of the planned construction works; these must be capable of being professionally executed as planned and delineated, and also in a way that preserves the landscape. If soil improvement measures are needed before transfer of possession – such as laying connecting or field drains or breaking up subsoil compaction – so that the compensatory land allocations for individual participants are of equal value (plan-specific land preparation measures), care must be taken to make sure that the measures have lasting effect and are environmentally compatible. Because of this, both the planner and the surveyor setting out and surveying the planned works for the cadastral register must be knowledgeable in land development engineering and land improvement; the engineers

involved must have a realistic idea of how the planned works and measures will be executed on the ground and fit into the landscape when completed. If such knowledge is lacking, remedial work may have to be done later on, with further impacts on nature and the landscape, or in serious cases revisions may have to be made to the land consolidation plan.

Fig. 4.4-1: A reorganisation of farmland has to take into account the structure of the landscape in the procedure area together with the conditions present with regard to furthering the use and development of the land (photo: BayStMELF)

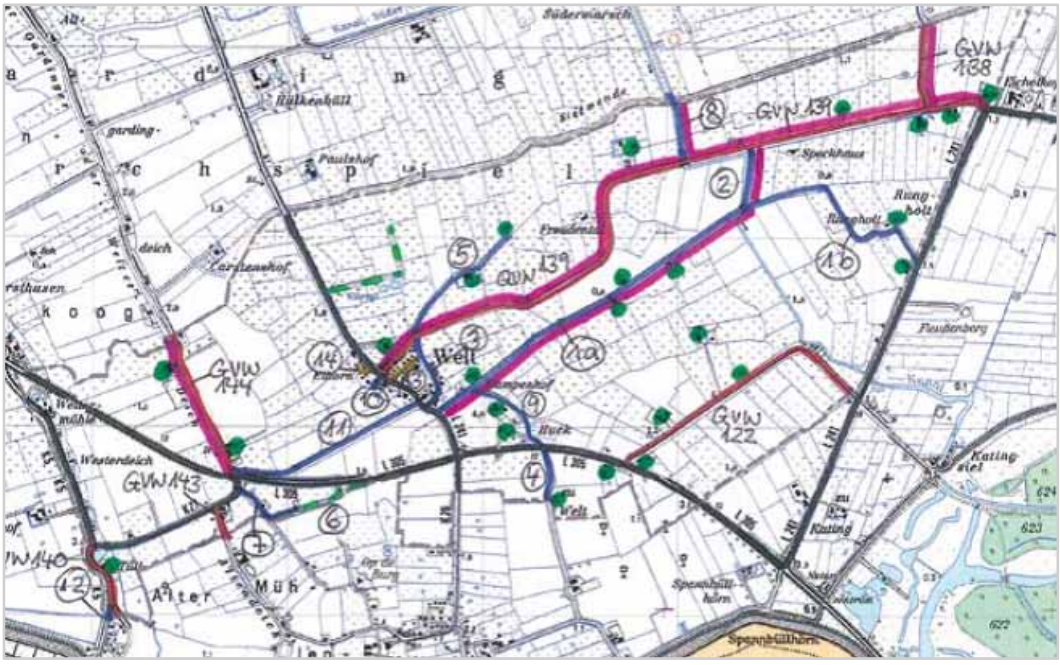


4.4.3 Rural roads and tracks

4.4.3.1 Planning objectives and planning principles

Rural access infrastructure consists of an extensive network of roads and tracks of varying function and quality. The rural road and track network developed in Germany primarily between the 1950s and 1980s was at first mostly used for agriculture. Today, that same network also serves diverse non-agricultural users (walkers, touring cyclists and mountain bikers, horse riders, joggers, inline skaters and so on). For this reason, we no longer speak here of agricultural but of rural roads and tracks. This terminological distinction aims to reflect today's multifunctional uses, which because of the differing needs of the various user groups can lead to conflicts and even accident risks. While it is reasonable to expect all users of rural road and track networks to show mutual respect and look out for each other (DLKG 2010), the multifunctional uses just mentioned must also be given due consideration when planning a new rural road and track network in a land consolidation procedure.

Fig. 4.4-2: Identifying origin and destination traffic and characterising road function and user groups (ALR-SH 2011)



Local and regional conceptual plans for a rural road and track network should be based on the following goals:

- For efficient use of rural infrastructure, routes should be planned jointly with neighbouring local authorities
- Clear functional assignment of roads and tracks enables the network to be wider-spaced and optimised with a view to the ever-increasing field sizes in agriculture

- Planning of the road and track network must have due regard to natural systems and further the development of the cultural landscape
- The various user needs must be coordinated
- The network should enable conflict-free use
- Roads and tracks should also be planned and constructed so as to keep down long-term maintenance costs.

A systematically produced guide on upgrading rural road and track networks with numerous practical recommendations can be found in a study, *Wege mit Aussichten*, published by Akademie für ländliche Räume Schleswig-Holstein e.V. (ALR-SH 2011).

These goals are best achieved if road and track network planning is integrated into overall planning for the whole local region in an integrated rural development approach; this is the most effective way of meeting the various economic, environmental and sociocultural requirements. The anticipated development of the area as shown in the local municipal preparatory land-use plan should be taken into account when planning the road and track network (Bertling; Kriese; Lütkemeier 2015).

Planning of the new road and track network requires comprehensive analysis of the existing situation, covering relevant user groups, origin and destination traffic and the function of specific routes; this also includes analysing traffic movements at supra-local and regional level. The planning of the road and track network is a significant factor in farm productivity; it cuts travel and turn times in tilling, reduces machine operating and labour hours, helps minimise the use of fertiliser and pesticides as well as fuel consumption and can encourage machinery pooling.

Planning should cover the entire area and proceed from large to small, starting off by calling into question the farm roads and tracks already in the planning area. In particular, agricultural traffic should be kept apart from everyday road traffic as much as possible. The routing and size of individual roads and tracks is decided by their present-day and expected future importance, both in the surroundings of the procedure area and in the regional context. This calls for accurate estimation of future agriculture and forestry working and vehicle movement patterns. The road network also needs to be coordinated at regional level. Whereas in the past, farm roads and tracks mainly catered to transportation between farm and field or between neighbouring communities, today that is true only to a limited extent. Structural change in German agriculture over recent decades has created a situation where farms have to manage land not only in their own community, but in some cases literally ‘far afield’. In addition, agricultural traffic patterns today are partly determined by pooling of large machinery and by the extent to which agricultural contractors are used for tilling and harvesting. Origin and destination traffic in material and harvest transportation is mostly no longer focused on the farm but extends to purchasing and marketing locations in the region and beyond. Service traffic for biogas plants involves yet another, different set of factors that are specific to such operations.

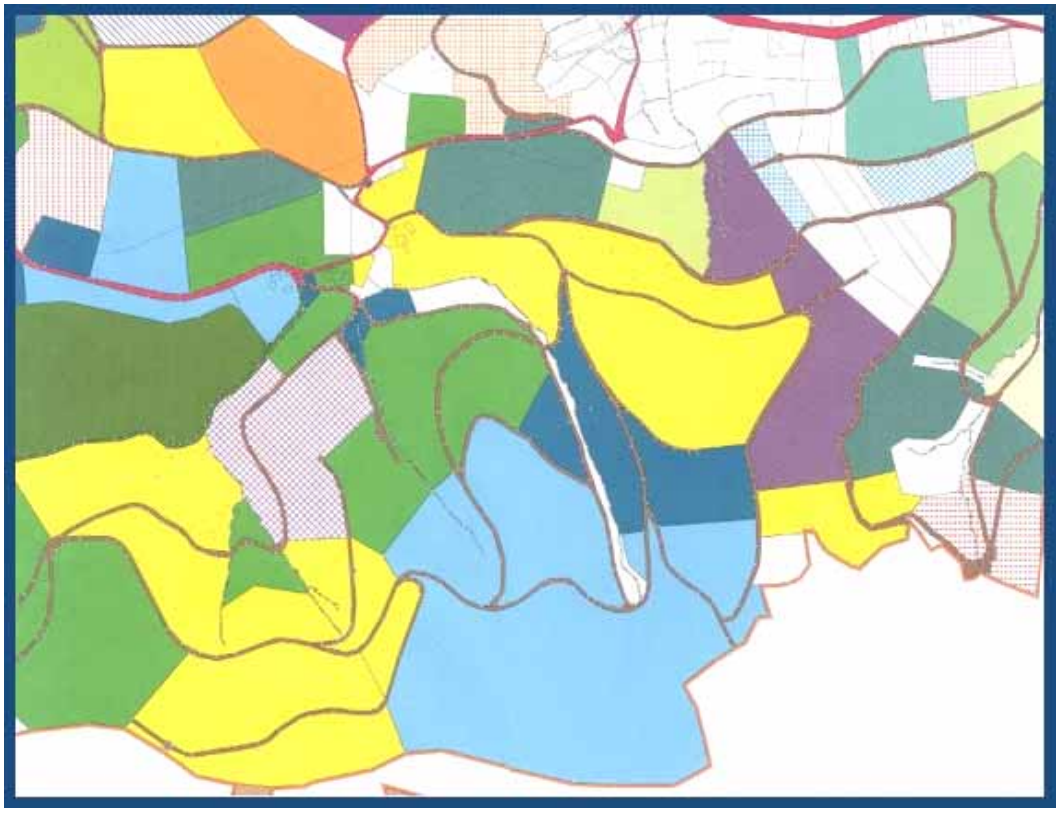
As regards axle loads and driving speeds of agricultural machinery, rural roads off the main public road system in Germany today must meet all maximum permissible specifications in the German Road Traffic Registration Regulations (*Straßenverkehrs-Zulassungs-Ordnung*), although with a reduced design speed of 40 km/h.

The changed present-day requirements for rural road and track networks have major cost implications. These sometimes lead to thoughts of restricting road construction to a 'core network' that has to meet the increased requirements regarding dimensioning and build quality in full (primarily with a view to heavy traffic). Farm vehicles then only use the remaining roads and tracks off the core network for accessing actual farmland. Carriageway widths and quality in the core network must accommodate modern agricultural machinery.

Special attention should be paid to how rural roads and tracks connect to the public road network. Among other things, the number of junctions should be kept to a minimum. Junctions should also be designed to enable safe turning into and out of the side-roads.

The road and track network must blend harmoniously into the countryside and routed to follow the shape of the landscape. When planning, due regard must be given to valuable landscape features (and not just those protected by law). Road and track construction must meet ecological, hydrological and aesthetic requirements. While connecting roads should conform with the landscape, field-access and field-dividing roads and tracks in arable areas need to be planned in accordance with the requirements of mechanised agriculture. In steeply sloping terrain, tracks follow the topography as contour tracks. The spacing between these depends on the slope and on the soil type and associated erosion risk.

Fig. 4.4-3: Road and track network in Oberelspe land consolidation with contour tracks following the topography (source: BezReg Arnsberg)



The planned network of roads and tracks shapes the future pattern of fields and woodland in the land consolidation procedure. As far as possible, it should be designed to result in large fields that are easy to farm. The spacing of the agriculture road and track network determines the size and shape of fields for cultivation. In the case of smaller and medium-sized farms, the requirements in this regard are mainly determined by the harvesting machinery (especially in potato and beet farming), and also by erosion prevention and irrigation needs; the situation is different in large-scale arable farming. Network density is measured in m/ha or km/ha. It is a figure of statistical interest and is sometimes used to cap the size of public grants for a land consolidation procedure, although it very rarely serves as a planning criterion. Other structural conditions such as ownership and tenure, land use forms, farm labour relations, farm operations, etc. are more relevant.

The plan covering the common and public facilities and the subsequent new field layout have a key impact on effective soil protection. While roads and tracks can help retain water, they can also accelerate runoff if badly planned. The network spacing should be as large as possible. Surface type is another factor affecting runoff in the procedure area. Unbound surfaces and tracks are therefore to be preferred over bound surfaces. When using bound surfaces, preference should be given to surfacing wheel tracks over surfacing the entire width. Roads and tracks and their ditches should follow the contours of the terrain where possible. Side ditches should be designed to retard surface runoff and let water soak into the land. Roads and tracks, hedges, banks and terraces that cut across the slope of the terrain provide natural barriers to runoff. In large-scale arable farming areas, grass strips several metres wide across the direction of slope can effectively counter soil erosion.

Roads and tracks should be laid out to avoid concentrating the flow of surface water; where possible, they should have a crossfall towards the down-slope side to allow stormwater to soak away over the track shoulder. Retaining stormwater in the landscape and retarding runoff aids water infiltration, evaporation and the retention of solids suspended in surface water. If it is not possible to avoid concentrating the flow of surface water, it should be channelled along ditches on the up-slope side of the road or track and discharged into the nearest natural watercourse. In woodland, surface water can be channelled off downhill at short intervals. This slows water runoff and promotes the deposition of washed-off soil particles. Stormwater can be drained via a vegetated swale. For vehicular access to land on the other side of it, a swale can be interrupted by a pipe culvert or paved ford.

A woodland track network should be connected to the public road network in such a way that the harvested timber can be transported safely and cost-effectively to the sawmill. The inlying access network for woodland should be geared to the requirements of forestry operations while having due regard to averting dangers to the public in the case of storm, snow breakage, forest fires and suchlike. Usually, an access infrastructure requirements plan (*Wegebedarfsplan*) at the relevant state forest administration will provide an initial overview of access needs in the region. Tracks should be planned for minimum impact on the landscape and on timber stands, as stands exposed by new roads or tracks are highly vulnerable to windblow in the first few years.

Cut timber is generally stacked along forest roads, and sufficient unsurfaced roadside strips need to be provided for the purpose. These should not exceed a width of 4 m alongside the road due to the limited reach of transport vehicle crane arms. A sufficient number of landings (timber stacking areas) should also be provided for. Fire control measures such as fire ponds and firebreaks should be designated and maintained as common facilities. Account must also be given to the recreational function of woodland for the public by planning a network of tracks that meets the needs of other woodland users as well as forestry requirements. Recreational use of woodland can be usefully guided by creating recreational amenities such as car parking, woodland nature trails, barbecue areas and playgrounds.

Full and accurate appraisal of the terrain when planning roads and tracks in hilly and mountainous areas requires reliable elevation maps or digital terrain and elevation models. Even if good geo-topographic map material is available from the state survey service, critical terrain will still require visual inspection on-site and additional site surveys. Having high-quality elevation data and detailed topographic information available when drawing up the plan covering the common and public facilities improves the quality of the plan and the reliability of cost estimates for infrastructure.

4.4.3.2 Design elements for agricultural and forestry roads and tracks

The guidelines on rural road construction (*Richtlinien für den ländlichen Wegebau*) published by the German Association for Water, Wastewater and Waste (DWA 2016/2018) distinguish the following categories:

Connecting roads (*Verbindungswege*) connect farms and forestry holdings to the public road network and connect farmsteads and forestry enterprises with the farmland and neighbouring places.

Farm roads and tracks (*Feldwege*) comprise service roads and grass tracks. Service roads (*Wirtschaftswege*) provide access to fields within a field block. According to the traffic load, they are either surfaced or are naturally hard-wearing and so do not need artificial surface dressing; they provide access for cost-efficient deployment of agricultural machinery but are navigable only in the right seasonal conditions. If they are to serve vehicular traffic all year round, service roads need to be upgraded accordingly.

Grass tracks provide access to individual fields for farming. They are unsurfaced farm tracks navigable by tractors and other agricultural equipment and machinery only in suitable seasonal conditions.

Design elements for agricultural and forestry roads and tracks are determined by the expected traffic load. For connecting roads, the priority is on speed of transit. The use of transition curves (clothoid curves) to specify the road axis, while previously unusual, is likely to become more common in future for roads carrying heavy loads and long vehicles. Parameters for circular and transition curves depend on the terrain, the length of vehicles that normally use or are expected to use the road and the prevailing speed of travel. Bends curving in opposite directions should be separated by at least 15 m of straight road. When routing service roads, the priority is on ensuring that adjoining fields are conveniently shaped, as this is essential to the cost-efficient

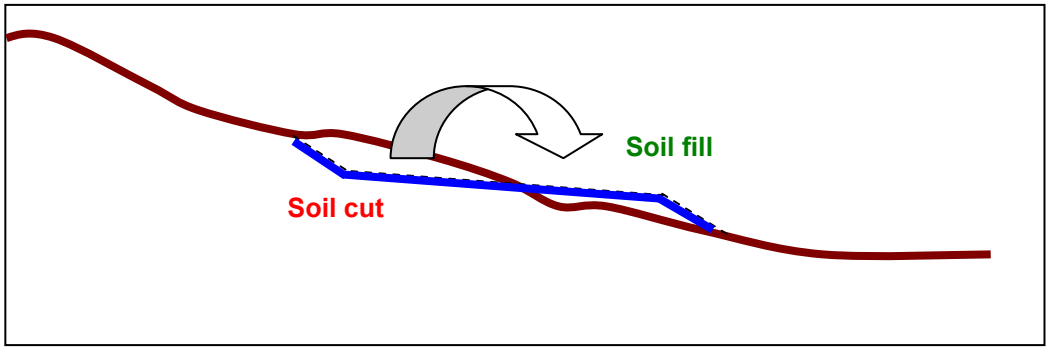
deployment of modern agricultural machinery. At the same time, strict geometric shapes should also be avoided where possible for aesthetic reasons. Visibility splays must be maintained at crossroads and junctions; the required length of visibility splays depends on the design speed for the road in question.

The road gradient should conform as far as possible to the terrain. Where possible, connecting roads should be laid out with a uniform gradient. Changes in gradient or even opposing gradients in a connecting road should be avoided. A useful way of identifying a route that satisfies these requirements is the 'no-cut/no-fill' line. Certain maximum gradients should not be exceeded (6% for connecting roads and 8% for service roads). In exceptional instances, a 12% to 15% gradient may be permitted for short stretches, although this generally requires a bound surface. A gentle gradient of not less than 1% should be allowed for so that surface water can drain away.

Switchbacks should be used only as a last resort because hairpins encroach severely on the landscape.

In hilly and mountainous terrain, slope cuts, through cuts and through fills are unavoidable; as well as constituting interventions in the landscape that require ecological offsetting, these also add to the cost of construction and to the land footprint for the roads. The simplest form of slope cut is a cut-and-fill road where the material excavated above the road is reinstated below.

Fig. 4.4-4: In a cut-and-fill road, the material excavated on the up-slope side (cut) is reinstated on the down-slope side (fill)



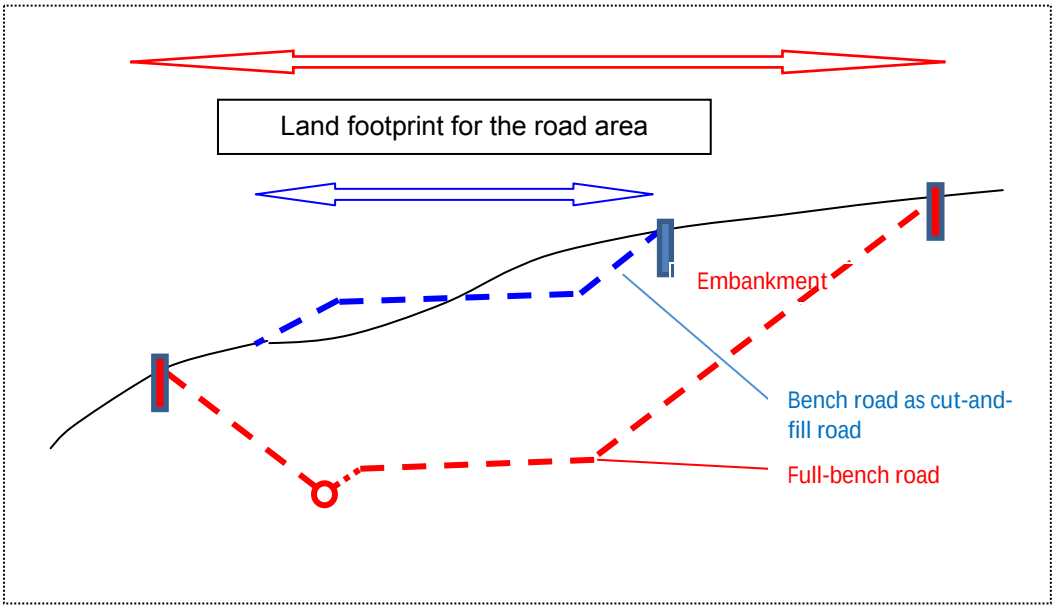
When earthworks are unavoidable in road construction in order to achieve a uniform gradient and crossfall, we speak of designing and constructing a full-bench road. This generally involves excavating a larger or smaller volume of soil material and filling it elsewhere. In many cases, the excavated material has to be carted away by truck to where it is to be filled. A cut-and-fill road is a special case of bench road, as the excavated material is reinstated immediately down-slope.

Full-bench roads should be designed with their gradient on a balanced cut-and-fill basis, meaning that the 'cut' volume and the 'fill' volume are equal. This minimises the transportation costs of material to be excavated and filled elsewhere.

As figure 4.4-5 below also shows, a full-bench road – where balanced cut-and-fill is not possible *in situ* because of the terrain – not only costs more to build than a plain cut-and-fill road, but also means that a bigger land footprint has to be designated for the

road and consequently met out of the land contribution under section 47 (1) of the Land Consolidation Act (see section 3.2.5.2). In the example shown, a full-bench road would have around double the land footprint of cut-and-fill for the same stretch of road.

Fig. 4.4-5: Land footprint and construction cost by road construction method



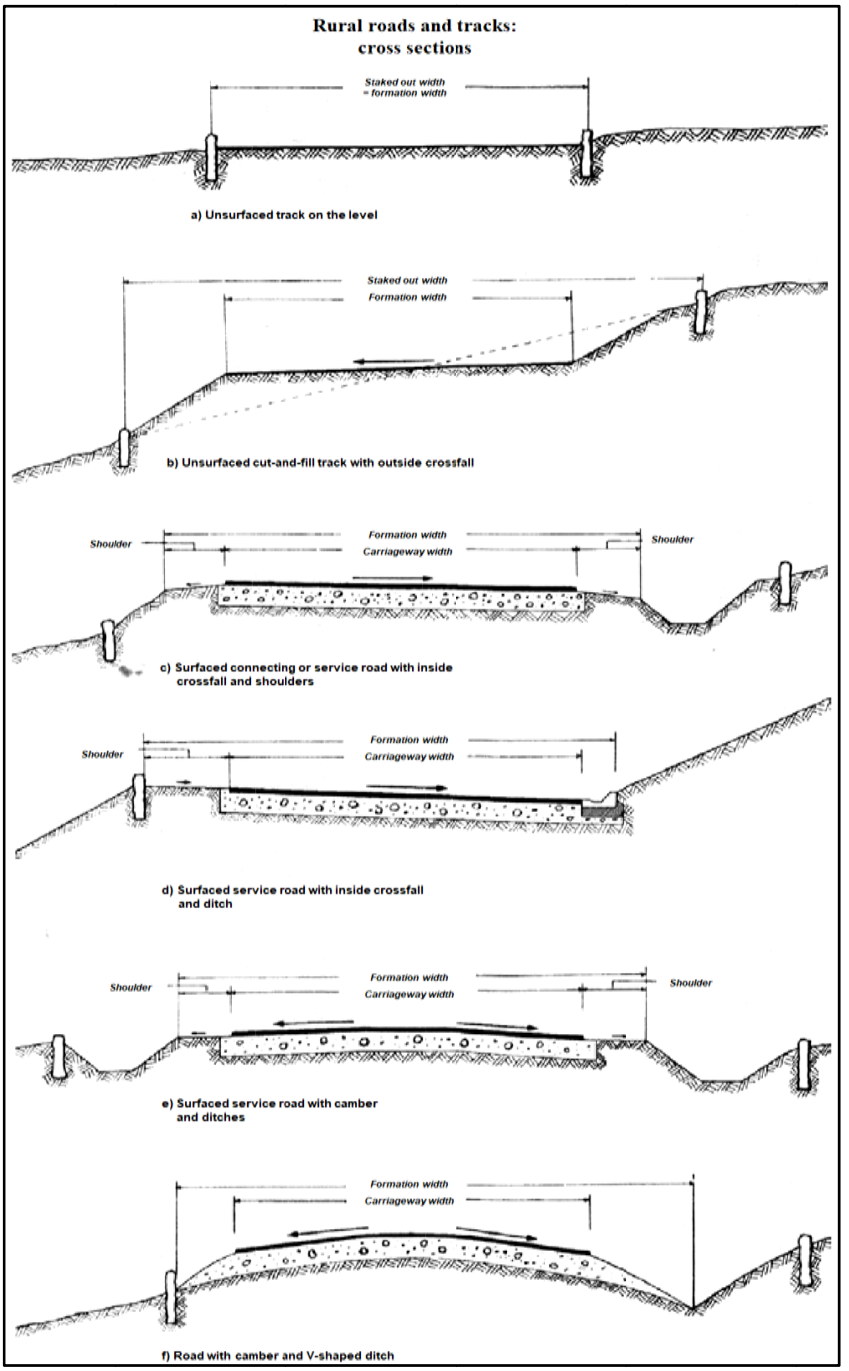
For year-round navigability, the road structure needs to be kept dry. Where the soil type allows, this is usually done by means of side ditches. Water infiltrating or percolating from the side is also kept off the road structure by side ditches; pipe drains or trenches are possible as an alternative.

In the case of silty soils with high soil water content, the road structure may have to be stabilised, for example with geofabric underneath; longitudinal drains within the road structure can also help keep it dry. As a general rule, side ditches should only be dug where absolutely necessary. Where they are necessary, care should already be taken at the route planning stage to ensure that, if possible, the track does not run through the lowest point in the terrain.

Drainage of surface water is crucial for stability and long-term serviceability; it is achieved by the base course or combined base/wearing course having a crossfall of at least 3%. The shoulder should have a 6% crossfall.

Rising springs and standing waters should be given a wide berth. Unavoidable watercourse crossings should be planned for minimum impact on the landscape and the watercourse. When routing tracks across wet land, it should be borne in mind that the road drainage can also end up draining the adjoining land.

Fig. 4.4-6: Cross-sectional design of rural roads and tracks (BMELF 1992)



The road or track cross-section is determined according to traffic volume. Most rural roads or tracks will be single-lane; if there is frequent oncoming traffic, it is necessary to design and build a two-lane road. In the case of a single lane, vehicles pass using the shoulder(s), which need to be structurally stabilised for the purpose.

Fig. 4.4-7: Passing traffic on a rural track (DLKG 2010)

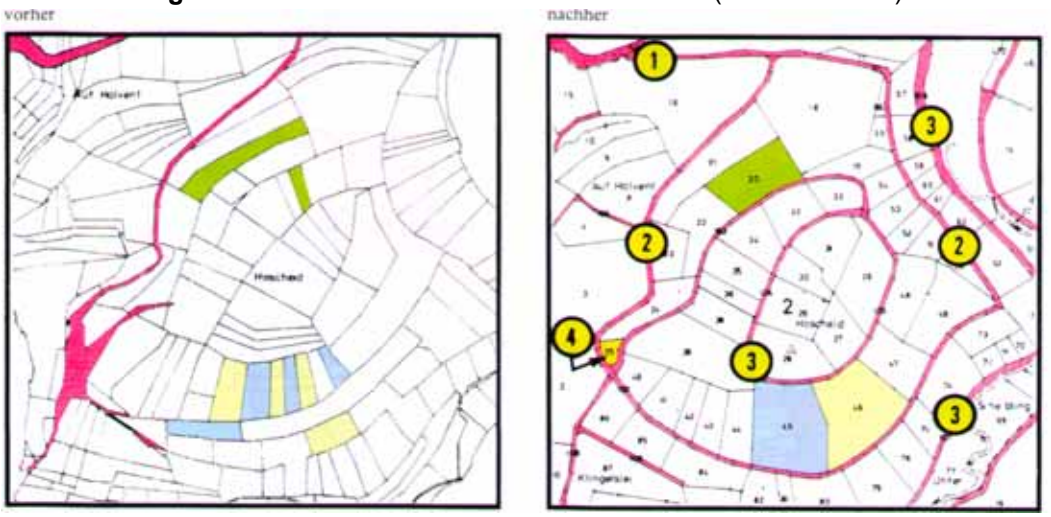
Woodland tracks are used for access to and management of adjoining areas of woodland. According to their differing functions, they are divided into surfaced or naturally hard-wearing forest roads and unsurfaced extraction tracks. About one-third of forestry traffic is heavy truck traffic, the other two-thirds being general operating traffic.

Heavy-duty forest roads are mainly used for timber extraction by heavy trucks, farm or forestry tractors, and tractors with trailers or log haulers. The remaining operating traffic comprises cars, minibuses and other forestry administration and forest workers' vehicles transporting, among other things, supplies, planting material, fences, gates and fertiliser. Forestry harvesters also use the road network to enter the area but from then on move freely as far as the terrain allows. Forest roads need to be constructed and surfaced so that they can be safely used by all heavy trucks and specialist equipment approved under the Road Traffic Registration Regulations. They are designed for low speeds and in most cases for timber haulage.

Forest roads should allow rapid transport and conform as well as possible to the terrain. They should have a uniform gradient wherever possible to avoid gear-shifting. Most of all, they should not have opposing gradients and should be well surfaced and navigable all year round. The roads should lead, without any need for turning, by the shortest route from the landing to the public road. Where a forest road connects to the rural road and track network, the section through to the next public road must withstand the same design loads as the forest road. Dead-end tracks with turning areas should be avoided as much as possible. The author of this book does not share the view sometimes advanced in the literature that dead-end tracks keep out through traffic; they are not a suitable solution and are excessive with regard to the associated environmental impact and constructional problems. Instead, provision should be made for heavy trucks to make a round trip, as shown in the illustrative example below.

Minimum radii should not be less than 20 m in flat terrain and 12 m in steep terrain. Hairpins in steep terrain and bends with a change of direction greater than 45 degrees require special design elements and are generally to be widened on the inside of the curve according to the minimum turning radius; for further details, see BMELF (1992).

Fig. 4.4-8: Woodland road and track network (MWVLW 2006)



Forest roads for timber haulage require a carriageway width of at least 3.50 m and a (surfaced) formation width of at least 4.50 m. On straights, the road profile should have a 5% to 7% camber to either side; on bends, a crossfall may be appropriate.

Extraction tracks and other unsurfaced forest tracks only need to be navigable by forwarders and are used to transport the timber to the landing. They can have a gradient of up to 50% and are generally 3 m wide. Their spacing depends on the navigability of the terrain; in any case, the forwarder must be able to transport all harvested timber to the landing. Extraction tracks should join the forest road as near as possible to the landing.

As with agricultural road and track networks, the density of a forestry road and track network is stated in km/ha and is determined as the total length of the roads and tracks divided by the area to which they provide access. However, a better measure of the degree of accessibility achieved is the average spacing between forest roads. This applies especially when providing access to steep terrain where timber can no longer be picked up by forwarders or harvesters; it then has to be cable-extracted to a point where the terrain is navigable. The maximum distance for cable extraction is generally 100 m.

4.4.3.3 Standard construction methods for agricultural and forestry roads and tracks

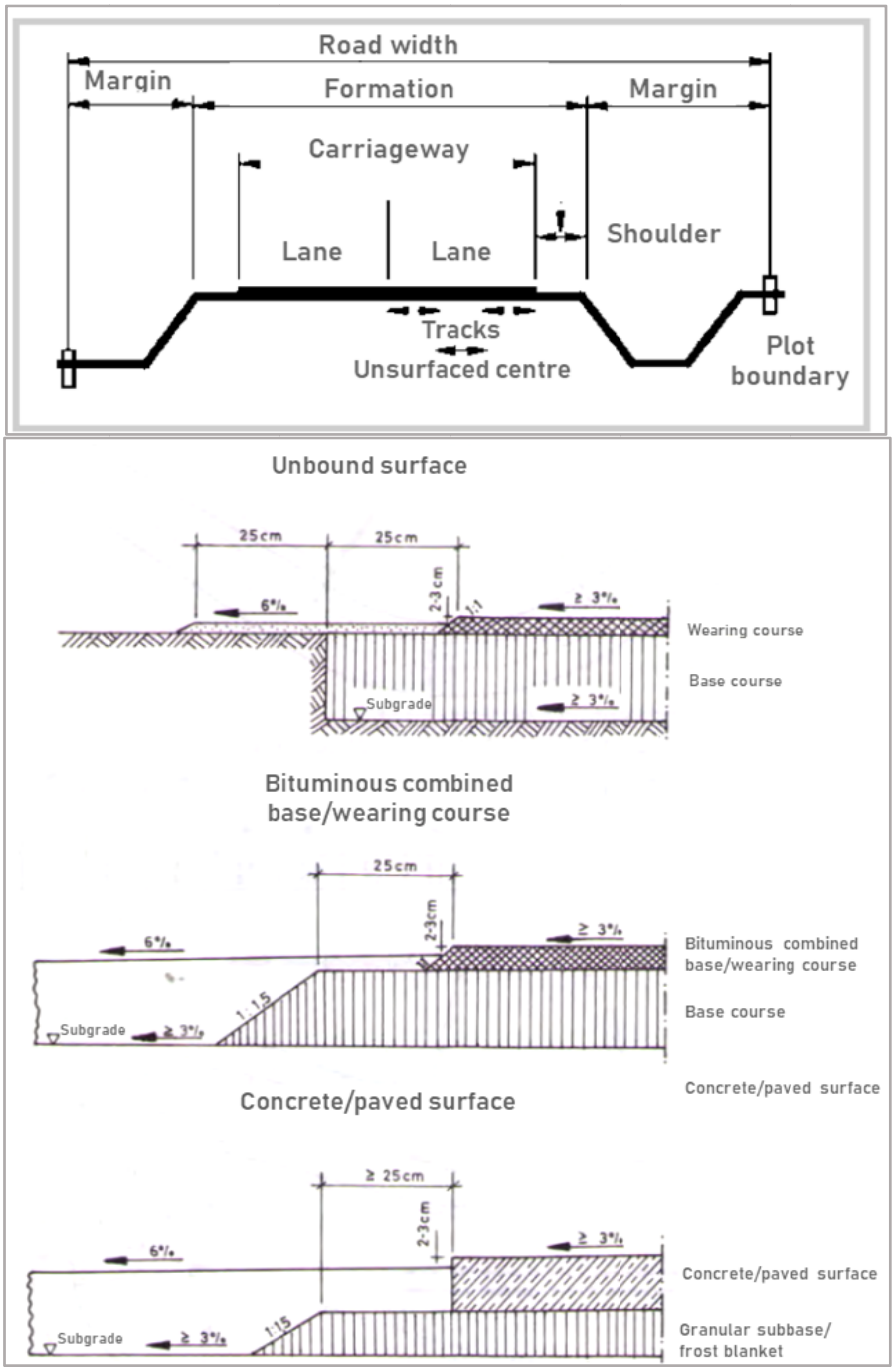
The method of construction of agricultural and forestry roads and tracks is determined by local conditions, ecological requirements, technical and economic aspects and regional experience. It must also be geared to the degree of wear, which depends on traffic volume, axle loads, vehicle speed and expected total weight. The following standard construction methods are available:

Fig. 4.4-9: Standard construction methods for agricultural roads and tracks

Type of surface	Surface coverage
Without binder	**Entire surface area**
With hydraulic binders and concrete	**Entire surface area or tracks**
With asphalt	**Entire surface area or tracks**
With paving stones	**Entire surface area or tracks**
With track slabs	**Tracks**

The structure of an agricultural road or track follows the following basic scheme:

Fig. 4.4-10: Basic structure of an agricultural road or track
(DWA 2016/2018, BMELF 1992)



When constructing a road or track, the route line is first cleared by removing vegetation, built structures and other obstacles. The topsoil is stored to the side of the route line and later reused to landscape the side banks. In the ensuing earthworks, the

substratum is prepared as planned and the sub-base laid if needed. The required earthworks comprise removing, loading, transporting, filling and compacting soil, stone and other suitable material; this also includes the use of geosynthetics and geotextiles.

Next, the subgrade is prepared to receive the road or track structure by planing and compacting. Silty soils may require soil improvement by mixing in lime or cement to give the subgrade sufficient stability. The lower base course is laid on the subgrade, followed by the upper base course and, if needed, an additional wearing course.

The (unbound) lower base course made of crushed stone material or gravel has to spread the forces exerted on the substratum in such a way that loads do not distort the road structure. Its thickness varies between 0.20 m and 0.45 m (in its final, compacted state) and is determined according to the expected axle loads. The thickness of the lower base course also depends on whether it is made of crushed or uncrushed stone. It should be laid about 0.20 m wider to each side than the upper base course so as to prevent edge damage when the edge of the road or track is driven on. The bound upper base course prevents the surface from wearing out too quickly under vehicular traffic and also increases load-bearing capacity. It is made of aggregate material with a specified particle size distribution and is mixed with hydraulic binders or with bitumen as a binder. The wearing course protects the course below from water penetration. It is usually made of asphalt mix or concrete. For cost reasons, however, preference is frequently given to a single-layer combined base/wearing course made of asphalt or hydraulically bound material, which has the properties of both the upper base course and the wearing course and must therefore have a suitable material composition.

Fig. 4.4-11: Load suitability of rural road and track construction methods
(KTBL 2005)

Construction method	Heavy loads	Medium loads	Light loads
Without binder and without surface course	unsuitable	suitable	suitable
Without binder and with surface course	suitable	suitable	suitable
Asphalt surface	suitable	suitable	
Asphalt track	unsuitable	suitable	
Concrete surface	suitable	suitable	
Concrete track	unsuitable	suitable	
Paved surface	suitable	suitable	
Concrete block paved track	unsuitable	suitable	
Track with concrete slabs	unsuitable	suitable	
Hydraulically bound combined base/wearing course	unsuitable	suitable	
Hydraulically bound wearing course	unsuitable	suitable	

In the case of single-lane roads and tracks, the shoulders must be able to withstand occasional passing traffic without damage and must therefore have the same load-bearing capacity as the carriageway. This means the base course must then be widened to include the width of the shoulder, which will be filled and compacted with unbound base course material once the bound carriageway surface has been laid. The shoulder has to drain surface water away from the carriageway so that it does not infiltrate the base course. To this end, it is laid a few centimetres lower than the top surface and given a crossfall ≥ 6%.

Banks should generally have a slope of 1:1.25 in the case of through cuts and 1:1.5 in the case of through fills. They should be made less steep if the soil has low stability. With stable soils, banks in a through cut can be steeper. At all events, however, it is necessary to check if stability is compromised by increased water uptake or the ingress of stratum water in the event of prolonged precipitation. A clear presentation of basic construction concepts for rural road and track construction, including a description of the pros and cons of different construction methods and additional literature, is provided in ALR-SH (2008b).

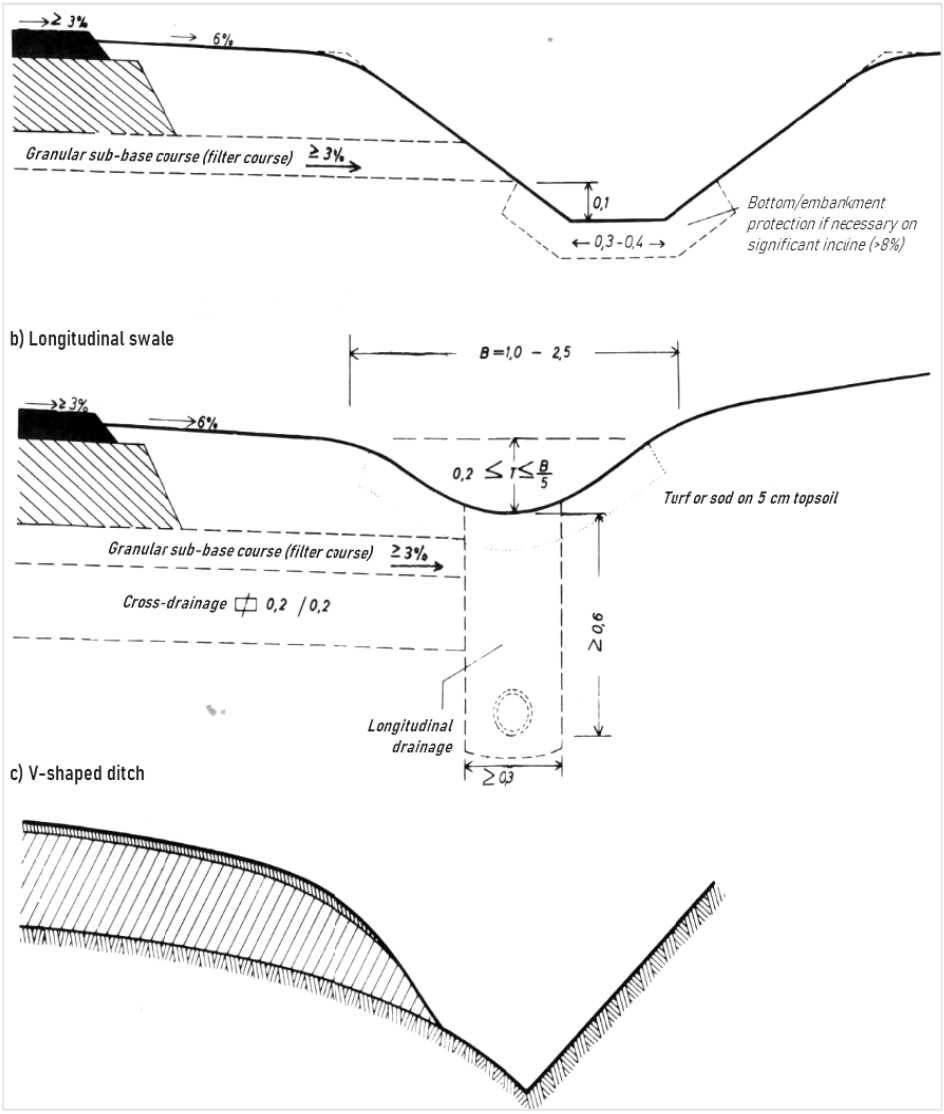
A decisive factor for the durability of a road or track is sufficient and lasting drainage of the structure. This is usually achieved by means of side ditches that must be at least 0.20 m deeper than the subgrade; in upland terrain, they also keep the structure free of water percolating from uphill. Groundwater emerging from embankments is captured by stone drains or longitudinal trenches and channelled into the side ditches. If the side ditch has a gradient exceeding 5%, it should be stabilised with riprap.

Water from the side ditches should be discharged in natural water bodies at every opportunity. A trap is usually needed to collect any washed along debris before discharge into a nearby water body. If side ditches are dispensed with, surface water is shed into down-slope channels or allowed to soak away through the fill slope.

When building forest roads, it is not usually necessary to excavate soil to form the subgrade. Instead, only rootstocks and butts need to be dug out and cast aside to rot naturally, and the topsoil removed to the side. Mineral material is then applied to the ground prepared in this way. If the substratum is unstable, the road should be rerouted to the side where the ground is stable; ground stabilisation by mixing in cement or trass lime or by inserting mineral fabric is not done in woodland in any case. The mineral layer may have to be made thicker to achieve the desired load-bearing capacity; it is sometimes helpful to add layers of pine or spruce brash. Where needed, side ditches should be V-shaped.

A special feature of forestry roads and tracks is that forest roads are sometimes little-used for years at a time, only to come under frequent use with a large proportion of heavy loads for management measures and when it comes to harvesting the timber. This has to be taken into account when planning and surfacing forest roads and in their maintenance. In areas of plenter forest, the periods between low and high traffic volumes are far shorter and more evenly spread.

Fig. 4.4-12: Options for road and track drainage (BMELF 1992)



4.4.3.4 Special-purpose infrastructure in agricultural road and track networks

The size of the area covered by a rural road and track network makes it necessary to cross public roads, rail tracks, watercourses and other linear infrastructure such as water mains, sewers, pipelines, underground cables and suchlike. These crossings are either ‘at grade’ (in the same plane) or ‘not at grade’ in the form of an overpass or underpass.

Junctions between rural roads or tracks and classified roads must comply in Germany with the Guidelines for the Construction of Roads (*Richtlinie für die Anlage von Straßen*; RAS-K 2001). A converging road should meet a higher-order road at right-angles and be as straight and horizontal as possible for about the last 15 metres before

the junction. Special attention should be given here with regard to visibility and surface water drainage.

Rail crossings in Germany must comply with the Rail Crossings Act (*Eisenbahnkreuzungsgesetz*; EKrG). Level crossings should be kept to a minimum by planning the road and track network accordingly and should be equipped with modern safety technology.

Planning crossings generally requires agreement to be reached with the transport, cable or pipeline operator with regard to permission, implementation requirements and any cost sharing. In the case of rail tracks, pipelines and cables, safety rules specified by the operator must be observed in the area of the crossing and safety precautions taken during construction.

Crossings in the form of underpasses and bridges are not very often needed in a land consolidation; their nature and dimensioning depend on the infrastructure to be crossed. An engineer should be consulted for the design and construction of such crossings.

Fig. 4.4-13: The culvert on the left under the stream crossing has sufficient depth of cover and stream bed substrate; the culvert on the right is an impassable barrier for aquatic fauna (photos: Peter; Thomas)

Watercourse crossings are generally constructed as culverts; bridges are the exception. Their dimensioning depends on the maximum water volume of the watercourse under the crossing, traffic volume, the cross-section of the road or track and the ecology of the watercourse in the vicinity of the crossing. Constructing structures of this kind generally interferes with the natural watercourse habitat and must therefore be planned and executed in a manner that is as environmentally sensitive as possible.

The simplest crossing structure is a pipe culvert. This takes the form of a concrete pipe with a circular cross-section. The required pipe diameter is determined by hydraulic analysis of the watercourse. With judicious dimensioning and installation of the pipe in the stream bed, the stream bed substrate can continue uninterrupted through the culvert, which is beneficial to the ecology of the watercourse. Culverts should be installed deep enough for a stream bed of natural bedload to form inside the pipe. The substrate must be at least 20 cm thick in the middle of the invert (the bottom of the culvert).

Fig. 4.4-14: The oldest form of watercourse crossing for a road or track, the ford, is coming back into use where water and traffic volumes allow
(photo: Thomas)

For larger flow volumes, box, slab, sheet steel or reinforced concrete culverts are used. In all cases, culverts must have a sufficient depth of cover, as specified by the manufacturer, to withstand the loads exerted by crossing traffic without damage. The foregoing considerations also apply to the planning and construction of bridges over watercourses.

In upland terrain, constructing a road or track along a hillside that has a slope of 40% or greater may make it necessary to build walls. These always incur extra cost and obstruct access to and cultivation of adjoining land. The construction of retaining walls should therefore be avoided wherever possible. Possibilities include prop walls, cantilevered retaining walls and gravity walls, depending on the function they are required to perform. Here again, an engineer should be consulted for design and construction. In recent years, where walls are needed, they are also often constructed using gabions – mesh cages filled with mineral material – because these have positive ecological effects similar to expensive drystone walls.

4.4.3.5 Engineering measures on water bodies

Planning objectives and planning principles

For many years, water protection activities primarily focused on improving water quality and arterial drainage. At the latest since the adoption of the European Water Framework Directive (EU WFD 2000) and its implementation in national law, water bodies must be subjected to an all-round analysis covering physical and chemical properties, flow characteristics, sedimentation and the morphological structure of the water body and its floodplains. Rivers and streams should provide the greatest possible diversity of habitats for aquatic flora and fauna. Today, waters are assessed according to ‘good ecological status’ or ‘good ecological potential’.

A water body, its bed, the riparian zone and the surrounding area form a complex interrelated system on which flora and fauna depend. The constantly changing nature of rivers and streams, the associated reshaping of their floodplains and the dynamics of flooding and drying produce diverse landscapes. These numerous functions of semi-natural water bodies and their floodplains must be safeguarded, restored and enhanced (Hübner; Tara 1995).

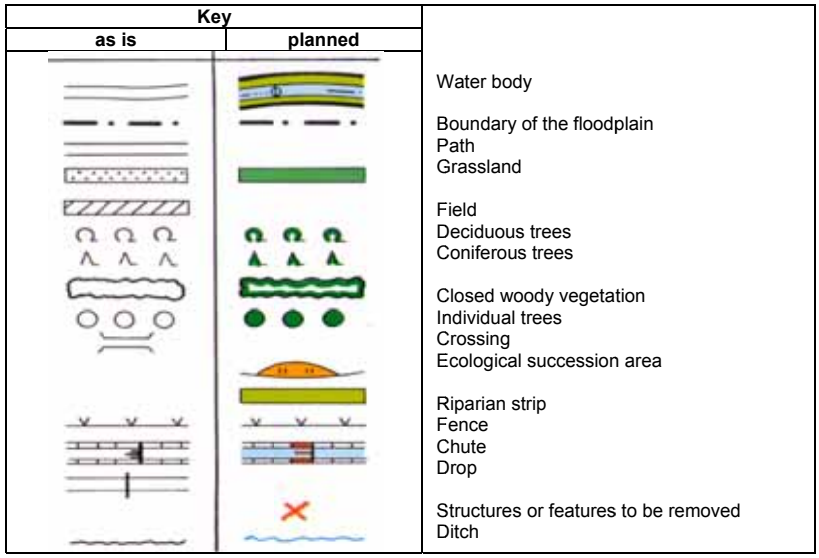
Fig. 4.4-15: A water body, its bed, the riparian zone and the surrounding area form a complex interrelated system: the Lippe river near Hamm (source: Bezirksregierung Arnsberg)

Any planning for the reshaping and development of watercourses must be guided by the unique characteristics of the watercourse in its semi-natural state. Subsequent construction works should do no more than create the starting situation for the river or stream to evolve into a semi-natural watercourse, in particular without unnecessary modification to natural features that define the face of the landscape. A watercourse's longitudinal form and cross-sectional profile are closely interrelated. The line of a stream or river must conform as closely of possible to its typical course. Any shaping of detailed structural features should be left to the natural sculpting forces of the water itself. To be able to develop under its own dynamics, a watercourse needs sufficiently wide riparian strips that allow lateral erosion in general and erosion at bends to varying degrees as well as scours, bank failure, point bars, ongoing point bar deposition and gravel bars. A 'stepping stone' approach is often followed where well-structured stretches of a watercourse serve as the embarkation point for aquatic organisms to colonise poorly structured sections. This involves measures to initiate or enable the watercourse's self-sustaining development. Examples include channel lengthening, in-channel bank and bed improvements, measures to vitalise the watercourse by improving substrate availability and increasing the proportion of deadwood, connecting side channels and oxbows, removing built structures and improving the bedload regime. All of these measures have the effect of improving watercourse habitats.

Measures to reverse anthropogenic modifications to watercourses serve to restore watercourse continuity (upstream and downstream passability) and notably include the removal of mill weirs, drops, culverts and other barriers; some cases require the creation of bypass channels.

A comprehensive guide to possible measures for the development of near-natural watercourses is provided in the 'Blue Guideline' (*Blaue Richtlinie*; BlaueRichtl 2010). This general guideline issued by the state of North Rhine-Westphalia describes how near-natural watercourses can be protected and structurally impaired watercourses allowed to develop as closely as possible to their natural state. At an early stage in a land consolidation procedure, the land consolidation engineer should contact the authorities in charge of water resources management in general and of implementation of the EU Water Framework Directive in order to determine what, if any, state-level measures specified in action plans are to be implemented in connection with the land consolidation.

Fig. 4.4-16: Plan for nature-oriented development of a watercourse (BlaueRichtl 2010)



All hydraulic engineering activities must also serve the purposes of flood protection, with suitable measures to keep water in the floodplain for as long as possible and to retard runoff. These include the retention of and judicious additions to natural vegetation, ensuring that floodplains are kept clear, creating new floodplain areas and providing retention zones and riparian strips. Further valuable guidance is provided in BMELF (1992).

Basic considerations regarding hydraulic engineering for near-natural watercourses

Hydraulic engineering measures focus on improving the ecological status of an impaired watercourse. Engineering intervention can also usefully serve the goal of returning a watercourse to a near-natural state. Measures are carried out step by step to bring about changes that cannot be achieved in regular watercourse maintenance. The main purpose of the improvements is to create the starting conditions so that a watercourse can be left to develop in a semi-natural manner on its own.

All improvements should give the watercourse sufficient freedom to develop. They should be based as regards the longitudinal course and lateral profile on the natural state of the type of watercourse concerned. This applies both to the aquatic and amphibious zones and to terrestrial areas affected by the improvements. The channel should not be shortened by cutting out bends and any previous shortening should be reversed. Floodplains should be retained and where applicable reclaimed. Historical maps can provide valuable information about the past line of a watercourse, which in many cases will have been altered by human intervention. A watercourse must have ecological continuity in all directions and remain connected to its surroundings. Drops and pipe culverts must be avoided and any existing culverting removed. Water flow is determined by the gradient, cross-section and roughness of the bed and banks, hence no measures should be carried out that increase the gradient, widen the cross-section or make the channel smoother. Riparian woody vegetation, reedbeds and shrubbery should be planted where they do not grow of their own accord. If bank stabilisation is required, it should be done with living materials such as red alder, willow and ash. Where stone does have to be used – to protect built structures, for example – the character of the watercourse should not be changed as a result. In areas with bedrock, local stone should be used rather than bringing in stone from elsewhere. Oxbows should be preserved and where possible restored. Non-living construction materials in the form of riprap, stone banking, surface filters, fascines, wattles, interwoven fencing or brush mats should only be used as an exception where the watercourse cannot be left to develop on its own, or where this can be achieved only to a limited extent.

Earthworks on watercourses should only be carried out from one side if the channel width and conditions permit. If a watercourse flows past the edge of woodland, care should be taken to protect the trees and tree canopies. Existing turf should be reused. The topsoil should be properly removed, kept separately and reinstated at suitable places or spread over the floodplain.

The construction, operation and maintenance of installations in and on water bodies in Germany are subject to the provisions of the Federal Water Act (*Wasserhaushaltsgesetz*; WHG 2009). Construction of and substantial alterations to installations in and on water bodies requires a licence. Installations in watercourses that interrupt or impair watercourse continuity or seriously impair their ecological functioning must be avoided.

A watercourse must have sufficient space to develop under its own dynamics. To this end, watercourses must have sufficiently broad strips of land (riparian strips) to either side. These are an integral part of the watercourse. The required width is determined by the development objective for the watercourse and depends on the type of watercourse, its flow energy and tendency to meander, the stability of the banks and the surface composition and use of the adjoining riparian land. Riparian strips should have a width of at least 5 m from the top of the bank on either side. Where immovable structures and features require bank stabilisation, this should be provided using living or non-living material typical of the surroundings. Care should be taken to ensure that localised bank stabilisation of this kind does not result in undercutting; where necessary, this should be limited by stabilising the channel bed (with riprap, for example).

Fig. 4.4-17: Watercourse with riparian strips in western Münsterland
(source: Bezirksregierung Münster)

Large rocks or tree stumps can be placed in the water channel to make the flow along the channel bed and banks less even and create slow-flowing areas as resting zones for aquatic fauna. Sills are a further means of altering flow patterns to allow the development of small-scale habitats in a watercourse. Chutes make up elevation differences in the channel bed as a result of channel shortening and are generally created at a gradient of 1:20 or shallower. The length of the chute is therefore determined by the height difference to be made up.

4.4.4 Landscape preservation measures in land consolidation

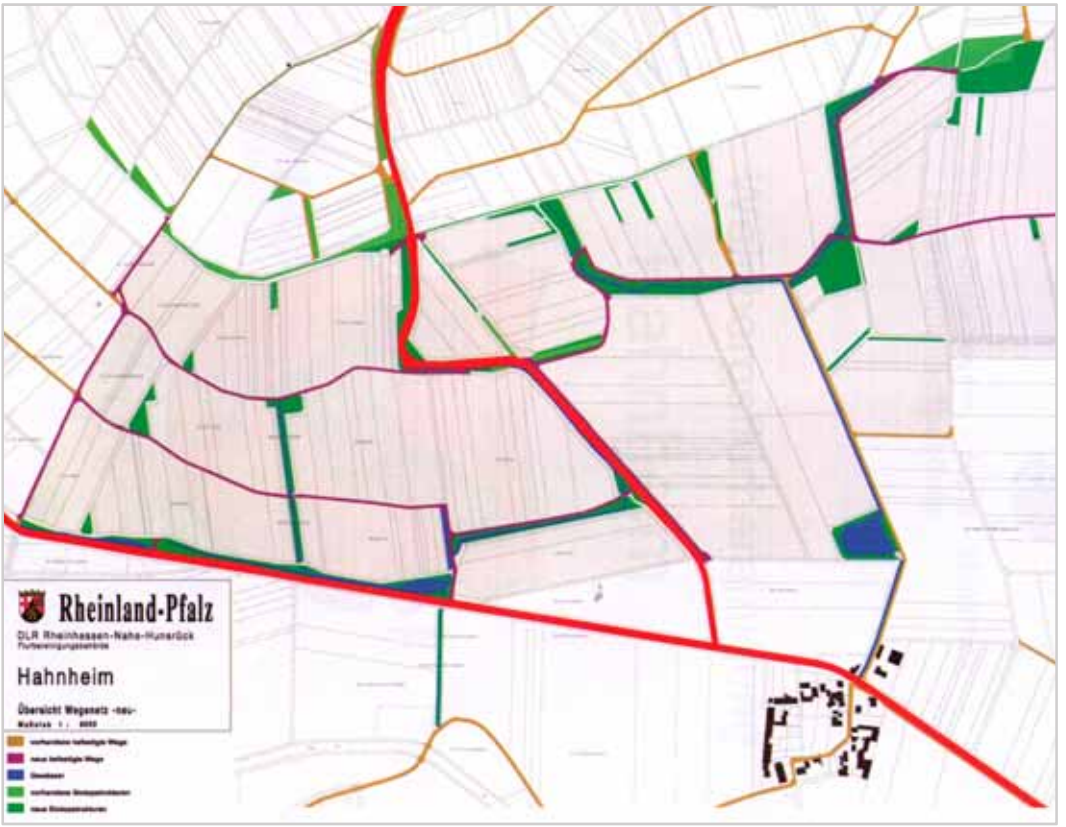
4.4.4.1 Planning objectives and planning principles

The task of reorganising and reshaping the land under the Land Consolidation Act expressly includes landscape preservation. This forms the link between productive agricultural or silvicultural land use and protection of natural resources and natural systems in the human-influenced cultural landscape. Land readjustment measures directed at improving production and working conditions in agriculture and forestry should therefore always also be aligned with landscape management measures. Conversely, all landscape management measures must take into account the agricultural use of natural resources. The following principles and objectives provide guidance in this regard:

The effective functioning of natural systems, natural resources, fauna and flora must be protected, maintained and enabled to develop along with the diversity, uniqueness and beauty of nature and the landscape. A further aim is to foster ecological networks by interconnecting landscape features in an ecologically beneficial and aesthetically appealing manner. The farming countryside, which is frequently lacking in natural or nature-like elements, should be structured and shaped on the basis of ecological and scenic considerations. A key aim is the creation of a system of ecological priority areas and connected near-natural habitats that extend as a network across the cultural landscape. This prevents individual habitats and their populations from becoming cut off and enables the constant movement and exchange of species and genetic material. Ecological priority areas are linked together by small connecting elements and fringe habitats along byways and watercourses. Such elements typically include pools and ponds, rising springs, single trees, copses, damp meadows, dry grassland, hedges, elevated hedgerows, woodland margins, field margins, field strips, embankments, sunken lanes, trackside margins and ditches, greenways, streams, field ditches, terrace walls, bogs and bog relicts.

As well as the conservation of valuable natural and landscape features, they should be placed under the stewardship of suitable entities and where necessary provided with a protective or buffer zone in order to prevent harm from neighbouring agricultural land use or passing roads and paths. Trees, hedgerows and the like that characterise and structure the landscape should be retained wherever possible. The same applies to sunken lanes, field dikes and natural terraces. Preserving such landscape features generally takes precedence over recreating them elsewhere. Action should be taken to remedy any gaps or other damage, particularly because such features often help prevent erosion. As the following example from the Rhineland-Palatinate region shows, the goal of preserving a diversely structured landscape can indeed be reconciled with the needs of modern agriculture. By judicious reorganisation of farmland, it is possible to safeguard landscape features that are otherwise at risk due to agricultural activity.

Fig. 4.4-18: Existing habitat structures can be supplemented in land consolidation to ecologically beneficial effect (Hahnheim land consolidation)
(source: DLR Bad Kreuznach)



Water-dependent landscape features such as ponds and pools and remnants of carr woodland and peatland must be preserved in an ecologically functioning state; land consolidation must have no impact on wetland habitats. Nothing is allowed to be done on neighbouring farmland that would be expected to have an adverse effect on such features.

Trees and shrubbery typically found along networks of roads, paths and watercourses should be retained wherever possible and added where necessary. Special care should be taken to preserve trees at village margins and within the built-up area of a village. Traditional orchards – which often survive only in rudimentary form – and typical village plant communities with their herbaceous margins in village surroundings possess high ecological value and should be restored to their ecologically functioning state as far as possible. This is not only a matter of scenic beauty or landscaping: increasing attention is paid to the village ecology objective of preserving and fostering flora and fauna characteristic of the locality (see, for example, Henkel 2011).

Fig. 4.4-19: Valuable ruderal vegetation and other 'inhabitants' are frequently found in village surroundings (photo: Pflug)

Open farmland should be enriched with structuring features while having due regard to the unique character of the landscape. Linear structures such as roads, tracks and watercourses are particularly well suited for this purpose, although point features such as solitary trees, shrubbery and copses also lend much character to otherwise uniform farmland. Cutting into woodland margins (such as when laying roads or tracks) should always be avoided. Unprotected open woodland edges should be given a tiered margin of deciduous trees, shrubbery and herbaceous vegetation. In total, the ecological network should account for 5% to 20% of the countryside area according to the type of landscape (Eichenauer; Joeris 1993, BMELF 1992); an average of 10% may be taken as a guide.

Landscape preservation also includes the care and conservation of architectural, archaeological and cultural monuments left in the cultural landscape by human activity. In Europe, the commonest of these are wayside shrines and crosses, which tend to be erected in places that are typical of the region concerned and for reasons that are now long forgotten. Providing for such monuments in the plan covering the common and public facilities for a land consolidation is sometimes a special challenge for the planner. Relocation should be considered only in exceptional instances and should then take place in close consultation with the community, the historic monuments authority and local heritage or history societies. The same applies to old, abandoned (in many cases Jewish) cemeteries in farmland locations; relocation is out of the question here because of the Jewish prohibition against disturbing the peace of the dead.

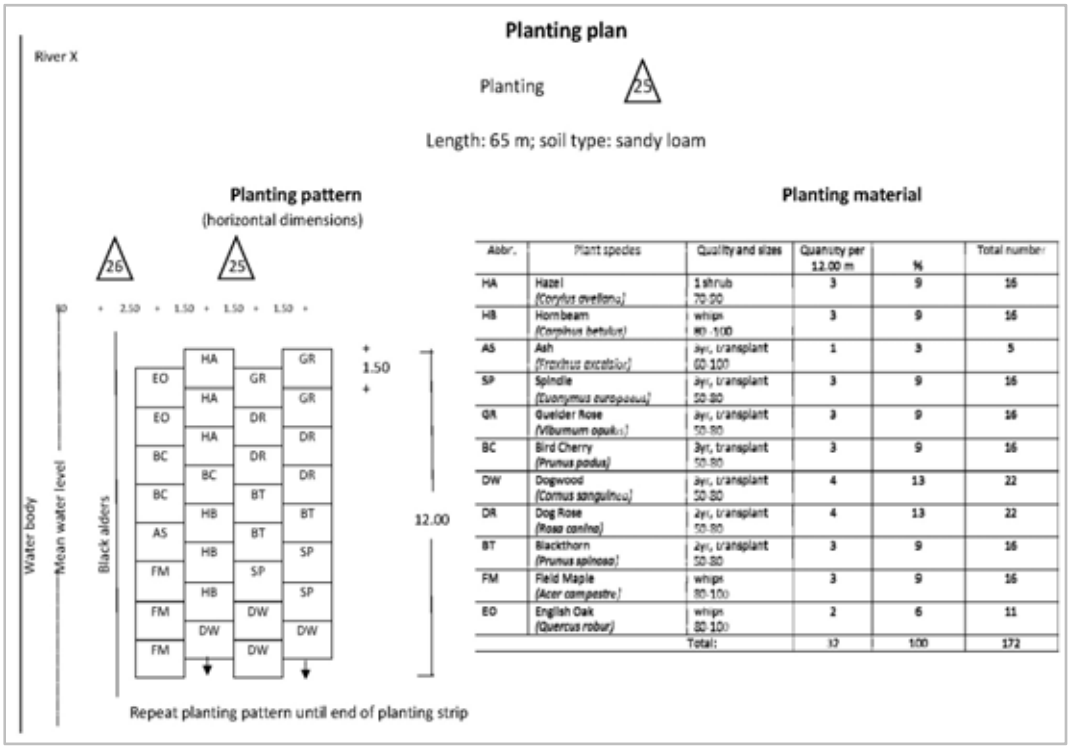
In land consolidation, as is clear from the above considerations, landscape management measures are an integral part of all reorganisation efforts relating to agricultural structure and the use and development of the land.

4.4.4.2 Notes on the implementation of landscape management measures

Information on planned landscape development is provided in Germany, where such plans exist, by the (regional-level) landscape framework plan (*Landschaftsrahmenplan*) and the (county or municipal) landscape plan (*Landschaftsplan*). The land consolidation authority will generally have been involved in the preparation of the latter as a body representing public interests. It is a sectoral plan containing nature conservation and landscape management-related stipulations and recommendations on landscape development. Such a plan contains numerous pointers as to where and how to implement the compensation measures required under nature conservation law. Additional landscape development measures must also be carried out in the course of a land consolidation. These and the necessary compensation measures in a land consolidation are given their legal basis in the plan covering the common and public facilities with the accompanying landscape conservation plan.

Implementation of the compensation and landscape development measures generally requires additional detail-level planning. Where necessary, this includes a tree planting plan specifying the planting material and planting pattern. Plantings carried out according to a planting pattern should be at least three rows deep, with the width of the planting area increased by at least one metre for each additional row. The size of tree plantings along watercourses is independent of the watercourse profile and is based on the type of watercourse. A planting pattern for a block planting along a watercourse is shown in the figure below.

Fig. 4.4-20: Planting plan for a linear and block planting by a watercourse
(BlaueRichtl 2010)



Abbr.	Plant species	Quality and sizes	Quantity per 12.00 m	%	Total number
HA	Hazel *(Corylus avellana)*	1 shrub 70-90	3	9	16
HB	Hornbeam *(Carpinus betulus)*	whips 80-100	3	9	16
AS	Ash *(Fraxinus excelsior)*	2yr, transplant 60-100	1	3	5
SP	Spindle *(Euonymus europaeus)*	2yr, transplant 50-80	3	9	16
GR	Gueldor Rose *(Viburnum opulus)*	2yr, transplant 50-80	3	9	16
BC	Bird Cherry *(Prunus padus)*	2yr, transplant 50-80	3	9	16
DW	Dogwood *(Cornus sanguinea)*	2yr, transplant 50-80	4	13	22
DR	Dog Rose *(Rosa canina)*	2yr, transplant 50-80	4	13	22
BT	Blackthorn *(Prunus spinosa)*	2yr, transplant 50-80	3	9	16
FM	Field Maple *(Acer campestre)*	whips 80-100	3	9	16
EO	English Oak *(Quercus robur)*	whips 80-100	2	6	11
		Total:	32	100	172

The planting plan is only meant to give an idea of the parameters to be considered in terms of tree species, planting pattern, plant sizes and intermixing. It means that the actual composition of a planting is not left to the contracted nursery operator, but is guided by the ecological purpose of the planting measure in conjunction with the regional and geomorphological surroundings. The area needed should already be reserved by earmarking the land when drawing up the plan covering the common and public facilities (section 41 of the Land Consolidation Act; section 3.2.2.7) and preparing the land consolidation plan (section 3.2.6.2).

When planning tree plantings, consideration should be given to the future growth of the trees in terms of height and crown spread in order to keep enough distance from adjacent transportation infrastructure and private production land. This is subject to state-specific law on the rights of neighbours, local bye-laws on watercourse management and the statutes of local water and soil associations. The same applies to single trees, rows of trees and group plantings.

Trees should only be planted that are characteristic of the region and are site-adapted. Care should be taken to ensure that autochthonous planting material is procured. The genetic makeup of native, regionally adapted trees means that they are ideally suited to local soil and climatic conditions. When planting fruit trees alongside roads and tracks or when creating or extending traditional-type orchards, the selection should be restricted to locally typical 'old' fruit varieties.

In many cases, planting material does not have to be bought from a nursery or market garden. For willows, it is usually enough to stick fresh cuttings into the ground (either softwood or hardwood cuttings will do). Regular cutting back to the trunk results in the typical pollarded willow shape over time. If landscape feature vegetation needs to be removed for planning reasons, consideration should be given to 'living' relocation elsewhere in the procedure area, although this only makes sense if the material being replanted is still sufficiently vigorous and has good prospects of continued growth.

It is not always necessary to construct and plant everything in the plan. Residual land can be left to natural succession. This results over time in regionally typical vegetation and woodland communities that conform to what is known in ecology as the 'potential natural vegetation'. So that general natural succession can take hold, it is useful in the beginning to place tree stumps or brushwood in the area to prevent human interference.

A special form of initial planting is the 'Benjes' hedge. The basic principle of a Benjes hedge is not to plant a new hedge, but to allow one to develop from seed dispersal on the wind and in bird droppings. A Benjes hedge, also known as a deadwood or dry hedge, is created by laying deciduous cuttings – softwood and hardwood cuttings together with brushwood – in the desired location of the hedge (Benjes 1997).

Sunken lanes or 'hollow ways' generally have great ecological potential and should be preserved wherever possible. How best to ensure this depends on the future traffic through the lane. If traffic is not going to change significantly as a result of the reorganisation, a sunken lane should be left where it is as part of the local habitat. This is because a habitat that is left to its own devices and not used will otherwise develop by natural succession into woodland. If improving the lane or if its future traffic volume would pose a threat to the local habitat, it should be removed and recreated nearby. To avoid the effect resulting from a sunken lane falling out of use, it should be connected to the new road and track network so that it potentially remains in use for hikers, mountain bikers and the like.

Fig. 4.4-21: Many valley meadows (here a daffodil meadow near Monschau in the Aachen region) can only be preserved by extensive agricultural use
(photo: Thomas)

The cessation of farming in marginal locations such as hard-to-access valley meadows is a threat to the survival of these types of landscape. When they fall out of use, such meadows gradually evolve into a woodland community conforming to the potential natural vegetation. Many such meadows have long been reafforested with poplar, alder or spruce after grassland farming was abandoned. One way of ensuring that these stream valleys are kept clear is to secure extensive farming under management contracts in what is called contract-based nature conservation. A valley may have to be cleared of regionally uncharacteristic tree growth by felling.

Heathland, and especially juniper heath, requires intensive sheep grazing to keep it clear. Otherwise, after a period of scrub growth, it too will revert to a woodland community. Heath can also be kept clear using contract-based nature conservation. Measures of this kind can be classified either as development measures or, under German nature conservation law, as compensation or substitution measures offsetting interventions elsewhere, especially if they can be made permanent by a contractual arrangement between the party causing the intervention and a suitable operator (see section 4.5.3).

Landscape management measures are generally carried out in early spring or late autumn, at the beginning or just after the end of the growing season, giving due consideration to bird and fish breeding and spawning times.

4.4.4.3 Measures to reduce soil erosion (water and wind)

Arable regions have been subject in recent years to increasing erosion damage on steeply sloping land due to heavy rains. Potential causes include increasing maize cultivation (especially silage maize), which as a crop provides particularly poor soil cover at the time of greatest erosion risk (May to July). Also, less organic matter now tends to be applied to the soil. Finally, unsuitable tillage (with heavy machinery and unfavourable

timing) places more stress on the soil than before. This adversely increases the structural stability of the soil and reduces soil water permeability, thus promoting soil erosion. As the rate of soil erosion depends not only on soil properties and farming practices, but also on the lie of the farmland, it makes sense to examine when planning a reorganisation whether erosion risk can be reduced by modifications to the field layout and to the network of rural roads and tracks.

The sight of completely eroded terrain is currently alien to Central Europe, but water and wind-driven soil erosion does affect much arable land in Germany. This loss of soil, which is usually a gradual and barely noticeable process, poses a threat to food security in the long term as new soil develops far more slowly than existing soil is lost.

Soil erosion by water is additionally promoted by poor vegetation cover in intensive arable farming, heavy rainfall over very short periods, steeply sloping terrain and long slopes uninterrupted by barriers, especially in the case of loamy and silty soils. Such conditions are mostly found in hilly and mountainous areas.

Even in otherwise low-risk areas, however, heavy rainfall events can cause severe erosion damage. To estimate erosion risk, many of the German states have compiled maps of potential (based on natural conditions) water and wind erosion threats to soils in their territory. The potential erosion can be simulated. Erosion can take the form of gully erosion or sheet erosion.

Stipulations of soil and water protection law – primarily in the German Federal Soil Protection Act (*Bundesbodenschutzgesetz*), EU agricultural subsidy law and the EU Water Framework Directive – require the assessment of soil erosion and its impacts together with the planning of preventive measures. Implementation requires an assessment of the status of waters and an estimation of pollution from diffuse sources in the river basin. In much of Germany, diffuse sources are considered one of the main causes of soil erosion and the associated transportation processes. Particularly with a view to precautionary soil and water protection, this creates the need to develop an efficient approach along with suitable methodologies and modelling techniques for the planning, simulation and assessment of soil and water protection measures. The hierarchical approach to planning such measures is based on modular reference units (regional units, river basins/surface waters, field blocks and fields) that comprise the study area in accordance with a specified spatial target scale. A suitable empirical approach for forecasting soil loss and designating potential erosion risk areas on a large geographic scale is the Universal Soil Loss Equation (Schwertmann et al. 1990). In land consolidation, soil protection measures are closely linked to measures for the general use and development of the land and for landscape management.

Planning activities in the course of the land consolidation must therefore be carried out in a situation-driven interdisciplinary process involving soil experts, agricultural experts and the board of the body of participants. In many cases, optimum erosion prevention can only be achieved by a combination of shared and farm-level measures. Further erosion reduction measures are described in an advisory guide on soil erosion and flash floods, *"Beratungsleitfaden Bodenerosion und Sturzfluten"*, published by Landesanstalt für Landwirtschaft und Gartenbau Sachsen-Anhalt (LLG 2018).

4.4.4.4 Soil improvement objectives and measures

Soil improvement measures are directed at sustaining the natural fertility of soils suitable for agriculture and at facilitating the tilling of the soil. The aim is to remedy poor soil air and water conditions and (mostly anthropogenic) impairments of soil structure.

Soil improvement measures should be given critical appraisal and limited to what is absolutely necessary. They should normally be carried out only on productive farmland, and not to bring new land into cultivation. The effects of large-scale soil improvements on natural systems and the landscape must be carefully assessed in advance. They should only be carried out if poor soil conditions are human-induced, and not if they could adversely affect water resource management or if there are compelling nature or species conservation reasons to the contrary.

Soils with a poor water-air ratio can generally be improved by drainage. This removes waterlogging that is detrimental to crops and tillage, improves soil aeration, allows root penetration into deeper soil layers, permits better use of nutrients and stimulates the activity of soil bacteria. Tilling is made easier and crops have a longer growth period. Site conditions determine whether and in what form to consider subsoil improvement. In land consolidation, drainage is sometimes added in the form of field drains after creating the new field layout as a measure to bring about a compensatory land allocation of equal value; the aim here is to eliminate waterlogging to enable uniform cultivation in large fields. This is not to be done to drain permanent wetlands. Field drains are created either as pipe drains or as 'mole' drains. They are also used in situations where, for example, water coming down a slope is to be kept away from a road or track by interceptor drains transverse to the direction of flow. Drainage systems in Germany have to comply with DIN 1185 (DIN 2016).

Mechanical soil improvements by changing the soil structure also serve to regulate soil water and soil air conditions. Heavy equipment is used to loosen compacted subsoil layers so that water that accumulates in the soil can spread better and penetrate deeper layers. This increases the rootable soil volume and sustains fertility. Mechanical soil improvement must generally be supplemented by subsequent planting with a deep-rooting crop and where necessary by liming. Deep ploughing is generally dispensed with today because it upsets the natural soil stratification and in some cases results in completely different production conditions. Soil improvements must be timed carefully to ensure the right degree of soil moisture for the operation. The soil must have dried out sufficiently down to the loosening depth for a crumbly structure to result when it is broken up.

Mineral soil improvements aim to change the alkalinity of the soil and enhance the supply of nutrients.

Where soils have too little water rather than too much, production conditions can be improved by irrigation. Irrigation means providing farmland with water to promote crop growth and make up for lack of rain. The basin or flooding irrigation system still practised in many arid parts of the world, where the land is supplied with water at specific times by an elaborate system of ditches and sluices, is no longer common in Germany. Subsurface irrigation by pipework or by raising the groundwater table is also generally uncommon in Germany. Water is mostly supplied to the land by overhead irrigation, which may be implemented as a solid-set system, as a centre pivot or linear move system or as a fully mobile system. Overhead irrigation includes irrigation methods using stationary or mobile sprinkler systems. Water is pumped through pipes to the overhead irrigation system in the field. In some cases, such as in viticulture and fruit growing, irrigation is also used to protect against frost, or to spread fertilisers or crop protection products. Pumps and supply piping for overhead irrigation systems are usually permanently installed. The sprinkler lines are moved within the installed system; this is

what is known as a centre pivot or linear move system. In fully mobile systems, neither the pumps nor the supply lines are permanently installed. Drip or trickle irrigation has become established in vegetable growing and to a certain extent in viticulture. Overhead irrigation using solid-set systems is only suitable for permanent crops.

Fig. 4.4-22: Solid-set and linear move overhead irrigation systems (sources: Bezirksregierung Köln; Zhovtonog)

The type of irrigation practised or to be used in the area in question will affect the plan covering the common and public facilities and the new field layout. It must be taken into consideration in planning the field block layout and the location and accessibility of well systems. Permanently installed well systems and water supply lines incur substantial additional cost in a land consolidation if the installation needs to be modified. DIN (2016) and local official advisory bodies should be consulted on specific questions.

4.4.5 Other requirements relating to the use and development of the land in land consolidation

4.4.5.1 Requirements relating to the use and development of the land in forestry

Ownership and tenure of woodland does not fundamentally differ to farmland, especially as regards traditional rural ownership and tenure of small private woodland holdings or in regions where equal-shares inheritance was practised in former times. Here, too, there are many areas where plots are fragmented and uneconomically laid out, in many cases unconnected to forest roads or tracks and inaccessible by forestry vehicles. Uncertain boundaries remain widespread, with frequent discrepancies between the situation on the ground and official property records. Land consolidation is therefore the right tool for remedying such structural deficits by reorganisation, thus improving production and working conditions in forestry (Hahn 1960).

Fig. 4.4-23: Ownership and tenure structure in woodland (cadastral record: white; actual run of the track: yellow) (source: Bezirksregierung Arnsberg)

Woodland consolidation nevertheless involves different requirements to land consolidation in farmland. In agriculture, the crops and hence land use generally change with crop rotation from year to year. In forestry, geared as it is to long-term cultivation, the crop cycle is more like a century and woodland changes only gradually in appearance as timber stands age over time. The annual cultivation cycle is also completely different. Farming activity in the field declines significantly after harvesting at the end of the growing season and only starts up again just before the next. Most of the work in forestry takes place in the winter months. This determines key objectives for woodland consolidation in terms of the use and development of the land.

Fig. 4.4-24: Woodland tracks are a working area, storage area and transportation route at the same time (source: Bezirksregierung Arnsberg)

The reshaping and reorganisation of woodland tenure must be based on the future use of the woodland. These can be inferred in the German context from the forest management plan (*Forsteinrichtungswerk*) and forest use plan (*Waldfunktionsplan*) maintained by forestry authorities. Ecological priority areas and regionally characteristic woodland habitats are to be preserved and safeguarded for the future.

The compensatory parcels to be established should be sufficiently large in both directions. It is less important in woodland consolidation for parcels to be parallel to each other than for them to be accessible by a forest road. Small holdings should be combined into larger units in such a way that owners can join forces in forestry management associations under cooperative ownership (Ahlborn 2008); the land consolidation should encourage the establishment of forestry management associations. Some woodland areas in the Siegerland and Olpe region are subject to a traditional communal oak and birch coppice management system known as *Hauberg* and are already jointly owned property; areas of this kind or similar cannot generally be exchanged or relocated because of their special management form (described in LFV-NRW 1995) and the ecological potential of this type of forest management.

Fig. 4.4-25: This new forest road serves forestry purposes and is also inviting for hikers (photo: Merten)

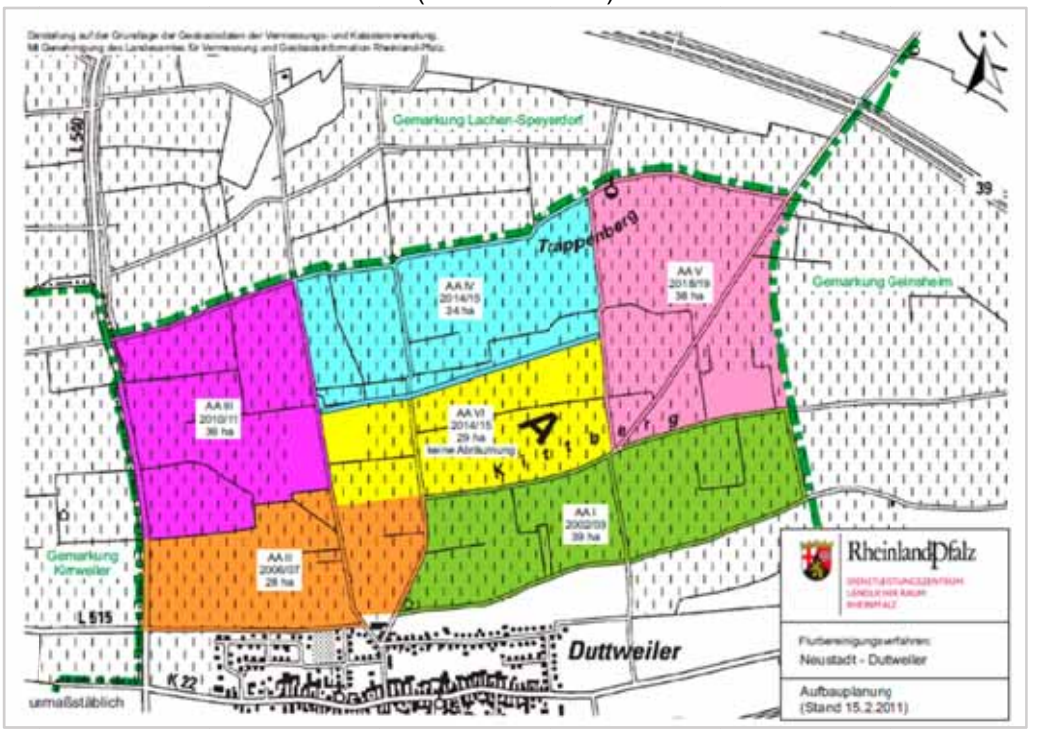
4.4.5.2 Requirements relating to the use and development of the land in viticulture

Viticulture is the most labour-intensive form of cultivation after market gardening. The aim in viticulture, too, is to improve production and working conditions by reorganising land tenure in ‘vineyard consolidation’ (variously referred to in the German

literature as *Rebflurbereinigung* or *Weinbergsflurbereinigung*). This seeks to reduce work effort, facilitate working on steep terrain and enhance sustainable yields (BMELF 1979). Cultivation methods in viticulture depend on topography. In flattish locations with slopes of less than 30%, vineyards can be accessed by service roads and mechanically cultivated. Sites of this kind are frequently ecologically impoverished, however, and generally require the addition of enhancing landscape features in the event of a reorganisation. Steep slopes with gradients greater than 30% generally have special natural production conditions in terms of soil and climate and have developed over time into valuable habitats for flora and fauna. Viticulture in these conditions suffers under the lack of scope for mechanisation and incurs high production costs due to the bigger labour input. This is rewarded, however, with excellent quality wines and wine specialities. In either case, vineyards need to be reorganised in a manner that conforms to the landscape, creating sufficiently large production areas and also establishing a suitable network of roads and tracks.

A reorganisation measure in viticulture is generally taken as an opportunity for vineyard renewal and replanting. This involves replacing aged, frost-damaged and in some cases phylloxera-damaged vines with site-adapted varieties. Cohesive replanting of an entire block of vineyards is only possible in the context of a land consolidation. A viticultural cooperative or winegrowers' association (*Reben-Aufbaugenossenschaft* or *Winzer-Aufbaugemeinschaft*) is established to organise the necessary work according to a local vineyard replanting plan. First of all, the vineyards have to be completely cleared. The new vines are then planted by the association or by each individual participant following transfer of possession in the land consolidation.

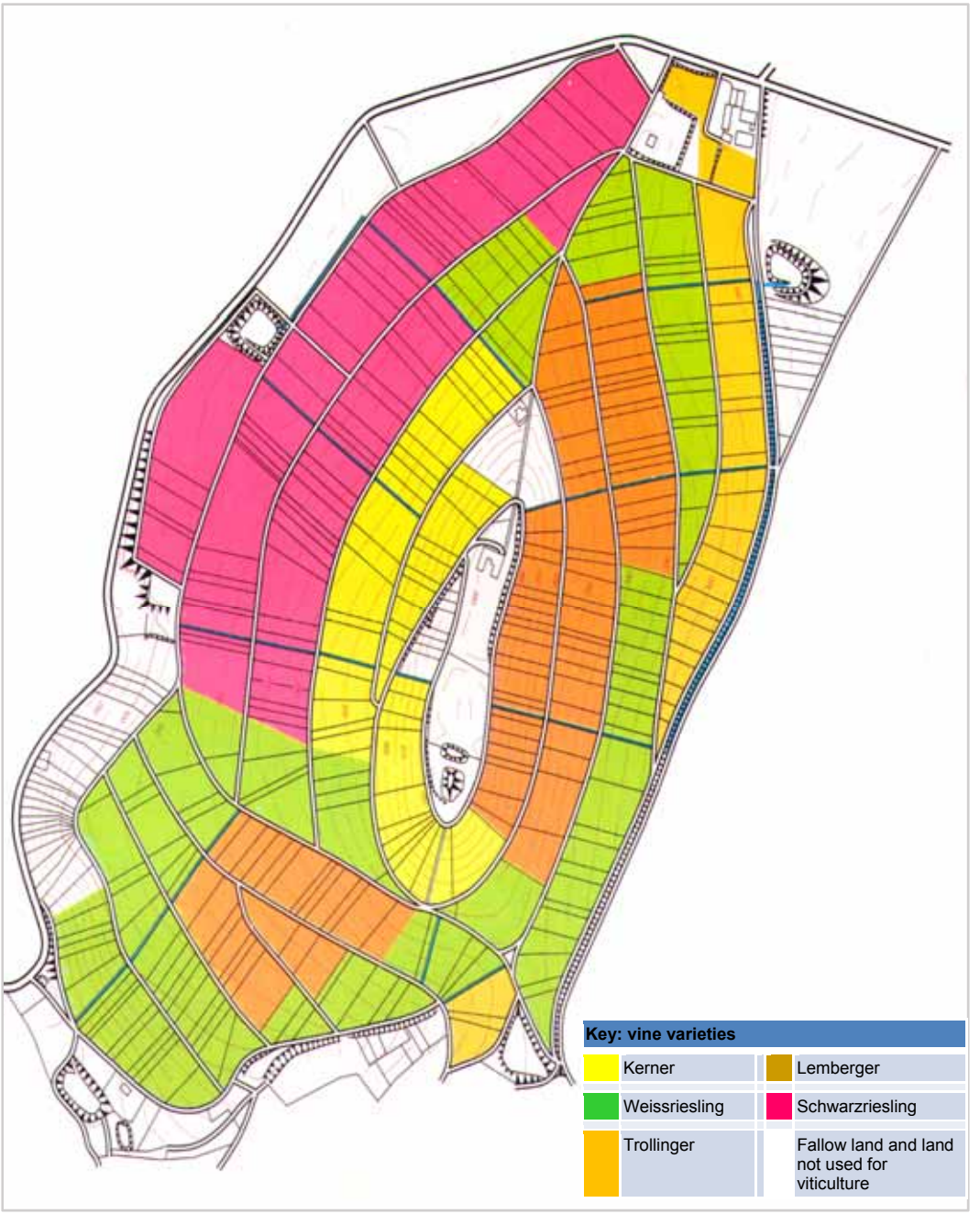
Fig. 4.4-26: Replanting plan in the Neustadt-Duttweiler vineyard consolidation (DLR-RLP 2017)



Steep slopes with gradients exceeding 30% are frequently home to valuable habitats, particular for warmth-loving flora and fauna. Such terrain includes a high proportion of small terraces, dry walls, rock formations and dry grassland. Some such areas have long been taken out of production because they offer little scope for mechanisation and are correspondingly labour-intensive to cultivate. At the same time, their situation means that they have exceptional potential for excellent quality wines. In addition, steep slope viticulture has a scenic appearance that lends it great tourist appeal and makes it a hallmark of tourism marketing for entire regions. Nevertheless, the specific rationalising effects sought in land consolidation – providing access to and combining and enlarging production units with favourable property boundaries – make it necessary to create terraces. Winegrowers can then access the strip between gabion and drop with a narrow gauge tractor and do most work mechanically. Remaining manual tasks, such as pruning, foliage care and grape harvesting, can be done standing on the level terrace, which is far less hard work than on a steeply sloping vineyard. Many successful examples show that improving productivity in viticulture and improving the conservation status of habitats and protected areas do not conflict with each other but are two sides of the same coin.

Fig. 4.4-27: Steep slope viticulture today (source: MWVLW 2006)

Fig. 4.4-28: Illustrative example of a road and track network in a vineyard consolidation with circumferential contour tracks and reorganisation of the vineyards (Cleebronn/Michaelsberg land consolidation) (BMELF 1979)



The network of tracks and watercourses in a vineyard consolidation is planned according to terrain, slope and how the vineyards are cultivated. Tracks should be laid out wherever possible as contour tracks, with the pattern of vineyard units determined by paths created between the tracks. Row lengths should be planned so as to allow mechanical cultivation. Rows should meet paths on either side, with the compensatory parcels laid out to allow for as many parallel rows as possible. The following recommendations apply to the spacing of contour tracks:

Fig. 4.4-29: Row lengths in vineyards according to slope gradient (BMELF 1992)

With a slope gradient of	Row length on the slope
up to 10%	150 m to 200 m
15 to 30%	150 m to 80 m
over 30%	80 m to 60 m

With regard to design elements for road and tracks in winegrowing areas, the remarks in section 4.4.3.2 apply in general. There are a number of special considerations, however. If steep slopes call for switchbacks, the minimum curve radius should not be less than 5.50 m. Contour tracks should be laid out along existing breaks in the slope so that when using a cable hoist, the cable can always be kept taut without touching down. Their spacing depends on the slope, the soil type and the machinery used. Contour tracks should be planned with a carriageway width of 3.0 m and a formation width of 4.5 m to 5.25 m. They always require an inside water channel with a lined bottom, especially in the case of crumbly or weathered soils. The track running above the vineyard should have an outside shoulder at least 1.5 m wide for passing traffic and for the parking of equipment (such as a cable hoist) when working on the vineyard. Contour tracks should have a gradient of at least 2% and not more than 6%, with paths between them not exceeding 12%. They should have an inside crossfall of between 3% and 6%.

Very close attention should be paid to water erosion. For drainage purposes, contour tracks need to undulate, with surface water channelled off where possible at the steepest gradient. This minimises the catchment area for each watercourse and enables drainage to be kept on a small scale. The planning challenge is to combine maximum water retention for vines in the vineyard with the safe drainage of surface water. Water is generally channelled along tracks, following the contours to low points in the terrain for discharge down the run of the slope. At the bottom, the water needs to pass through silt and debris traps that are dimensioned for vehicular access so they can be cleared mechanically. Before being discharged into natural waters, the surface water generally needs to be captured in retarding basins; these too should be capable of vehicular access. To reduce the flow energy, the steep parts of drainage channels need to be lined with riprap, stone banking or precast concrete elements in a cascade formation. Hydraulic calculations are needed in order to determine the appropriate size of channels.

Fig. 4.4-30: Crumbling drystone walls (left) are replaced by gabions (right), which are also environment-friendly and fit into the countryside (photo: Thomas)

For the construction of retaining walls, the same generally applies as discussed in section 4.4.3.4. Here, too, however, a number of special features of viticulture need to be taken into account, such as the fact that retaining walls are necessarily far more common in vineyards and that they should generally be passable by vehicles, or at least on foot. In steeply sloping terrain, they constitute the downhill side of a vine row. An overview of the various forms of reorganisation and land development engineering practices in viticulture is contained in Kurbjuhn (2002).

As well as the upgrading of tracks and watercourses, reshaping vineyards frequently requires extensive grading work, in some cases with considerable interventions in nature and the landscape. Environmental and economic considerations and the impacts of grading therefore have to be carefully weighed against each other. Earthmoving should be planned only where it is necessary to bring about sustained productivity improvements in viticulture and where it is economically and environmentally justifiable (BMELF 1992). Grading increases the size of vineyards that can be cultivated as a single unit. It can also eliminate cold air sinks and obstacles to cultivation. In some cases, it serves to change a slope's exposure and increase the incident sunlight. The slope should allow vine rows to be oriented up and down. If vines are to be cultivated from side to side along the slope, this should not have a gradient exceeding 6%, or mechanical cultivation will be severely limited. Grading generally goes hand in hand with soil improvements by working in manure, compost or humus.

Any grading must be precisely planned. It requires an accurate elevation survey and knowledge of the geological and soil mechanical conditions. Digital terrain models make for easy project planning of the resulting terrain configuration and calculation of the volumes of earth to be moved. Rising springs and water-bearing soil horizons need to be identified and discharged by drains or trenches. Land intended for filling must likewise be terraced and provided with suitable drainage. To rule out future landslips, fill depths and the nature and extent of compaction should already be specified at the planning stage. Once grading is completed, re-vegetation and replanting should take place as soon as possible.

New ecological network elements need to be created in good time to ensure that animals and rare plants are not displaced from their previous locations during grading

work. Existing fallow land and areas to be taken out of viticulture due to poor productivity can be used as substitute or alternate habitats.

Wine growing areas feature cultural landmarks in a similar way to arable regions. These include wayside crosses and shrines, chapels, vineyard huts and towers. There are also distinctive regional structures such as the corbelled stone huts (similar to the Italian *trullo*) in the state of Hesse. Such landmarks are part of the cultural heritage and also serve practical purposes such as shelter during storms. They should be preserved wherever possible. When adding new built structures, care should be taken to use building materials characteristic of the region and to ensuring that they fit into the countryside.

4.4.5.3 Requirements relating to the use and development of the land in fruit, hop and vegetable growing

Reorganisation measures are also carried out in fruit, hop, vegetable and asparagus-growing areas. In each case – just as with woodland and vineyard consolidation – particular requirements are involved relating to the use and development of the land. First of all, these have to do with the fact that the plants concerned have a lifetime measured in years or even decades, which means that they require large compensation payments upon any change of ownership. In addition, specialised crops of this kind are accompanied by various forms of technical infrastructure. Finally, their labour-intensive cultivation is now largely mechanised – from ground preparation and plant care through to crop protection and harvesting. All of this has to be taken into account in the plan covering the common and public facilities. The side boundaries of compensatory parcels should be exactly parallel, with parcel widths corresponding wherever possible to an integer multiple of the variety-specific row spacing (which can vary from region to region). Additionally, if possible, the parcel ends should meet the access roads to be provided at right angles.

In low precipitation areas, irrigation is the most important factor for the economic viability of such crops. The same applies to growing areas that are less arid generally but dry in summer. On light soils, supplementary irrigation is often necessary to safeguard yields. In land consolidation, this means that existing irrigation systems have to be reworked or new systems created. Sprinkler systems are particularly important in fruit growing, where they are used for frost protection irrigation during flowering in regions where late spring frosts occur.

Any reorganisation of tenure in fruit growing areas should be approached with a similar strategy to a vineyard consolidation. For a comprehensive reorganisation of an entire fruit growing area, the change of ownership should be planned and timed so as to minimise any loss of harvest for participants and compensation payments for plantations. The timing depends largely on the age of the plantation, which will have a lifetime of between 30 and 40 years depending on the variety. Where fruit plantations have a long residual lifetime, their production value should be appraised by experts. In such cases, transitional provisions in the land consolidation can have a major positive or negative cost impact.

Traditional orchards are a form of fruit growing in which mostly strong-growing tall fruit trees with large crowns stand widely spaced with a maximum of 150 trees per hectare, usually on ground with permanent grass cover. Such orchards are a

characteristic feature of the cultural landscape, especially in central uplands. A typical feature of traditional orchards is their subsidiary use as permanent grassland. This should be taken into account if they change hands in a land consolidation. There are also such orchards with subsidiary arable or horticultural cultivation, although these are now only found in a part-time and 'hobby' farming context. In many cases, traditional orchards comprise various fruit tree species and varieties in a range of different ages and size classes.

Fig. 4.4-31: A traditional orchard on the margins of a village is of high ecological and scenic value (photo: Thomas)

Hops are grown on trellises in what are variously known as hop fields, hop gardens or hop yards. The trellises are made of poles up to 7 m tall that are rammed into the ground and linked with cables. These run in a chequerboard pattern from pole top to pole top. 'Strings' hang down from the trellis cables to the ground as runners for the hop plants to climb. Hops are planted in rows with a row spacing upwards of 2.5 m so that the hop field can be accessed by heavy equipment with a lifting platform. The spacing between hop plants depends on the needs of each variety and is usually around 1.5 m. The bines (shoots) on the usually mechanically pruned hop plants are trained around the strings and grow up to the usual trellis height of up to 7 m by maturity; newer varieties are suitable for lower trellis heights. In harvesting, the bines are taken down from the trellis and the cones stripped from them by picking machines on the farmer's premises.

Hop fields are used for around 15 to 20 years and then cleared due to declining yield. The trellises are a major business investment, and modifying or relocating them in a land consolidation incurs substantial costs. Careful prior appraisal of the remaining useful life of the hop plantation and of the size, age and condition of the hop field is essential.

Germany has seen asparagus cultivation increase by almost 30% in recent years due to its high profitability. Asparagus needs warmth and a loose, sandy, not overly moist soil. A newly planted asparagus bed takes at least three years to establish and a spacing of at least 1.0 m has to be left between beds. Here, too, compensatory parcels in land consolidation should have exactly parallel side boundaries to make optimum use of the land. The parcel widths should correspond wherever possible to an integer multiple of the row spacing (which can also vary from region to region). With proper care and fertilisation, asparagus beds can give good yields for up to ten years. In the event of a change of ownership, it is therefore necessary to decide on the basis of the remaining useful life of the bed whether to provide for a long-term utilisation arrangement in the land consolidation plan or whether the former owner is to be given monetary compensation for the lost profit over the remaining useful life. More recently, asparagus is increasingly cultivated on 'normal' soils, which is successful provided that the soil has been loosened, is not waterlogged and contains enough lime. This further increases the requirements relating to the use and development of the land when it comes to land consolidation in an area where asparagus is cultivated.

In areas with the specialised crops discussed above, crop-related infrastructure and parcel shapes are not the only important requirements. Decisions relating to the reallocation itself must also take particular considerations into account. This applies first of all to the physical soil conditions in terms of soil type, soil development level and soil water conditions. It also applies, however, to the situation and slope of the terrain and the microclimate in specific locations. These can sometimes vary considerably over small distances. It is not possible to make general recommendations in this regard. Conditions must be determined on the ground for each particular case and, in consultation with the board of the body of participants, analysed for relevance and whether they need to be taken into account. Before preparing any reorganisation plan, it may be helpful to call in experts in order to survey and map the potential for fruit plantations or for hop or asparagus fields in the areas in question.

Similarly diverse conditions can be found in field vegetable farming and ornamental plant cultivation. Here too, in the event of a land consolidation, it is necessary to survey local requirements relating to the use and development of the land, analyse them in close consultation with the regional professional associations and implement them in planning decisions to suit the situation.

However the countryside is put to use for agricultural and forestry in Germany, the 'cultural landscape' is more than just a factor of production; it also serves urban and rural populations as an attractive space for leisure and recreation. This must also be taken into account in the plan covering the common and public facilities and the accompanying landscape conservation plan.

4.5 Environmental impact assessment and impact mitigation under nature conservation law in land consolidation

A land consolidation procedure is, to a unique extent, always a spatially relevant undertaking, because its very purpose is to eliminate structural deficits in land use that hinder general development in a given area. Consequently, the measures to be carried out and the associated construction and modification of common and public facilities generally have an impact on nature and the landscape. As part of the planning process, it is therefore necessary to examine whether the planned measures are likely to have a negative impact on nature, the landscape and the environment and how ecological compensation can be provided for in the case of unavoidable interventions in nature and the landscape.

This requires various assessments in the course of the land consolidation procedure:

1. A general **environmental impact assessment** (EIA) must be carried out under the Environmental Impact Assessments Act (*Gesetz über die Umweltverträglichkeitsprüfung*; UVPG 2021) to assess whether the project will have an impact on people, animals, plants and biodiversity, soils, water, the air, the climate, the landscape, cultural heritage assets or other assets. Under item 16 of Annex 1 of that act, construction of the common and public facilities requires an environmental impact assessment.
2. A site-specific assessment must be carried out to determine whether the project is compatible with the objectives of Natura 2000 (**Habitats Directive assessment**); the legal basis for this is the Habitats Directive, Directive 92/43/EEC (EU Habitats Directive 1992).
3. A species conservation assessment in accordance with the EU Birds Directive must demonstrate that the project does not negatively affect strictly protected species. The legal basis of the **species conservation assessment** is Directive 2009/147/EC (EU Birds Directive 2009).
4. Finally, impact compensation provisions have to be worked through under the Federal Nature Conservation Act (*Bundesnaturschutzgesetz*; BNatSchG 2009) and under nature or landscape legislation of the relevant German state.

4.5.1 Preparation and conduct of the environmental impact assessment

An environmental impact assessment verifies that projects that have an environmental impact meet environment protection requirements. This ensures that in projects listed in Annex 1 of the Environmental Impact Assessments Act:

- Environmental impacts are identified, described and assessed comprehensively and as early as possible in accordance with uniform principles
- The outcomes of the EIA are taken into account as early as possible in official approval decisions.

An environmental impact assessment covers the environmentally relevant impacts of all planned measures and facilities, including their interdependencies. Its findings are taken into account when deciding on project approval. An EIA is subordinate to official administrative project approval procedures.

Following the assessment in preparation of the land consolidation (section 3.1.1) as to whether negative environmental impacts are to be expected in the project. the planning (land consolidation) authority, after initiating the land consolidation procedure (section 3.1.3) must notify the competent approving authority (the higher land consolidation authority) of the planned project, describing the subject matter and scope of necessary environmentally relevant measures. On this basis, the higher land consolidation authority responsible for approving the planning of the project discusses questions of significance for the conduct of the EIA in a hearing with the developer, which includes the scope of the survey and the methods for carrying out and evaluating the EIA.

If significant environmental effects are to be expected in a land consolidation procedure – as is the case with land consolidation procedures for the improvement of agricultural structure or for land development, in which case a plan covering the common and public facilities generally has to be drawn up – then an environmental impact assessment is required.

At the preparation stage, the land consolidation authority already notifies the authorities responsible for nature conservation and landscape preservation in the prospective study area of the matters to be covered by the forthcoming environmental impact assessment. Those authorities inform the land consolidation authority of their knowledge concerning nature and the landscape and their nature conservation and landscape preservation plans and measures in the envisaged land consolidation area. At the latest in the hearing on initiation of the envisaged land consolidation procedure, the study area and subject matter for the EIA should be consulted upon with the landscape preservation agencies and nature conservation organisations. The land consolidation authority takes this information and the outcome of these consultations into account in the further conduct of the procedure.

In the course of a land consolidation procedure, nature conservation and landscape management objectives are implemented in close cooperation with the nature conservation authorities. Use should be made here of the possibilities provided by law for maintaining and restoring the effective functioning of natural systems and for fostering the diversity, uniqueness and beauty of the landscape. Suitable measures should be taken to protect flora and fauna and to conserve resources (section 2.3.4). The basis for implementing nature conservation and landscape management objectives consists of relevant plans and programmes at national and local level. Reshaping measures in land consolidation have to be environmentally compatible. Significant or long-term adverse effects must be avoided. The measures are to be carried out so as to preserve and enable the development of the cultural landscape. Habitats and species of conservation importance, including landscape features that provide structure to the countryside, are to be preserved, safeguarded, protected from negative impacts and where possible enabled to develop and connected in ecological networks. Land readjustment measures in land consolidation procedures must help to resolve or at least mitigate land use conflicts between nature conservation and landscape management on the one hand and agricultural and forestry on the other. Where interventions in the landscape are nevertheless avoidable, the impact compensation provisions under nature conservation law must be applied (section 4.5.2).

Where common and public facilities are to be created or modified, it is necessary to assess at the planning stage whether and, if so, how interventions in natural systems and the landscape can be avoided. Unavoidable interventions must be compensated. The impacts must be presented and described and communicated to the public. On the basis of suggestions and concerns raised in the public hearing, the approving authority will decide on approval of the plan covering the common and public facilities together with the landscape development plan (section 3.2.3).

Fig. 4.5-1: An upland farming landscape rich in field margin habitats and copses compared with a featureless monoculture created by industrial-scale agriculture
(photos: Thomas)

Immediately after formal initiation of the land consolidation procedure (section 3.1.3), the land consolidation authority has a survey and assessment prepared on nature and the landscape in the land consolidation area. This survey and assessment of nature and the landscape has the purpose of surveying and analysing the current situation. It provides the basis for:

- The reshaping of the land consolidation area
- Preparation of the plan covering the common and public facilities with accompanying landscape conservation plan
- Assessment of the permissibility of interventions in natural systems and the landscape
- Determination of the nature, extent and location of any ecological compensation (offsetting) measures that may be necessary.

The survey and assessment should therefore be completed before establishing the general principles for reorganisation of the land consolidation area (section 3.2.2.1).

4.5.1.1 Survey of nature and the landscape

The survey is carried out on the basis of available documents on protected status under nature and water law together with other data under nature conservation law; it is generally verified and supplemented by extensive local surveys.

Documents on protected status under nature and water law comprise documentation on protected areas under European and national law, such as Natura 2000 sites, national parks, nature parks, nature conservation areas, landscape protection areas, protected landscape features, natural monuments, legally protected habitats, water protection areas, source water protection areas and legally designated floodplains. This documentation is available from the competent sectoral authorities under national law.

Other data under nature conservation law, primarily from the **habitat inventory** (*Biotopkataster*), is of important practical importance in the context of the situation review for the EIA in a land consolidation as it forms the basis for survey work on the ground. It comprises nature conservation data listing and describing in great detail not only habitats protected by law, but also all other habitats of conservation importance.

The habitat inventory is a collection of data (in a geographical information system database) on habitats and their wild animal and plant species of importance to habitat and species conservation. It is structured according to uniform scientific criteria, with

habitats delimited and classified by conservation value. The data is freely available online for the general public. Data from the habitat inventory provides the land consolidation authority, and in particular the engineer responsible for planning the reorganisation of the land consolidation area, with important information at a very early stage of the land consolidation procedure on the natural and landscape management potential and risks in the project area.

Fig. 4.5-2: Illustrative excerpt from a habitat inventory (LANUV 2008)

Habitat type	Habitat value	Protected by law	Unoffsettable/ special site	Natura 2000 code	
Inland salt basins					
Natural inland salt basin, salt meadow	**10**	**X**	**X, +**	**X**	1340
Spring, stream, river					
Hostile to nature, concrete-lined, heavily polluted	**1**				
Non-natural	**2**				
Partly non-natural	**5**		**(X)**	**(X)**	3260,
Partly near-natural	**8**		**X, +**	**(X)**	3270,
Near-natural/natural	**10**	**X**	**X, +**	**(X)**	(7220)
Ditch, canal					
Non-natural	**2**				
Partly non-natural	**4**				
Partly near-natural	**6**				
Near-natural	**7**				
Oxbow/backwater, pond, heathland pond					
Non-natural	**2**				
Partly non-natural	**5**		**(X)**	**(X)**	3110,
Partly near-natural	**8**		**X, +**	**(X)**	3130,
Near-natural/natural	**10**	**X**	**X, +**	**(X)**	3140, 3150, 3160
Artificial pond, quarry ponds, bodies of water formed by subsidence, reservoirs, small bodies of water					
Non-natural	**2**				
Partly non-natural	**4**				
Partly near-natural	**6**				
Near-natural/natural	**7**	**X**			
Forest, forest edge, field copse **With habitat-typical tree species - percentages in all layers present (without herbaceous layer) 0 < 30%** **The following details refer to all forest habitat types (percentage of habitat-typical tree species 0-100%):** **Habitat-typical tree species:** Types of potentially natural forest communities in their natural range including their pioneer tree species **Young stands to pole wood:** Development period up to 30 years (predicted habitat type) or **low to medium tree stand** in habitat-typical forests with fast-growing tree species in floodplains (floodplain willow scrub and woodland) **DBH:** diameter at breast height (trunk diameter) at a height of 1.3 m, estimated; **Structures:** Classification based on the criteria of growth, mature trees and strong deadwood **Deduction of 1 point**, but no less than minimum habitat value 3 in the case of: – young stands in isolated non-forest areas (e.g. fields) – grassland, slag heaps, unsealed areas; also applies to predicted value)					

– serious adverse effects e.g. eutrophication indicator – and/or neophytes > 25% and/or drainage				
Young stands – pole wood, DBH up to 13 cm				
Structures of habitat-typical tree species, moderately to poorly developed	**3**			
Structures of habitat-typical tree species, well developed	**4**			
Structures of habitat-typical tree species, very well developed	**5**			
Low – medium tree stand, DBH ≥ 14 – 49 cm				
Structures of habitat-typical tree species, moderately to poorly developed	**4**		**X**	
Structures of habitat-typical tree species, well developed	**5**		**X**	
Structures of habitat-typical tree species, very well developed	**6**		**X**	
Strong – very strong tree stand, DBH ≥ 50 cm				
Structures of habitat-typical tree species, moderately to poorly developed	**4**		**X**	
Structures of habitat-typical tree species, well developed	**5**		**X**	
Structures of habitat-typical tree species, very well developed	**6**		**X**	

Explanation
Habitat types that are fully protected under the Nature Conservation Act are marked with x; individual habitat types to be classified here are marked with (x).
In terms of the time frame for restoration, unoffsettable habitat types are marked with x and individual unoffsettable habitat types are marked with (x). Additionally, habitat types with a long development period (> 100 years) and special site requirements are marked with +; individual types to be classified here (e.g. "forest with a percentage of habitat-typical tree species of > 50%", bog woodland) are marked with (+). If these habitat types cannot be restored to the same level of functionality, an additional need for compensation arises. Some other habitat types that are important in terms of nature conservation and with extreme site requirements may in some cases also come under this rule if their functionality cannot be restored. Habitat types that are also FFH habitats are marked with x. Individual habitat types to be classified here are marked with (x).
Habitat types that are also habitats for planning-relevant species are allocated the corresponding habitat code. As regards compensation, a period of 30 years (one human generation) is to be taken as a basis for the habitat type to be developed and its predicted value.

The **on-site survey** in the field verifies the available nature conservation data and supplements and updates it where necessary. It should be carried out on the basis of a map to which can be added all other landscape elements and features, including roads, paths, water bodies, embankments, walls and other things important for the reorganisation of the procedure area, such as archaeological monuments, wayside shrines or crosses and the like.

The area covered by the survey depends on the nature and scope of the planned reorganisation measures. After scoping the survey, the geographic locations of the required objects and areas are determined by field surveying – if that has not already been done for another purpose – and entered in a map; suitable map scales range from 1:2000 to 1:5000. An orthophoto map or other topographic map enlarged to the required scale is used as the basis. The survey and assessment findings are entered in the map, where possible using a nationally uniform set of symbols. Specific matters are presented in separate detail maps with a suitably larger scale.

Necessary explanatory notes and drawings can be entered in the map unless this compromises readability, in which case separate notes and drawings are made. Care must be taken to properly cross-reference the separate notes and drawings with the map.

The on-site field work for the ecological survey should be planned over an entire vegetation period in order to accurately record the flora and fauna in the land consolidation area. If the survey cannot start early enough in spring, a follow-up survey should be planned for the spring of the following year. The findings should be available at the latest prior to establishing the general principles for reorganisation of the land consolidation area (section 3.2.2.1).

The on-site survey is done by ecology or landscape management experts who are either on the staff of the land consolidation authority or contracted by the land consolidation authority as outside experts. Such work is frequently also carried out by forestry experts. In consultation with the competent national nature conservation and landscape preservation authorities, the appointed expert also determines the assessment method to be used (see next section, 4.5.1.2).

The survey results are recorded in a **'landscape and ecology survey map'**. Protected areas under nature conservation, landscape conservation and water law are included for information purposes, with their legal basis recorded in the documentation of the ecological survey and in the plan covering the common and public facilities for the land consolidation. The survey map serves as a basis for the assessment of environmental impacts and for work on the plan covering the common and public facilities together with the accompanying landscape conservation plan.

4.5.1.2 Assessment of nature and the landscape

For the purposes of the assessment, it may be helpful to divide the procedure area into sub-areas according the following criteria:

- Similar relief, distinctive geomorphological structures
- Similar land use (such as arable land, grassland or woodland)
- Settlements and anthropogenic landscape features.

For proper assessment of whether adverse effects on natural systems or the landscape are to be expected, knowledge is needed of biotic and abiotic functions in the study area.

Biotic functions are generally identified from lists of habitat types in the study area. Existing faunistic and vegetation data should be evaluated and can be helpful in assessing the significance of interventions in nature and the landscape. Animal species that depend on specific habitats and need such habitats to maintain their populations should be listed separately. In-depth faunistic studies may be necessary in some cases.

Abiotic functions relate to geomorphology and hydrology. As well as looking at morphology, soil types and waters, it is also necessary here to describe land use risks such as wind and water erosion risks, flood risk, permanent waterlogging risk, degradation risk and drought risk. Areas or landscape features that particularly characterise the landscape should be described in qualitative terms and where appropriate also in terms of their scenic value.

Landscape features and habitats should be assessed according to the following criteria:

- **Terrain characteristics:** the site-specific conservation value of terrain characteristics should be assessed (for example, dry grassland, peatland, rising springs, rock outcrops, periodically wet areas, ditch and path verges, embankments and biodiverse grassland)
- **Degree of naturalness:** this is assessed by applying a naturalness scale (such as near-natural habitats and landscape features, semi-natural habitats and landscape features, and non-natural or apparently non-natural habitats and landscape features)

- **Plant habitat significance:** the habitat type or landscape feature is assessed as a habitat for wild plants, assigning a high rating to biodiverse vegetation or vegetation with protected species
- **Animal habitat significance:** assessment here notably relates to the structural richness of the habitat or landscape feature, its suitability as a breeding and foraging habitat and the significance of a landscape feature for animal migration; the location of the habitat in the wider surroundings and the age and diversity of the vegetation can also be significant for assessment
- **Rarity:** consideration should be given to the frequency of occurrence of a habitat or landscape feature in the ecological or landscape spatial unit; habitat types typical of the ecological spatial unit are given a high rating in residual or relict cases, while frequent habitat types are given a low rating
- **Restorability:** assessment of the restorability of landscape features or habitats is based on the time periods of relevance for planning; key factors are the characteristic features and age of the habitat type.

Assessment of nature and the landscape must be done with reference to applicable sectoral legislation with its environmental requirements, which are to be applied to the identified subject matter of relevance to planning. In connection with land consolidation in particular, this relates to sectoral legislation on the following:

- Nature conservation law with regard to protected areas and protected landscape elements
- Forestry law when it comes to converting woodland to other land uses or to afforestation
- Water law if water protection areas, water abstraction or construction measures on water bodies are planned as part of the reorganisation measures.

Below the level of legal requirements, assessing nature and the landscape and environmental impacts requires the use of a standardised methodology. Various assessment methodologies have been developed for this purpose since the 1980s:

- ADAM; NOHL; VALENTIN (1986): Bewertungsgrundlagen für Kompensationsmaßnahmen bei Eingriffen in die Landschaft. Ministerium für Umwelt, Naturschutz, Landwirtschaft und Verbraucherschutz NRW (Hrsg.), Düsseldorf mit praxisnahen und aussagekräftigen Beispielen.
- ARGE Eingriff/ Ausgleich (1994): Entwicklung eines einheitlichen Bewertungsrahmens für straßenbedingte Eingriffe in Natur und Landschaft und deren Kompensation. Ministerium für Wirtschaft, Mittelstand und Verkehr NRW/ Ministerium für Umwelt, Naturschutz, Landwirtschaft und Verbraucherschutz NRW (Hrsg.), Düsseldorf.
- LUDWIG; MEINIG (1991): Methode zur ökologischen Bewertung der Biotopfunktion von Biotoptypen, vornehmlich auf städtebauliche Maßnahmen fokussiert.
- FROEHLICH; SPORBECK; SMEETS; DAMASCHKE; REINISCH (2002): Leitfaden zur Erstellung und Prüfung Landschaftspflegerischer Begleitpläne zu Straßenbauvorhaben in Mecklenburg- Vorpommern. Bochum/ Schwerin, September 2002, erstellt im Auftrag des Landesamtes für Straßenbau und Verkehr Mecklenburg- Vorpommern.

An overview of methodological differences between the various approaches can be found in LANUV (2008).

The common feature of these assessment methodologies is that they use a discursive approach for a qualitative assessment of interventions in natural systems and the landscape and of ecological offsetting for such interventions. In addition, they include formalised, numeric valuation methods for measuring habitat functions so that offsets can be confirmed in quantitative terms.

> *An assessment methodology specially designed for the needs of land consolidation has been developed in the German state of Baden-Württemberg. Called Ecological Resource Analysis, it covers the inventorisation and assessment of nature resources in a land consolidation procedure and ex-post evaluation of ecological offsetting measures following implementation. The approach addresses soils, watercourses, flora, fauna, habitats, Natura 2000 habitats and species, landscape features, habitat networks and (where applicable) aspects of the historical cultural landscape. Special emphasis is placed on surveying all habitats and species necessary for assessments under nature conservation law, including Habitats Directive species, protected habitats under European law, habitats under section 30 of the German Federal Nature Conservation Act (habitats of critically endangered wild animals and plants) and nationally protected species. The data is collected in a geographical information system and presented in maps and in summary tables for the comparison of different planning alternatives. A summary report additionally provides specific guidance for planning and assists in identifying suitable measures for protecting and enhancing the surveyed ecological resources in ecological compensation measures (LGL-BW 2009).*

The results of the assessment are recorded in a **landscape and ecology assessment map** (*Bewertungskarte*) and are to be taken into account in all decisions to be made for the reshaping of the land in the land consolidation. This is an important reference basis for assessing the permissibility of interventions in nature and the landscape and for determining the nature, scope and location of necessary offsetting measures.

In simple cases, the assessment can be recorded in the **landscape and ecology survey map** (*Bestandskarte*). With more complex cases, the results of the survey and the ecological assessment are recorded in separate maps and preferably supplemented by assigning attributes and adding written explanations. For this purpose, the individual, consecutively numbered habitats and landscape features in the assessment map are listed in an assessment form and assigned attributes relevant to assessment; for example:

- Information on the surveyed habitat or landscape feature (such as species inventory, threats, adverse impacts and protected species)
- A discursive assessment
- The assigned assessment level (of high conservation value, of conservation value, not of conservation value), generally taking into account the context of the entire ecological spatial unit
- Planning options, such as marking for removal, establishing a new habitat or feature, moving boundaries, extension by suitable means or flagging for protected designation.

In special cases, it may be necessary to base the assessment on quantitative criteria or indicators.

The entire process of assessing the habitats and landscape features is presented in an **explanatory report** covering all matters relevant to understanding the findings. The explanatory report should include:

- The reasons for the choice of assessment method
- A cursory summary assessment of the resource inventory from a nature conservation and landscape management perspective
- Planning principles and development objectives in the land consolidation procedure for the area
- The main features of planned measures and the related situation regarding interventions in nature and the landscape
- Presentation of the nature, scope and timing of the expected interventions in nature and the landscape
- Presentation of the nature, scope and timing of impact mitigation measures and ecological offsetting measures.

4.5.2 Basis and rationale of the impact compensation provisions under German nature conservation law

Section 14 of the Federal Nature Conservation Act defines 'interventions' as changes affecting the shape or use of areas, or changes in the groundwater level associated with the active soil layer, which may significantly impair the performance and functioning of natural systems or significantly impair the landscape. Examples of interventions include constructing roads, converting woodland to other land uses or extracting mineral resources from the ground. The use of land for agricultural or forestry purposes is not considered to be an intervention provided that nature conservation and landscape management objectives are taken into account.

Wherever possible, the party causing an intervention must avoid any significant adverse effects on nature and the landscape. Unavoidable significant adverse effects have to be offset by compensation measures (*Ausgleichsmaßnahmen*) or substitution measures (*Ersatzmaßnahmen*) or, where such offsetting is not possible, by 'monetary substitution' (section 13 of the Federal Nature Conservation Act).

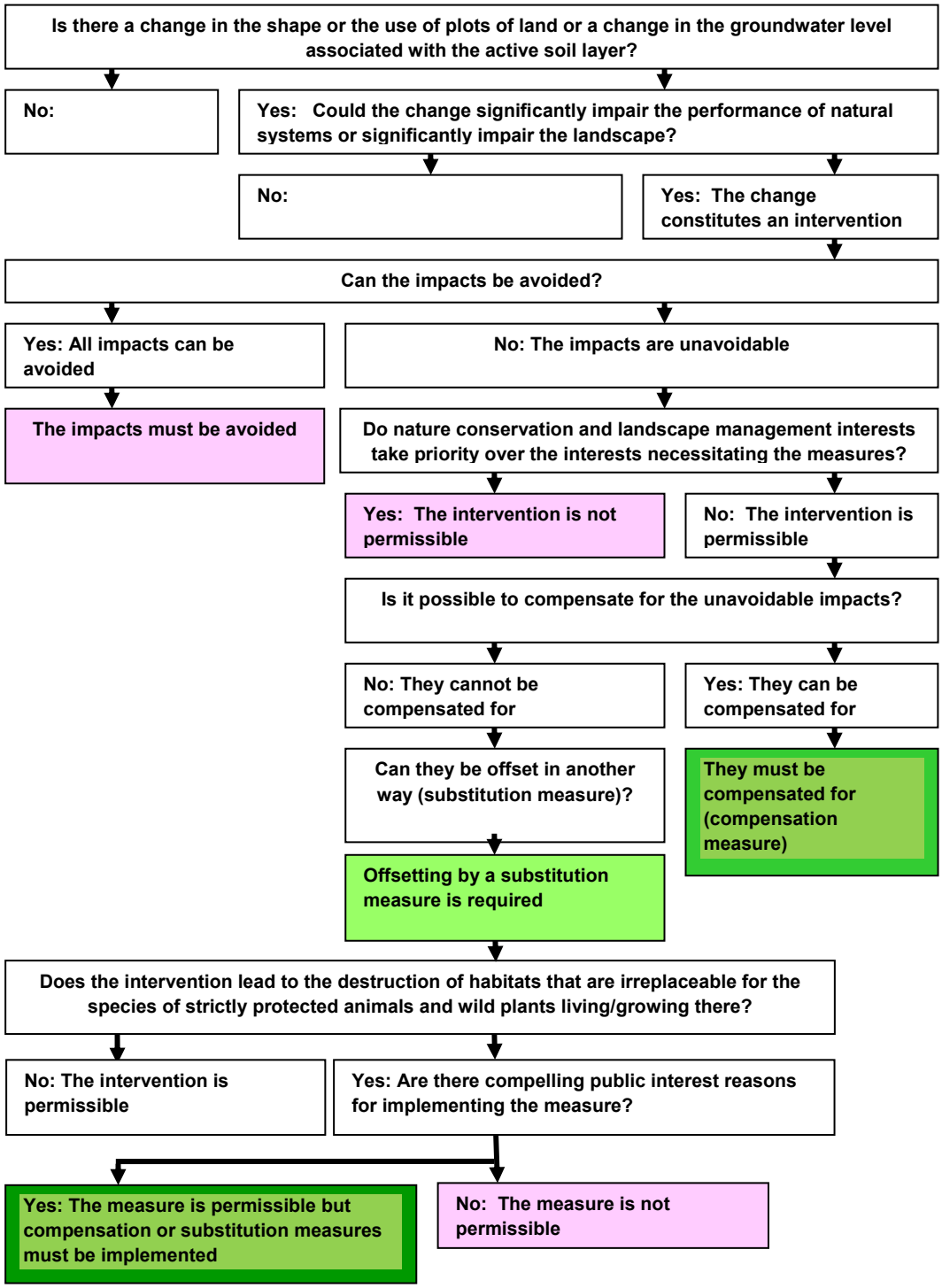
Under section 17 (4) of the Federal Nature Conservation Act, the party causing an intervention must provide qualitative and quantitative information on the location, nature and extent of the intervention and on the necessary offsetting measures. The party must also provide the necessary information on the factual and legal availability of land required for compensation and substitution. None of this applies to a land consolidation because the entire land consolidation plan is implemented as a land readjustment measure. The necessary information is usually presented in a separate sectoral plan, the 'accompanying landscape conservation plan' (*landschaftspflegerischer Begleitplan*), which may have to be submitted to the competent authorities; in a land consolidation, it is generally combined with the plan under section 41 of the Land Consolidation Act.

Under section 15 (2) of the Federal Nature Conservation Act, an intervention in nature and the landscape is considered to have been offset elsewhere if and when the impaired functioning of the natural systems has been substituted in an equivalent manner within the relevant natural area or the appearance of the countryside has been reshaped in a manner that is in keeping with the landscape.

The purpose of the impact compensation provisions is to avoid or at least minimise the negative impacts of interventions in nature and the landscape; the aim is to conserve the current state of nature and the landscape in a project area despite planned interventions.

For each individual measure, it is necessary to apply this logic in order to determine whether the measure constitutes an intervention and whether the intervention is admissible. The decision is made using the process shown in fig. 4.5-3.

Fig. 4.5-3: Process to determine the permissibility of interventions in natural systems and the landscape



As part of this, it is necessary to assess the significance and permanence of foreseeable impacts and to verify that all impact avoidance or mitigation options have been exhausted. The assessment for significance and permanence of impacts is done in discursive form. Its detail level depends on local conditions and can vary according to impact intensity and the sensitivity and importance of the affected habitats and landscape. Ultimately, the key factor is the plausibility and validity of the assumptions made in each instance.

A land consolidation generally involves measures that can impair the performance of natural systems or impair the landscape. Measures that in a particular case can significantly impair natural systems and the landscape include:

- Road and track construction and upgrading
- Recultivating existing roads and tracks
- Widening water bodies and the construction of water crossings
- Land improvement measures to drain moist grassland
- Clearing and grading work removing embankments, terraces and depressions
- Measures to bring about compensation in land of equal value in forms such as applying topsoil or building access ways to higher or lower-lying new plots.

The following are also considered interventions:

- Constructing or significantly altering thoroughfares, sealed agricultural or forestry service roads or built structures
- Removing hedges, avenues, rows of trees and traditional-type orchards that are characteristic elements of the landscape or filling in standing waters with an area exceeding 100 m²
- Laying above-ground or underground pipelines or cables outside of built-up areas
- Destroying or otherwise significantly or permanently damaging an area of land (or anything else) that is subject to statutory protection
- Converting grassland into arable land
- Converting woodland into arable land or grassland
- Fillings with a height of more than 2 m or excavations with a depth of more than 2 m and with an area exceeding 400 m²
- Surface extraction of mineral resources.

The following are not generally considered to be interventions:

- Removing habitats resulting from natural succession or management measures, or resuming a former land use on a piece of land that has been lawfully used in the past for farming or for a building or road (use of the ‘temporary nature’ approach)
- Laying pipelines or cables in the structure of roads and surfaced tracks outside of built-up areas, provided that trees alongside are not significantly damaged in the process

- Maintenance measures in fulfilment of legal obligations
- Necessary maintenance of water bodies to prevent bed retrogression.

If an intervention is permissible because the objectives of land consolidation take precedence over the interests of nature and the landscape, the selected survey and assessment methodology is used to quantify the extent of the intervention and to determine the required offsetting and where it is to be implemented.

The competent authorities in most of the German states have issued application guidance on the impact compensation provisions. Guidance provided in this connection for land consolidation procedures is led by the aspiration for ecological offsetting measures to be implemented with a minimum of conflict (Hammer et al. 2001). Rural land readjustment under the Land Consolidation Act is the suitable means of resolving land use conflicts caused by third-party offsetting measures under nature conservation law (Klaus 2001; FGSV 2003).

4.5.3 The qualitative and quantitative determination of offsetting obligations under nature conservation law

An impact is **compensated** if and when:

- The impaired functioning of natural systems has been restored
- The appearance of the countryside has been restored or reshaped in a manner that is in keeping with the landscape.

An impact is considered to have been **offset elsewhere** if and when the impaired functioning of natural systems has been substituted in an equivalent manner within the relevant natural area or the appearance of the countryside has been reshaped in a manner that is in keeping with the landscape.

Tower-like structures like wind turbines and overhead power lines have a significant impact on the landscape (quite apart from other impacts, such as on bird life). Due to their height, they cannot usually be offset by compensation or substitution measures. Where such an installation is permitted, ‘monetary substitution’ must therefore be paid to the competent nature conservation authority. Interventions in nature and the landscape of this kind that are not capable of non-monetary offsetting do not arise in land consolidation. Given the land readjustment options available when reshaping a land consolidation area, every planner should meet the challenge of finding the best possible non-monetary offset for any necessary intervention in natural systems or the landscape. Monetary compensation of interventions in natural systems or the landscape is therefore not an option in land consolidation.

When it comes to selecting and implementing offsetting measures, preference should be given to measures in the following list according to the situation:

- Ecological improvement of existing agricultural and forestry land use and of existing landscape features
- Renaturalising pieces of land with surface sealing or leaving them to natural succession
- Restoring culverted watercourses

- Ecological improvement of watercourses, including the creation of riparian strips
- Planting site-adapted trees and shrubs and regionally characteristic fruit tree varieties, either as fringe habitats or traditional-type orchards
- Removing conifer plantations from valley meadows
- Planting roads with avenues, single trees, groups of trees or bushes and hedges to lend structure to and connect habitats in the landscape
- Giving intensively farmed land over to extensive farming (for example, by turning arable land into grassland and more extensive grassland farming)
- Leaving land to natural or managed succession
- Creating or improving wetlands
- Increasing the area of woodland in areas with little woodland or transforming woodland stands
- Implementing measures in connection with national implementation of the EU Water Framework Directive (EU WFD 2000).

Management and maintenance measures that permanently enhance natural systems or the landscape can also be used for offsetting. These also include measures on periodically alternating sites provided that they can be made permanent by a contractual arrangement between the party causing the intervention and a suitable operator. In the case of offsetting measures on alternating sites, the offsetting obligation is deemed to be fulfilled if the party causing the intervention presents a suitable contractual agreement. Such offsetting measures can be stipulated by the land consolidation authority in the land consolidation plan.

Production-integrated compensation

Moves towards greater flexibility with regard to offsetting under nature conservation law, which began to emerge in the 1990s, have since become established as a specific toolkit known as 'production-integrated compensation' (Czybulka; Hampicke; Litterski 2002). This relates to nature conservation measures on farmland that offset interventions in nature and the landscape and are integrated into farming practices. Unlike conventional offsetting measures to enhance natural systems and the landscape, production-integrated compensation is thus integrated into everyday agricultural production operations. Farming continues on the areas of land concerned.

Production-integrated compensation can be implemented either for the long term on a single piece of land (and secured in rem by a limited personal servitude recorded in the land register) or on periodically alternating sites. In the case of alternating sites, the offsetting requirements are institutionalised by a contractual agreement with the party causing the intervention in nature and the landscape; the agreement is entered into with a suitable body such as a nature conservation authority, nature conservation foundation or landscape management association. The latter then ensures that the offsetting obligation is indeed fulfilled by means of

contracts with farms stipulating management requirements based on nature conservation considerations.
Irrespective of whether production-integrated compensation is implemented on a single area of land or on alternating sites, a period of 25 years is taken as the basis. Additional formal details are laid down in state-specific statutory instruments such as the 2013 Bavarian Offsetting Ordinance (BayKompV 2013). Offsetting obligations affecting federal administrative entities are governed by the Federal Offsetting Ordinance (Bundeskompensationsverordnung; BKompV 2020).
Reduced yields or higher expenses incurred by farmers as a result of management requirements are made up by the party causing the intervention in the form of monetary compensation under civil law contracts (section 15 (4) of the Federal Nature Conservation Act). The areas concerned therefore remain under cultivation by the farmer and continue to be eligible for subsidies under the European Union's Common Agricultural Policy (CAP).
A systematic overview of suitable production-integrated compensation options is provided in Gödeke; Schwabe; Bärwolff et al. (2014). This study describes measures directed at a desired development objective on the basis of the condition of the area earmarked for offsetting. It also assigns a point score to each measure in an ecological assessment. The same principle is applied when production-integrated compensation measures are accounted for in compensation banking (see section 5.7.4). In predominantly arable areas, this approach can be used to restore biodiversity in the agroecosystem. Effective options include cutting sowing quantities by 20% to 50%, increasing the spacing between seed rows, reducing fertiliser use, refraining from growing legumes, using special seed mixtures for arable feed crop production, creating green strips and riparian strips, and creating ecological niches for ground-nesting birds.

If an intervention also has positive impacts on habitat and species conservation or on the landscape, this can be taken into account when assessing the intervention and the offsetting measures. This can be used to avoid a situation where land has to be taken out of cultivation. The amount of farmland needed can be reduced to the absolute minimum by carefully selecting and combining suitable offsetting areas and offsetting measures. In the aggregate across all offsetting measures, the area of farmland designated for offsetting should not exceed the area affected by the intervention in nature and the landscape. Where the scope of offsetting for specific functional impacts cannot be determined using an area-based approach (as for the removal of individual trees, groundwater changes or impacts on habitat complexes), the findings of the discursive assessment must be addressed separately in impact-offset accounting.

The location of offsetting measures should be selected in such a way that they can meet the functional requirements placed on them. This means:

- Compensation measures must be implemented in close spatial proximity to the intervention and the functional impairment. This can or may have to be departed from if local conditions require.
- If the close spatial proximity criterion cannot be met, offsets must be implemented in the same landscape spatial unit as the intervention. This means that despite relaxation of the functional and spatial proximity criterion, spatial proximity between intervention and offset should not be completely

abandoned. The landscape spatial unit is the spatial unit that, in the totality of its animate and inanimate elements, including interdependencies between them, comprises an ecological landscape unit with characteristic local conditions.

- Preference should be given to the use of publicly owned land for offsetting measures provided that it is suitable.
- Offsetting measures should be planned taking into account the spatial and functional relationships with their surroundings, avoiding isolated siting.

The total area of land for offsetting should be decided in each individual case and the offsets assigned to specific geographic areas. The degree of significance and/or permanence of an intervention is best taken into account by increasing or decreasing the size of the total area of land for offsetting. Interventions requiring compensation and offsetting measures are simply matched up against each other (basic impact compensation accounting). The qualitative documentation of interventions and offsetting can also be kept simple.

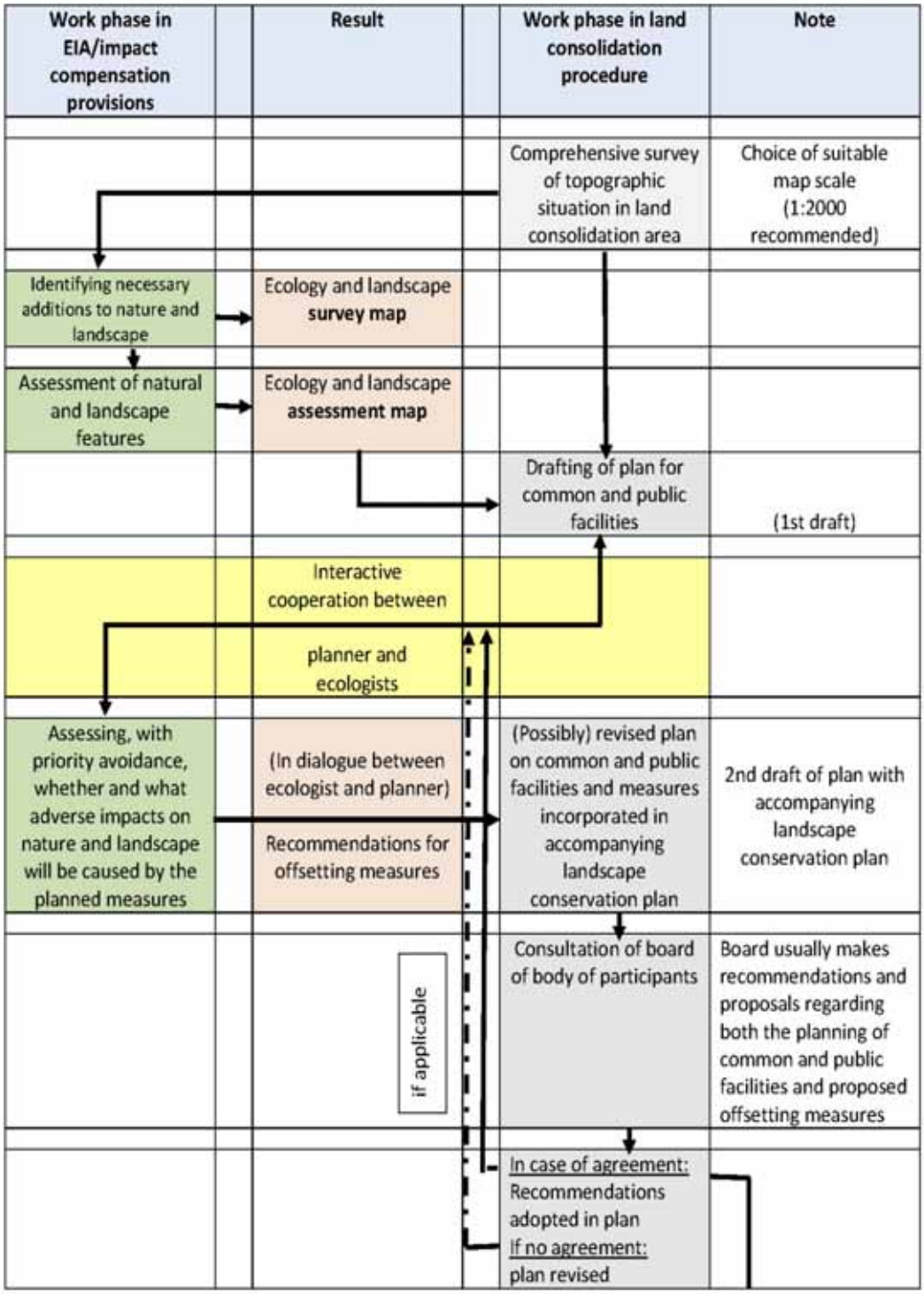
Environmental impacts should be assessed and documented in a summary presentation of all planned measures and their impacts on environmental assets. It is not usually enough for environmental impacts to be simply netted out. Instead, they should be weighted by main resource categories. Project alternatives should be assessed to determine which one has the least environmental conflict potential or risk.

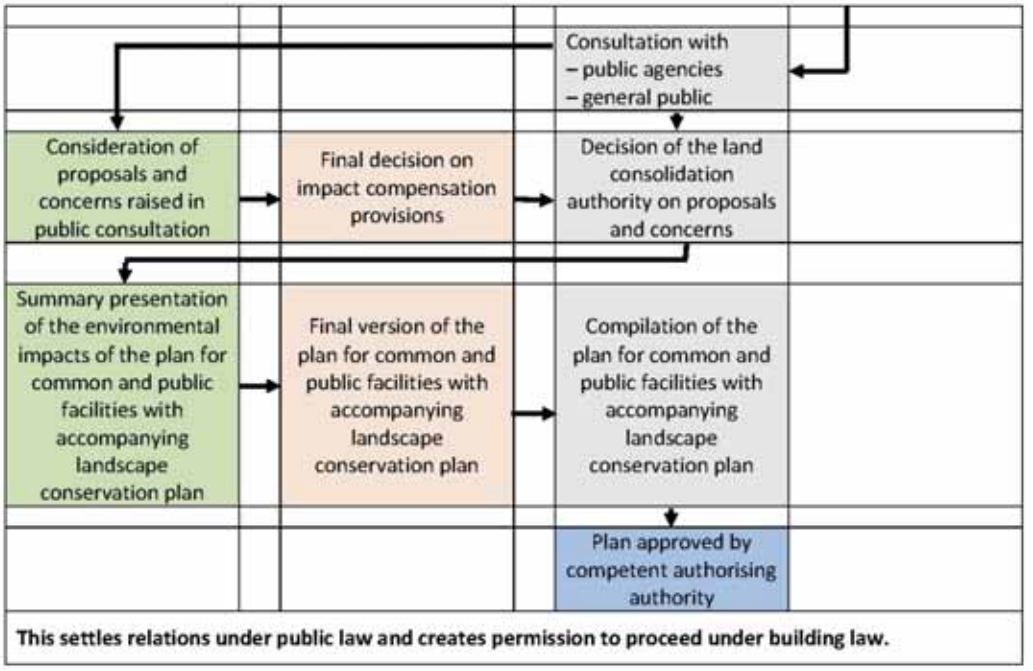
The assessment of environmental impacts is used to prepare the decision on the permissibility of the project as a whole. Its outcome is put on the record and taken into account in the decision.

4.5.4 Efficiency in the application of impact compensation provisions

The above discussion of environmental impact assessments in land consolidations makes it clear that in all reorganisation measures under the Land Consolidation Act, environmental considerations require the constructive involvement of all stakeholders in land consolidation, and efficient cooperation between planners and expert ecologists is essential in the planning phase. Even if meticulous attention is paid to the documentation of landscape and nature in the project area in the landscape and ecology survey and assessment map, the planner still needs feedback from ecology experts to accurately assess the interdependencies between what is planned and the environment in the project area. The same goes for deciding offsetting measures, especially considering that the board of the body of participants, the bodies representing public interests and the general public have to be involved in the process. The proposals and recommendations arising from consultation with the board of the body of participants, together with the suggestions and concerns raised in the hearing with bodies representing public interests and the general public, necessarily mean that an iterative approach is needed to obtain broad consensus on the final version of the plan covering the common and public facilities and the accompanying landscape conservation plan. For this process to be conducted efficiently and in a goal-oriented manner, it is recommended that the active planning phase should take the form outlined in the flow chart fig. 4.5-4.

Fig. 4.5-4: Planner-ecologist interaction in the planning process





Actual **implementation of offsetting measures** should start as soon as possible after the plan covering the common and public facilities and accompanying landscape conservation plan have been approved or accepted. It should be completed before formal conclusion of the land consolidation (see section 3.3.6).

The costs of implementing the stipulated offsetting measures are implementation costs in the land consolidation and are met out of the land consolidation budget. Where offsetting measures are caused by public facilities planned in the land consolidation, the costs are borne by the party having the measures carried out.

4.6 Conflict management in land consolidation and rural development

Land consolidation and land readjustment, together with the sustainable rural development measures embarked upon more recently at local level, constitute procedural interactions involving the state. As well as playing out between private citizens and institutions of regional or local government, these also result in interactions among the people involved, creating great potential for conflict that project managers must address in a professional manner.

4.6.1 Conflicts and conflict management in general

External conflicts are a recurring phenomenon in human society. They are caused by diverse extraneous circumstances and involve equally diverse objects of contention. Such conflicts can be classed as task conflicts, interpersonal conflicts, distribution conflicts, value conflicts and recognition conflicts. These categories of conflict manifest themselves in disagreement or antagonism in social interactions. All types of conflict can go hand in hand and they are often closely correlated as a result.

According to findings from psychology and sociology, conflicts always follow the same course. At first, a conflict brews beneath the surface, unnoticed by outsiders. At this stage, the conflict can still be settled between the parties involved by talking, negotiating, discussing and exchanging information. Once a conflict breaks the surface and becomes visible to outsiders, it is usually time to bring in a third party, an institutional entity or a mediator. The further a conflict escalates, the more third-party input is needed to manage it.

When institutional entities are called in to help settle a conflict, it is usually on the basis of a statutory or contractual provision.

For mediation, the parties have to agree to involve a mediator in the particular case. Mediation should enable the parties to separate the objective from the subjective, to recognise phenomena of individual perception as conflict factors and to acknowledge their own needs and interests and the differing needs and interests of the other party or parties. The aim of mediation is a consensual, out-of-court resolution of the conflict – where possible by mutual exploration of the causes and background – and to reach a binding, forward-looking agreement between the parties. In mediation, unlike court proceedings, both parties are meant to come out on top: the aim is a win-win outcome. Mediation does not focus solely on the objective cause of action, but considers the individual and common interests of all parties.

A mediation process is based on the following premises:

- The parties own the process and the outcome: The resolution of the conflict is devised by the parties themselves, while the mediator's job is to guide the talks and negotiations
- Open-outcome: The outcome of mediation cannot be fixed in advanced, and all conflict parties must go into mediation with some will to negotiate
- Impartiality of the mediator: The mediator must show willingness to identify with the parties' standpoints and in case of need to take sides with any party.

Everyone involved in a mediation process must show a basic attitude of respect and appreciation for others and the willingness to stand up for their own interests while also accepting others' interests and concerns. Mediation is also used in public consultation and participation processes.

A distinction is made in conflict management between ending a conflict and resolving it. Ending a conflict does not necessarily mean peace; indeed, it may result in severed relations and/or vengefulness. Genuine conflict resolution goes down to the underlying structure of a conflict.

4.6.2 Conflict causes and conflict potential in land consolidation and rural development

Specific situations in the course of land consolidations and rural development measures trigger various sources of conflict. Based on the above classification of conflicts, these come up in all rural development and land consolidation procedures and processes but have different causes. In all cases, they are 'external' conflicts in the form of:

- Task conflicts (choice-of-solution conflicts, such as on the content of the plan covering the common and public facilities in a land consolidation)

- Interpersonal conflicts (for example between neighbours as to the future line of their shared border)
- Distribution conflicts (concerning, for instance, who receives which plot where under the land consolidation plan)
- Value conflicts (about matters such as the use of natural resources or changes to the landscape in the context of an environmental impact assessment)
- Recognition conflicts, where a complaining party does not consider their concerns to have been taken seriously.

As a statutory land readjustment procedure, land consolidation holds great potential for conflict. This is because a statutory farmland reorganisation in which plots of land are exchanged, one for another, intrudes upon the substance and limits of the constitutionally guaranteed right to property. A conflict therefore arises with the authority carrying out this statutory procedure – a classic case of a **task conflict**, which emerges on announcement of the land consolidation plan, in addition to a **distribution conflict**. It is true that landowners have an assurance in law that the reorganisation of plots must leave them at least as well off as before and that they will be compensated with land of equal value. This legal requirement is an expression of the duty of the social state to uphold distributional equity. For a period of many months, however, participants remain in the dark as to where their compensatory plots will be located in the land area, who will be their neighbouring landowners and in what condition they will find the land. As well as exercising the minds of the landowners listed in the land register, these matters are a topic of discussion for family and friends alike for months on end, and a constant burden to all involved. All too often, hackles are further raised by circulating rumours, misinformation and jibes among fellow farmers or members of the village community. In this way, over the time up to announcement of the new field layout, a climate of distrust can develop towards the land consolidation authority and its service providers, together with malice and mutual suspicion among land consolidation participants. This makes the work of the land consolidation authority far harder and can even lead individuals to rash actions.

Landowners may also see a threat to their livelihoods. As a very basic right, property is closely bound up with the guarantee of personal freedom. Within the family of constitutional basic rights, the right to property has the task of ensuring its holders a degree of freedom under property law and hence of enabling them to lead their lives under their own responsibility (BVerfGE 1968). Even if individual participants in a land consolidation procedure may not reflect on this, they perceive the rearrangement of their property emotionally as a threat, or at least a potential threat, that touches upon their basic existential needs. That is because for most farmers, the land they farm is their livelihood. It generates an income to live on and constitutes their provision for old age.

This (perceived) threat from the reorganisation of the land also has another psychological component. According to Erich Fromm (1993) the nature of the ‘having’ mode of existence follows from the nature of private property. “I am what I have.” In this mode of existence, all that matters is the acquisition of property and the unlimited right to keep what one has acquired. “My property constitutes myself and my identity.” A change in the very essence of that which is owned is therefore perceived as a threat to the mode of existence, a threat to the self and to self-identity: a **recognition conflict**.

A different situation applies during preparation of the plan covering the common and public facilities (section 3.2.2.2). Individual participants are able to see here that the matter affects them only indirectly. It is clear to them that the networks of roads, tracks and landscape management measures provided for in the plan will have an impact on their subsequent compensatory land allocation, although they do not yet know which pieces of land that will involve. They see that they cannot truly represent their own personal interests here, thus giving rise to both a **recognition conflict and a task conflict**. They can only trust that the board of the body of participants will vigorously pursue their shared and hence also their personal interests. The resulting 'helplessness' can create a severe psychological burden for participants, at least if they are given insufficient or no information about the overall context of the plan.

Village communities always have **interpersonal conflicts**, and not only between neighbouring landowners. In many cases they also have little to do with the land contributed to a land consolidation procedure. Interpersonal conflicts tend to go back a long way. They are carried through the generations to the present day and rekindled time and again. If plot boundaries are to be changed or plots laid out differently for better exploitation of the land, any interpersonal conflicts flare up again in full force. They are frequently so intractable that a consensual solution seems out of the question, even if this is to the detriment of the conflicting parties.

Value conflicts arise in rural development primarily when lines of argument or decisions are influenced by an individual's ideological or ethical standpoint. In land consolidation, conflicts of this kind mainly come to light when establishing the general principles for reorganisation of the land consolidation area and in the context of environmental impact assessments.

Value conflicts also manifest themselves when working on integrated rural development concepts (section 4.1) or village development concepts, and are frequently fought out in a highly acrimonious and entrenched manner. In all cases, a value conflict will generally already become apparent in the initial situation and status review and will then persist through all stages of the dialogue process. The challenge for the process manager is to bring a value conflict down to the level of a task conflict. This is made easier if land readjustment is successfully shown to be capable of implementing the statutory measures with minimum conflict. Otherwise, the process manager ends up acting as a mediator.

4.6.3 Conflict management in land consolidation and rural development

The aim of conflict management is:

- Either to prevent an (open) conflict from arising in the first place
- Or to settle and actually resolve a conflict after the minimum possible escalation.

How a conflict is managed once it has shown itself depends on the type of conflict.

4.6.3.1 Conflict management by formalisation

There is no question that there is a conflict in a land consolidation procedure if an objection is lodged or an action brought by one or more participants against an official decision. Appealing against an administrative decision is a formalised means of expressing disagreement with it. The formalised appeal process plays a pivotal role in ensuring the proper conduct of administrative procedures. However, land consolidation

involves a number of inherent differences here relative to general administrative procedure under German law:

1. In land consolidation, administrative decisions generally affect a large number of persons (hundreds or even thousands of participants). Official decisions on a reorganisation of land ownership are announced and implemented in an administrative procedure enshrined in law and affect the immediate personal sphere of landowners and their families. As a consequence, an official decision and its implications for a given family are sometimes perceived and weighed differently by different family members. The statutory right of appeal is the proper channel for an aggrieved party to file a legal objection to a decision. A land consolidation also takes place under great time pressure, as the period of uncertainty about the outcome of the reorganisation has to be kept as short as possible – both for economic reasons and above all to minimise the emotional burden on the parties concerned. This aspect is also taken into account in the statutory, formalised right of appeal for conflict resolution.

2. Land consolidation is carried out in a formalised administrative procedure. The procedural stages build on one another and are formally concluded by administrative acts or administrative decisions. This means the parties concerned generally know what comes next. Only when one procedural step has become legally final does the procedure move on to the next.

- Initiation of the procedure (section 4 of the Land Consolidation Act)
- Valuation (section 32 of the Land Consolidation Act)
- Plan covering the common and public facilities with accompanying landscape conservation plan (section 41 of the Land Consolidation Act)
- Land consolidation plan (section 58 of the Land Consolidation Act)
- Implementation order for the land consolidation plan (section 61 of the Land Consolidation Act)
- Concluding determination (section 149 of the Land Consolidation Act).

This approach not only creates legal certainty for the authority. Above all, it creates legal certainty for individual parties, because it prevents completed stages from being rolled back due to late objections, which with so many conflicting interests could easily unravel the whole preceding web of decisions.

3. The public-law decisions by the land consolidation authority that conclude each stage of the procedure mean that the affected parties do not have to settle any objections among themselves, but only have to raise them with the authority.

4. Under the Land Consolidation Act, the land consolidation authority has special status as an authority with a specific purpose outside of the general public administration. It must treat the group of owners of rights to plots of land in accordance with fiduciary principles. This principle of fiduciary administration of real property and of rights to plots of land means that the land consolidation authority is bound to absolute neutrality and objectivity. Conflicts of interest or interpersonal conflicts between the parties concerned are thus kept out of the equation. Emotional sensitivities are placed on a strictly objective footing and neutralised. The same applies to administrative acts adopted by the body of participants as the representative body for the land consolidation

procedure. An example is the issuing of the notice setting the land consolidation contribution to be paid by participants.

5. Administrative acts of the land consolidation authority can be appealed against by lodging an **objection**. The land consolidation authority decides on the merits of an objection. This gives it the possibility, where necessary – that is, when an objection is well-founded – of remedying the objection by amending the administrative act. Objections against formal adoption of the valuation and against the published land consolidation plan are decided on by a land consolidation tribunal.

The land consolidation tribunal

Under the Administrative Procedure Act (*Verwaltungsverfahrensgesetz*), an objection (lodged by an individual party) against an administrative act is normally decided by the competent reviewing authority. Here, once again, the Land Consolidation Act has a *lex specialis* provision that is particularly effective as a means of resolution.

Under section 141 (2) of the Land Consolidation Act, the German states can stipulate that two farmers may be appointed in a *pro bono* capacity to participate in decisions on objections against the results of valuation or against the land consolidation plan. Most of Germany's sixteen states have made use of this provision by setting up 'land consolidation tribunals' *(Spruchstellen für Flurbereinigung*). A land consolidation tribunal is usually established at the competent supervisory authority and equipped with a 'standing order' (see for example GOSpSt 2023). It is composed of a senior official who is qualified to hold judicial office and two farmers as lay assessors. In its decisions, the tribunal is not bound by instructions. This ingenious arrangement for a special-purpose reviewing authority is highly effective at resolving objections. For one thing, the farmer-assessors bring to the reviewing authority the necessary professional expertise. Objections are consequently decided on their merits, not only on a formal legal basis, but also with regard to the fitness for purpose of the decision embodied in the administrative act. For another thing, parties lodging objections – which will generally relate to farming matters – encounter two experts who 'speak their language', and therefore feel that their concerns are in better hands from both a professional and an emotional perspective. In the tribunal's decision on an objection, the two farmer-assessors are able to overrule the presiding judicial official.

The land consolidation court

If an objection is neither remedied by the originating authority nor granted by the reviewing authority, or if a notice rejecting an objection as inadmissible or unfounded gives rise to a new complaint (against a third party, for example), then an action may be brought before the land consolidation court (*Flurbereinigungsgericht*). In departure from the stipulations on general administrative jurisdiction, the Land Consolidation Act introduces a special status for the land consolidation court.

The land consolidation court is established as a division of the higher administrative court (*Oberverwaltungsgericht*) of the German state concerned. This means that proceedings on the facts in land consolidation matters are restricted to a single instance. The land consolidation court is composed of two professional judges and three lay judges. All of these except for one of the two professional judges must meet special requirements. One professional judge and his or her deputy must be qualified for senior service in the land consolidation authority and have at least three years' experience in land consolidation matters. The lay assessors comprise a civil servant qualified for senior service and with engineering training and land consolidation experience, plus two farmers. Participants bringing an action before the land

consolidation court have assurance that their matter is in the right professional hands. The composition of the court with relevant expertise enables the practical side of a matter and the feasibility of an envisaged solution to be appropriately weighed in the court's decisions in both formal and substantive terms. Land consolidation participants consequently have all the more confidence in the court's decision-making practice.

A special feature of the two avenues of appeal available against administrative acts in a land consolidation procedure is that participants may be affected by another party's objection or action without themselves having lodged an objection or brought an action. This happens when an objection or action is held to be well-founded and in need of remedy, which can sometimes affect determinations in respect of other participants that are otherwise already final and incontestable. Further special features of the court procedure serve the purpose of bringing about legal clarity as soon as possible. For one thing, the proceedings on the facts are limited to one single instance. This caters to the statutory requirement that land consolidation procedures must be carried out as rapidly as possible. For another thing, if the land consolidation court holds an action against the valuation or against the land consolidation plan to be well-founded, it is able not only to set aside the contested administrative act, but to amend it at its own discretion with binding effect for all sides (where necessary after making those affected by the amendment parties to the case). This makes it unnecessary for the land consolidation authority to act again – and possibly trigger new disputes.

Appeals on points of law against decisions of the land consolidation court can be brought before the Federal Administrative Court (*Bundesverwaltungsgericht*), but only in specific cases.

In cases where an action or objection is upheld, the costs of the proceedings are borne by the German state concerned. If an action or objection is rejected as inadmissible or unfounded, the party lodging the objection or bringing the action may be charged a fee. No fee is generally charged if a participant withdraws an objection or action.

4.6.3.2 Conflict management by institutionalisation

Common interests and concerns of the participants in a land consolidation procedure are represented by a committee elected by the participants as a community, the **board of the body of participants**. The board of the body of participants comes into play at various stages:

- Establishment of the principles for valuation
- Drafting of the plan covering the common and public facilities and the accompanying landscape conservation plan
- Determining the nature and extent of ecological offsetting measures in the context of the environmental impact assessment
- In a provisional transfer of possession, establishment of the transitional provisions for organising the practicalities of the transfer of ownership to new land parcels.

Such decisions generally have at least an indirect impact on the compensatory land allocation for individual participants and can consequently result in task conflicts. These cannot be resolved by taking each individual party into account, however, but only by finding a balanced solution in the overall interest of all parties. This is done by the board of the body of participants.

Common interests of land consolidation participants are looked after by the body of participants, which is a body corporate. Towards other parties, participants as a community act through the elected board of the body of participants (section 2.5.4).

This is consequently a situation where common interests are looked after by a constituent organ of an institutional entity. The constituent organs of the body of participants operate according to the principles of representative democracy. This provides the best possible guarantee against the pursuit of particular interests. If individual participants wish to influence decision-making on issues of common interest, they can only do so by going through the board of the body of participants. They must then present their concern or what they consider to be important information or advice to the board. This can take place in meetings of the participants' assembly or public hearings, although participants are also free to take their concerns directly to the board.

As it has the legitimacy of an elected body, the board of the body of participants is an institution to be 'taken seriously' by the land consolidation authority in the best interests of the parties involved. Any differences of opinion on specific matters between the board and the land consolidation authority tend to be purely task conflicts. Discussion of the pros and cons of a potential planning solution between the board and the land consolidation authority usually leads to a balanced and legally watertight outcome. If the board then explains the reasoning behind the decision to participants, the outcome is more likely to be generally accepted. For this reason, the board is outstandingly well placed when it comes to obtaining general acceptance for all planning decisions affecting the community.

4.6.3.3 Conflict management by participation

Dialogue with the parties involved is a central element of conflict management in land consolidation. Any administrative act must be preceded by a hearing in which those affected have the opportunity to comment. Additional forms of public involvement have also emerged in the context of rural development.

Traditional forms of public consultation

- Before the land consolidation authority issues the implementation order for a land consolidation, the landowners who are expected to be affected must be fully informed about the planned land consolidation procedure (section 5 of the Land Consolidation Act). This requirement is usually satisfied by holding a public meeting in which the economic situation and agrarian structure of the region is presented and analysed. Using planning scenarios, it is shown how appropriate measures can guide development in the desired direction. This information meeting is required by law and has the aim of creating public acceptance for the envisaged measures.
- Comprehensive public consultation under the Environmental Impact Assessments Act (*Gesetz über die Umweltverträglichkeitsprüfung*) reflects increased environmental awareness in society as a whole. The environmental impacts of a project have to be assessed in advance. All members of the public can obtain information about them and contribute environmental knowledge of their own (see section 4.5). Consequently, this legal requirement applies irrespective of whether a member of the public is personally affected or has a

subjective claim. Since the introduction of environmental impact assessments with unlimited public involvement, Germany today hardly ever sees civil initiatives against specific land consolidation projects based on accusations of environmental 'destruction' of the kind that were common in the 1970s and 1980s.

- One form of constructive involvement is the 'preferences hearing' in a land consolidation procedure. Before a land consolidation authority prepares a land consolidation plan, it has to hear landowners with regard to their preferences for compensatory land allocations in the reorganisation of their land (section 57 of the Land Consolidation Act). Rather than having to wait until an authority has acted before expressing their disapproval – by lodging an objection against a planned compensatory land allocation, for example – citizens here exert direct, advance influence on the authority's forthcoming decision. Intensive dialogue, with individual discussions between landowners and planners representing the land consolidation authority conducted on the basis of full information and with careful balancing of interests, greatly improves the quality and general acceptance of the outcome in a land reorganisation. What cannot come out of such a hearing, however, even though some landowners would like it, is a commitment that they will be assigned a specific piece of land in the compensatory land allocation. This would unacceptably restrict the selection of land available for deciding land allocations for landowners who do not have their say until a later stage. The preferences hearing serves to avoid potential task conflicts and distribution conflicts, making it a form of 'conflict diagnosis'.

The challenge for the planner is to find a compromise. This means finding a solution acceptable to each individual from among the many different and in many cases mutually exclusive preferences expressed by the participants.

"A compromise is the art of dividing a cake in such a way that everyone believes he has the biggest piece."

The cooperation principle

The cooperation principle can come into play if the state, acting in the common interest, wishes to exert influence on the behaviour of specific economic or civil society parties without resorting to statutory prohibitions or requirements. To this end, agreements are made between an authority and an individual party with regard to:

– How to deal with conflict situations
– Mutual relations
– Principles governing compensation for state restrictions on land use.

Typical areas of application in rural development involve the protection of waters and nature conservation. The cooperation principle is the conservation policy and social policy basis for all contract-based nature conservation.

State conservation authorities designate a specific area in which only certain farming practices are permitted (mostly extensive forms of agriculture) in order to protect waters or for nature conservation. The farmers concerned are free to enter into a contractual agreement for this purpose with the conservation authority. Commensurate financial compensation is agreed for the lower yield and income. Agreements of this kind

are used for cultural landscape programmes (wetland, hill country, floodplain, traditional orchard and farmland wild flower programmes) and for woodland nature conservation. This use of the cooperation principle is also referred to as contractual land readjustment.

Although participation in such programmes is voluntary, almost all farmers in the areas to be protected usually take part – not least because of the adequate financial compensation. Such programmes nevertheless owe their main effect to their voluntary nature. The relationship between the state and citizens here is not one of superiority and subordinacy, but that of equal parties to a contractual agreement – a principle that is also applied in the production-integrated compensation for nature conservation measures described in section 4.5.3.

Newer forms of participation

Societal developments in Germany in the 1970s and 1980s were characterised among other things by increasing self-confidence among members of civil society and diminished obedience of authority. This also influenced forms of participation in rural development. Alongside statutory, legal and institutional forms of action, greater use began to be made of more informal, less rules-based approaches. The staff of land consolidation authorities went from a commanding to a motivating and intermediating role. In methodological terms, it is an approach like that introduced in Western Europe in the 1990s as part of Local Agenda 21 and the LEADER projects initiated by the European Union (see section 2.3.3).

Intermediation serves to foster participants' creativity, make the ideas of individuals available to all participants and to arrive at outcomes and decisions that can be supported and implemented by the entire community acting in consensus. The success of such an approach depends on the working climate and role assignments within the group. An open mind in problem solving and respectful treatment of dissenting opinions are indispensable.

This form of participation in working groups is particularly well suited to Integrated Rural Development Concept (IRDC) processes and the development of village development concepts (see section 4.1). Potential areas of conflict become visible in such working groups at an early stage and need to be verbalised and discussed. This enables all involved to rethink their own position, constructively forge compromises and take an active part in resolving conflicts of interest.

Conflicts tend to become all the more evident wherever issues are 'close to home' and affect the personal sphere. A diffuse blend of task conflicts, value conflicts, interpersonal conflicts and recognition conflicts can then quickly arise. The intermediating challenge in such a process consists of pinpointing the sources of conflict early on and making use of 'activating' working methods such as the Metaplan technique, mind mapping or role plays to get everyone looking and moving forward. As the people shape the development of the project from the outset, they can see how their ideas and suggestions have contributed to the project outcomes and can better identify with them. The conflict-resolving effect of the process is due to the fact that there are no official stipulations for people to have problems with. Any conflicts arise out of differences of opinion within the group. The group is a sort of 'constructive public initiative' that is *for* something rather than *against* something. That creates a sense of 'us' and strong identification with the rural development measures in question.

There is no reason why this form of participation should not be used in statutory land consolidation. It needs to be made clear from the outset, however, that at the end of the discursive process, the necessary decisions in a land consolidation have to be made binding and, to expedite the proceedings, be embodied in statutory administrative acts.

4.6.4 Conflict prevention and conflict mitigation by information and education

Public relations and education play an important role in rural development with regard to conflict prevention and conflict mitigation. Put simply, they help avoid conflicts.

- In public relations work, general information on objectives, procedure and illustrative examples of outcomes are provided in **leaflets, brochures and exhibitions**. Articles on complex land readjustment issues and funding available for village renewal are published in agricultural weeklies or similar regional publications.

  Those affected are informed about current events and forthcoming stages in a land consolidation or village renewal process via **daily newspapers, local radio and the land consolidation authority's website**. The latter should have dedicated pages for each ongoing project. This helps ensure that people are fully informed about the measures and the background to them. Conflicts in rural development among members of the public or between them and the authority are often due to lacking or inaccurate information. People act rationally and constructively if they are well-informed.

- That on its own is not enough, however, especially when it comes to working group-based and local agenda processes. Enabling people to contribute knowledgeably in this context is the aim of **education work** specially conceived for the purpose. Various German states have created educational facilities with a focus on land development, such as *Akademien Ländlicher Raum* ('Rural Academies') in Bavaria, Baden-Württemberg, Hesse, Lower Saxony, Rhineland-Palatinate, Thuringia and Schleswig-Holstein. In Bavaria, *Schulen der Dorferneuerung und Landentwicklung* ('village renewal and land development schools') also provide training in land consolidation and land development for interested parties. The *Zentrum für ländliche Entwicklung* ('Centre for Rural Development') in North Rhine-Westphalia has the same aim, and a *Natur- und Umweltschutz-Akademie* ('Academy for the Protection of Nature and Environment') in the same state provides environmental education for broad sectors of the population.

- These facilities provide further training in rural development and environmental education geared to specific target audiences. Moderating and presentation techniques are taught and practised, and training is provided on basic communication skills together with methods for dealing with and resolving conflicts. The training is rounded out with opportunities for sharing experience between stakeholders in rural development and for the preparation of rural development measures. Target groups comprise villagers – including the younger generations in school or training – members of village societies and village initiatives, members of town and local councils, municipal and public

authority office holders, land consolidation and village planners, architects, and people involved in countryside preservation or local heritage groups.

Bundesverband der Teilnehmergemeinschaften e.V. (the Federation of Bodies of Participants; www.btg-bund.de) provides further training for members of boards of bodies of participants.

In addition to imparting knowledge, educational facilities of this kind contribute to conflict prevention and above all to fostering social consensus and public acceptance around necessary measures in environment and development policy.

4.6.5 Conflict management in figures

A survey was conducted a few years ago in the state of North Rhine-Westphalia to determine how many conflicts due to differing interests among parties involved in land consolidation had to be decided by the courts. At the time of the survey, around 310 reorganisation procedures were underway, covering about 9% of the state's territory. The ongoing land consolidation procedures were at all procedural stages and affected around 100,000 landowners.

Assuming each of the participants in an ongoing reorganisation procedure was confronted with at least two administrative acts by the time of the survey – comprising decisions of the land consolidation authority for official confirmation of the valuation results and publication of the land consolidation plan – then across all reorganisation procedures and over the duration of those procedures there were about 200,000 administrative acts against which participants could potentially have lodged an objection.

State-wide, however, an average of only around 50-100 objections a year were submitted for decision by the first-instance review body, the land consolidation tribunal. That is 0.05% – five in every 1,000 – of all potential appeals. In all other cases – as a result of the judicious management of the procedure by project managers at land consolidation authorities – there were no formal objections.

If the 50-100 cases decided by land consolidation tribunals each year, no more than 20% are subsequently brought as an action before the land consolidation court. Based on the total number of potential conflicts, that means only one in a thousand cases ends up in a court of law.

4.6.6 Concluding note

The approaches for conflict management in rural development described above are the outcome not of an analytical process, but of nearly 180 years of practical experience in rural land readjustment activities by land consolidation authorities. It is not a matter of choosing the one single right approach for managing any conflicts that arise. To achieve open and harmonious interaction among all stakeholders in a land consolidation procedure, and to maintain that throughout the entire procedure, the approaches described must be applied according to the situation and challenges that present themselves at a given time. In addition, the staff of a land consolidation authority must develop the ability to recognise potential for conflict at an early stage so as to take preventive action.

This links back to the principles for the present-day implementation of rural development activities set out in chapter 2. Proper application of those principles requires the staff of a land consolidation authority to bring to their work a high level of awareness and understanding for the sensitivities of the parties involved, together with due concern and respect for people and property.

Even this high standard is still not fully met once the stakeholders in rural development and land consolidation have agreed on basic precepts for information, communication and participation. A recently published evaluation of communication in land reorganisation procedures on the basis of examples in Bavaria (Hesse 2021) concludes that most participants rate the communication in such procedures highly positively. Nevertheless, the study identified scope for improvement, for example with regard to the provision of information, to proactive communication and to project managers' awareness as to the effects of good communication. It also found that the board of the body of participants in a land consolidation procedure could be more closely and above all more actively involved in the various information activities. Information, communication and participation therefore remain a constant challenge for all involved in any rural development project.

4.7 Monitoring, operations management and impact-oriented assessment

Rural development measures are interventions by the state. The focus of activities is on statutory land readjustment procedures under the Land Consolidation Act, which reorganise land tenure to bring rural land holdings into line with present-day needs as regards basic services, agriculture and forestry. Village development and integrated rural development processes also have their origin in programmatic decisions of parliament and government. All such measures are carried out by the public administration. It is therefore in the nature of the thing to carry out periodic reviews and check that policies adopted by parliament have their intended effect and are still needed. Where policies are retained, it is necessary to verify the efficiency of their implementation by the authorities concerned.

> *For rural development in Germany, and for authorities created specifically for the purpose, this need has presented itself ever since statutory land readjustment has been on the policy agenda (since what is referred to as the Prussian Regulation Edict of 1811). Back then, the government assumed that the transformation of manorial subjects' land holdings into freehold farms would be completed throughout Prussian territory in the space of five years, and that the special authorities set up for the purpose could then be disbanded. It did not turn out that way, as seen in section 1.1.*
> *As time went by and the nature and scope of the tasks changed, governmental and parliamentary attention increasingly turned to the operating side of their implementation. This led in 1920, with the adoption of the Prussian Reallocation Code, to a far-reaching administrative reorganisation that remains in effect to this day (see section 2.5.1).*

Methods for regular monitoring and targeted control of public agencies in specific policy sectors have been refined over the years and have become established as part of administrative practice. For some 40 years now, use has been made of business and economic analysis methods applied in trade and industry. Nowadays, the focus of modern, service-oriented authorities is not only on administrative efficiency, but on the effectiveness of what they deliver. Public agencies involved in rural development and land consolidation are subject to various forms of monitoring and control.

4.7.1 Monitoring by agency management, sectoral supervisory authorities and audit institutions

Monitoring the internal business and work processes of a **land consolidation authority** and the responses of those affected by its services is traditionally the job of the head of the authority. The chief officer must take things in hand whenever problems arise. This is done on the basis of the division of responsibilities that follows from the authority's organisational structure: the head of the authority talks to the heads of division, the heads of division talk to group heads and group heads talk to their staff. This traditional form of public-sector management has the advantage of direct personal contact and personal communication between superior and staff. The disadvantage is that this sort of personal contact with management almost always takes place on an ad-hoc and 'reactive' basis. Proactive management of public-sector authorities is very rare.

In the German context, this applies equally to authorities that serve an entire state. With regard to land consolidation, a **higher land consolidation authority** is generally established as a central organisation at state level. This is the supervisory authority in land consolidation matters and coordinates between the competent state government ministry and land consolidation authorities operating at regional and local level. For this purpose, a reporting system is established between the lower authorities and the supervisory authority, in which the most important activity areas by category, volume and problem incidence are addressed at least once a year. The lower authorities report to the supervisory authority; the supervisory authority reports to the competent state government ministry. Reporting is verified in operational review meetings and where necessary distilled into stipulations and options for action. This process is again mostly reactive. Systematic organisational change in terms of processes or structure simply does not happen for want of meaningful indicators.

In a public authority organised according to the traditional governance model, proposals for systemic change come solely from the **audit institution** directly subordinate to parliament, in the form of an organisational audit. This requires extensive data collection in the particular case in order to obtain the data on operations, workflows and the cost side of the organisation needed to derive substantiated proposals for change. As a rule, the data is just not available to assess the macroeconomic utility of government support measures.

4.7.2 Operations management

Against this backdrop, new methods of public sector management have been established in Germany since the early 1980s as part of general efforts to reform public administration, including in land consolidation authorities.

4.7.2.1 Management by objectives

Goal setting is a business management approach in which a performance or process goal is specified within a value chain or in project management. Public sector organisations are likewise managed today by goal setting. Performance goals are set between adjacent operating levels in the process chain, such as between the head of the authority and heads of division, between heads of division and heads of unit or project managers, and so on. Interim goals or milestones are set as work outcomes or conditions that are to be achieved in the course of a year or of a project and whose achievement is to be monitored. In a goal setting process, which ideally takes place

annually at the beginning of the year, goals are put on record so the goal achievement level can be assessed in the course of the year (at mid-year, for example) and action taken to aid goal achievement if it is at risk. Goals should be set not only for operational matters, but also for the staff working environment (such as provision with office or IT resources) and staff development (such as special training measures). A goal setting process is a key element of staff motivation within a public sector or project organisation and is also part of the staff promotion system; goals of this kind are beyond the scope of the subsequent discussion, however.

The head of the authority prioritises goals according to the statutory and policy requirements faced by the authority. Distinctions are made between short, medium and long-term goals and between operational and strategic goals. A goal is specified with a description of the goal and measures for its achievement. This makes it necessary to have a full set of product and service descriptions for the authority's entire product portfolio.

A **goal** should be set in such a way that:

- The goal is in line with the authority's strategic direction
- Metrics for goal achievement also reflect that strategic direction
- The goal level is acceptable to all staff members.

Goals should be 'SMART' (**s**pecific, **m**easurable, **a**chievable, **r**elevant, and **t**imed).

Measures to achieve a goal must be clearly described and verifiable:

- Who (organisational unit, division)
- What (performance or process goal, with verifiable quality definition)
- When (timing for interim goals, milestones and results)
- How (human and financial resource commitment)
- Means (specified approach, methodology and processes)
- Follow-up (once the goal is achieved or not achieved)

Strategic goals are mostly set between the head of an authority and the superior authority or between the head of the authority and the heads of divisions; they are long-term goals of the authority that apply simultaneously to multiple organisational subunits. An example of a strategic goal might be to stimulate demand for macroeconomically more effective land consolidation procedures for land development as opposed to accelerated land consolidation, and thus to make more efficient use of scarce human and financial resources.

Operational goals are mostly short to medium-term goals relating to individual divisions or units within a division; they are subordinate to strategic goals and are generally annual, half-yearly or quarterly goals. Typical operational goals in land consolidation are achievement of a specific stage of the procedure (such as official confirmation of the valuation results in land consolidation X, or provisional transfer of possession by no later than 31 October of the current year in land consolidation Y). A category of goals that are harder to specify but also highly effective comprises quality goals relating, for example, to the working relationship between stakeholders in a land consolidation area, or participant satisfaction with the outcome of the reorganisation of a land consolidation area.

Introducing and implementing a goal setting system in public sector administration in Germany is subject to codetermination rules under labour law. In organisations with a works council (*Betriebsrat*), goal setting is governed by a 'workplace agreement' (*Betriebsvereinbarung*) between the management of the authority and the works council.

The introduction of public sector or project-level management by objectives in the 1990s contributed significantly to the fact that land consolidation authorities, despite their statutory mandate, now regard themselves as rural development service providers and are also perceived as such by people in affected regions.

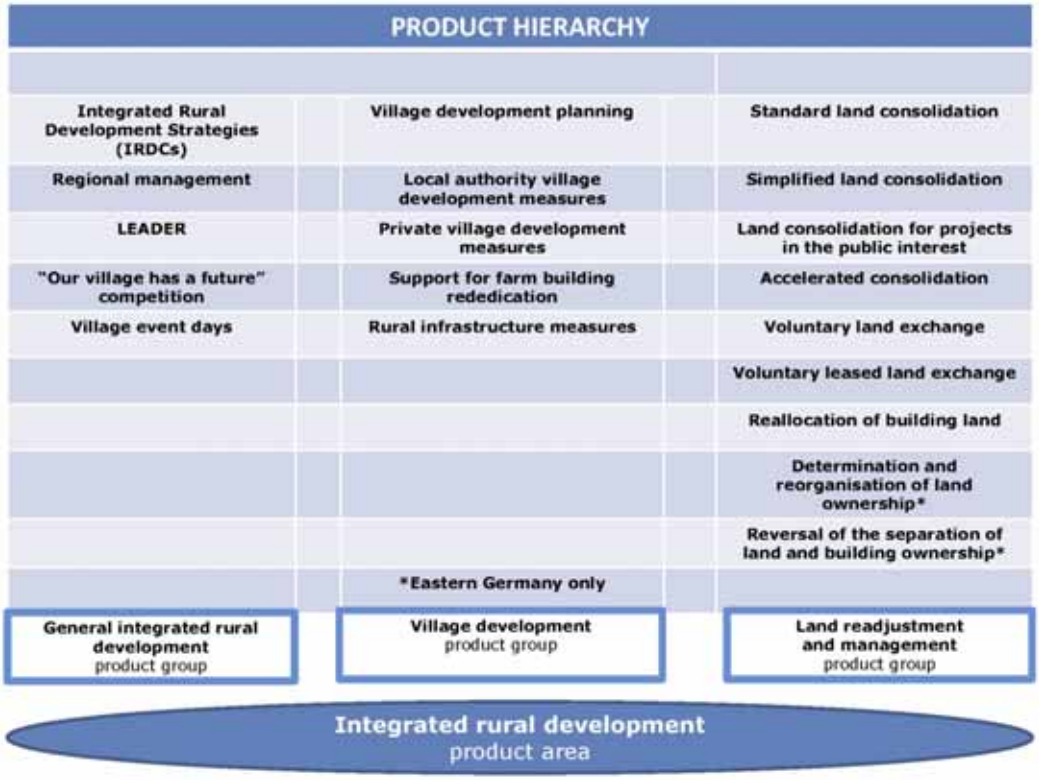
4.7.2.2 Cost and activity accounting

Cost and activity accounting is an operations management tool that provides business management data needed for internal management and control and for tracking the performance of organisational units.

A 'cost' is any use of goods or services, measured at its monetary value. Costs are recorded in cost element accounting, cost centre accounting and cost object or product cost accounting. 'Activities' are products of a given organisational unit for external or internal clients and relate to work results that the administration delivers for private individuals or entities or for other public sector entities.

Cost and activity accounting is based on a product and service portfolio. This covers everything in the authority's remit:

Fig. 4.7-1: Product and service portfolio of a land consolidation authority



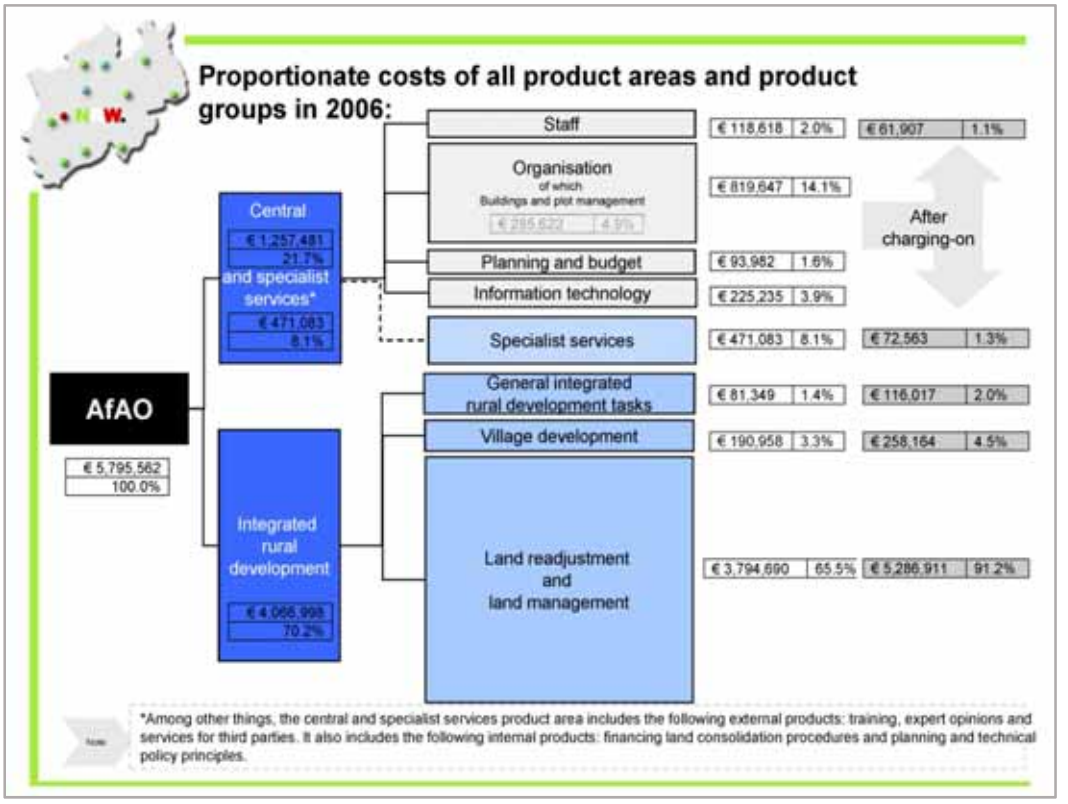
Verwaltung für Agrarordnung NRW (abbreviated AfAO) is the rural land readjustment administration in the State of North Rhine-Westphalia. It is the authority for rural structure that implements all rural development tools and funding measures, other than those for individual farms, from a single source in accordance with state-level policy.

The Integrated Rural Development product area is divided into product groups:

- *General rural development*
- *Village development*
- *Land readjustment.*

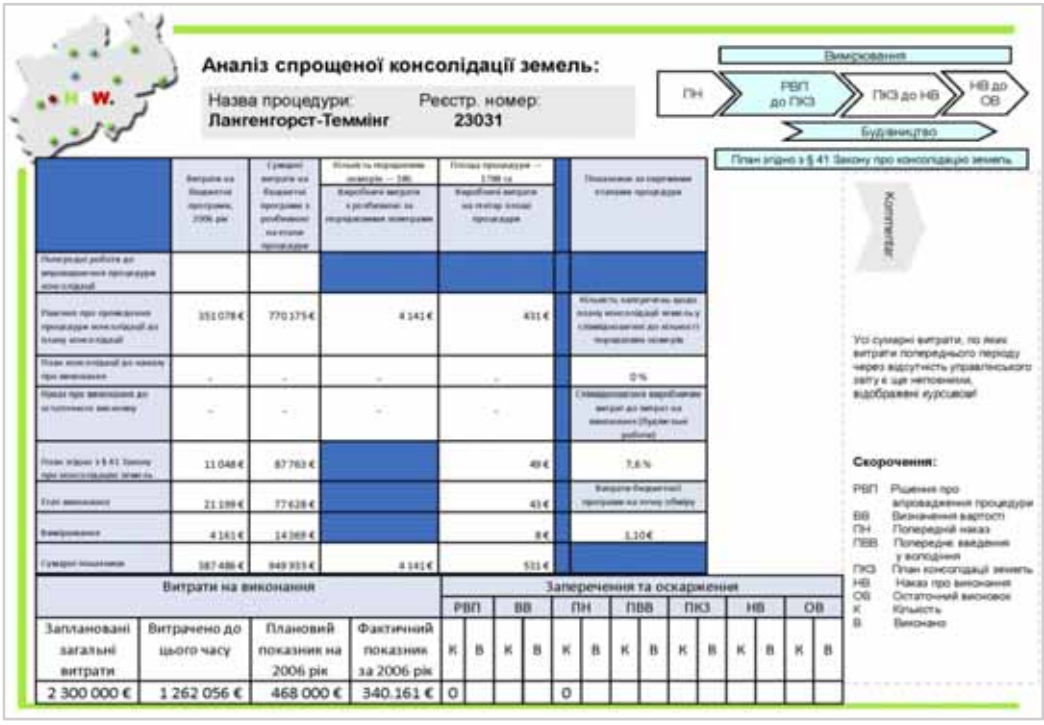
The land readjustment product group accounts for 80% to 90% of the land consolidation authority's resource input.

Fig. 4.7-2: Total costs of a land consolidation authority (AfAO)



Whereas products in the 'General integrated rural development' and 'Village development' product groups (approval notices for local authorities or other developers) are mostly 'produced' in a matter of months, products in the 'Land readjustment and land management' product group tend to take several years and are therefore divided into major cost and activity stages.

Fig. 4.7-3: Table of land consolidation procedure product costs



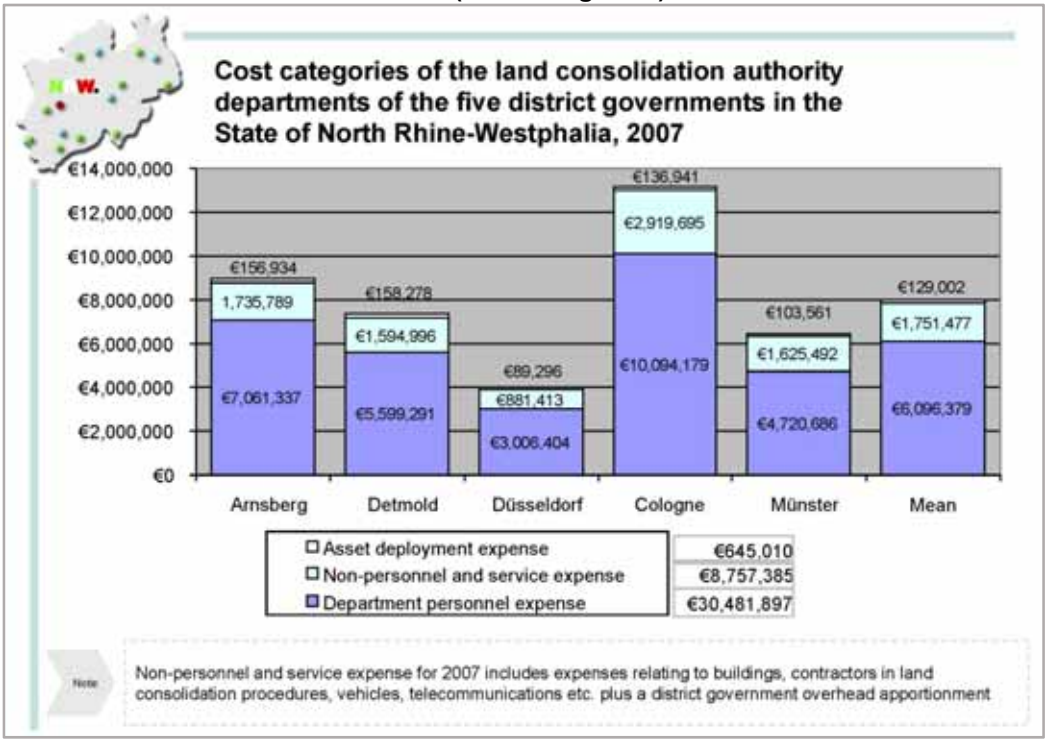
Аналіз спрощеної консолідації земель:

Назва процедури: Лангенгорст-Теммінг

Реєстр. номер: 23031

Витрати на виконання				Заперечення та оскарження											
				РВП		ВВ		ПН		ПВВ		ПКЗ		НВ		ОВ	
Заплановані загальні витрати	Витрачено до цього часу	Плановий показник на 2006 рік	Фактичний показник за 2006 рік	К	В	К	В	К	В	К	В	К	В	К	В	К	В
2 300 000 €	1 262 056 €	468 000 €	340.161 €	0				0									

Fig. 4.7-4: State of North Rhine-Westphalia cost and activity accounting report 2007 (cost categories)



For analysis by the supervisory authority, the performance indicators can be aggregated to time series and adapted at the same time to technological and staffing changes. The annual reports and performance indicators are the basis for annual operational review meetings and the resulting target setting between the state ministry and the subordinate land consolidation authorities. Following the operational review meetings, on the basis of performance indicators available to all authority staff, new targets are set for the next year. These relate, for example, to the completion of specific work phases and cost discipline, but also to quality goals such as faster procedure throughput. Cost and activity accounting performance indicators are also used for other purposes, for example:

- *To help in deciding staffing levels at land consolidation authorities in line with tasks and workload*
- *To identify scope for improvement.*

4.7.3 Impact-oriented assessment

The macroeconomic value added that deploying rural development instruments generates for service recipients ('clients') and budget setters is measured and reported by quantifying the impacts of the public activities and deducting the total cost of the work process. Economic value added is the difference between the sum of the macroeconomic impacts and the inputs or costs involved and can be used for global evaluation of government measures (Pieper 2016).

The land consolidation administrations of the German states and the competent federal government ministry for rural development matters have put forward various approaches to this end since the 1980s (see, for example, Ruwenstroth; Schierenbeck 1980, Läpple 1981, BMELF 1988). These approaches represent initial attempts at value added analysis but have not gained any practical significance.

For value added analysis of a land consolidation procedure, the societal impacts of administrative action in the statutory land readjustment process have to be classified and operationalised as fully as possible. This is because a land consolidation procedure triggers a complex system of economic, environmental, social and cultural impacts. Impact components are quantified using monetary valuation models and a generally acceptable market price is put on them by applying proven approximation and conversion methods. If certain tangible impacts cannot be assigned a monetary value, then suitable impact indicators are developed as an alternative. The impacts can then be measured on a qualitative basis so that they can be included in impact-oriented assessment. For intangible impact components, the nature and intensity of the impacts are described as precisely as possible. The starting point for the entire analysis is a cross-agency cost and process analysis to capture all public-sector resource inputs. A realistic, professional cost and activity accounting system (see section 4.7.2.2) for the service portfolio under analysis is an indispensable basis here.

4.7.3.1 Business impacts at farm level

The first step is to identify and analyse agricultural value added components based on the business impacts at farm level. This analysis is particularly useful in cases where a land consolidation procedure takes the traditional approach and is mainly directed at improvements in agricultural structure (see, for example, Heissenhuber et al. 2006). The metrics required mainly relate to the economic impact on farms in the land consolidation area.

They start with spatial metrics: the size and shape of individual management units, field shape, field size and field headland. Headland is used as a metric to determine boundary effects such as lower yields. The spatial metrics also include farm-field and field-field distances on the farms concerned. These mainly depend on the structure and quality of the road and track network and on the field layout in the regions under analysis.

This spatial analysis is paralleled by a derivation of farm-based metrics from farm surveys. These are used to develop standardised production methods for farms in the region. Adding together the various metrics and deducting positive impacts of measures not related to land consolidation gives the agricultural economic valued added from land consolidation.

A number of generalisations can be made from such farm-level analyses. Among other things, how an individual farm benefits economically from a land consolidation depends on several factors:

- How much land the farm has in the project area
- How bad is the starting situation
- To what extent subjective wishes of individual farmers prevent the optimum field layout from being implemented
- Where farms are mostly on leased land, the landowner's preferences regarding reorganisation should take a back seat to those of tenant farmers.

Farm-level value added analysis of this kind is also needed when determining the macroeconomic and societal impacts of land consolidation and rural development.

4.7.3.2 Macroeconomic value added analysis

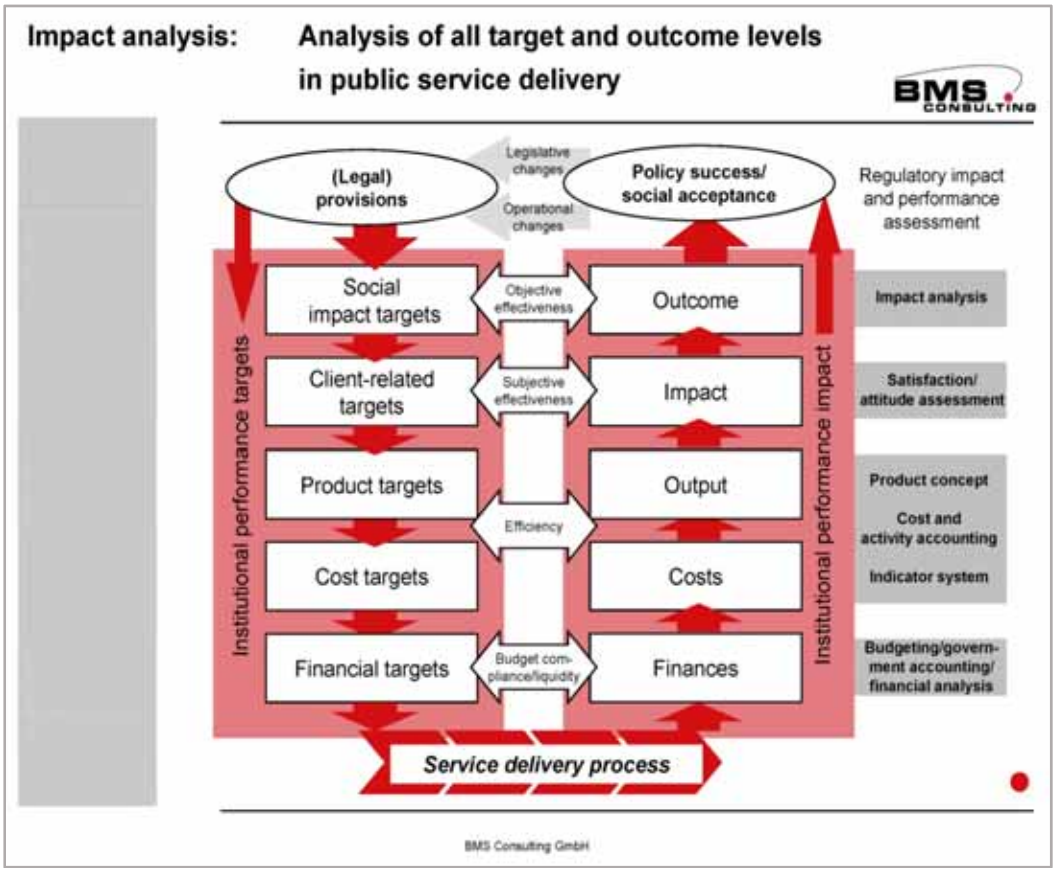
A mature and well-proven approach for macroeconomic value added analysis in land consolidation has been practised in Germany since 2005.

Under the leadership of BMS Consulting GmbH, and with academic support from the Chairs of Business Administration and Finance at the University of Münster, a method was developed on behalf of the land consolidation administration in the State of North Rhine-Westphalia for comprehensive (*ex-post*) macroeconomic value added analysis of land consolidations and tested using the example of a land consolidation for a project of public interest (see section 5.1) (BMS Consulting 2005). In 2006, in work carried out on behalf of the State of Rhineland-Palatinate, the approach was extended

for the forecasting of value added in planned land consolidation procedures – that is, for *ex-ante* value added analysis (Mosiek et al. 2006).

The value creation process of a public agency in the performance of its statutory responsibilities is transparently modelled across all institutions involved on the basis of a general model for description of the target and outcome levels in public administration.

Fig. 4.7-5: Target and outcome levels in public service delivery
(source: BMS 2005)

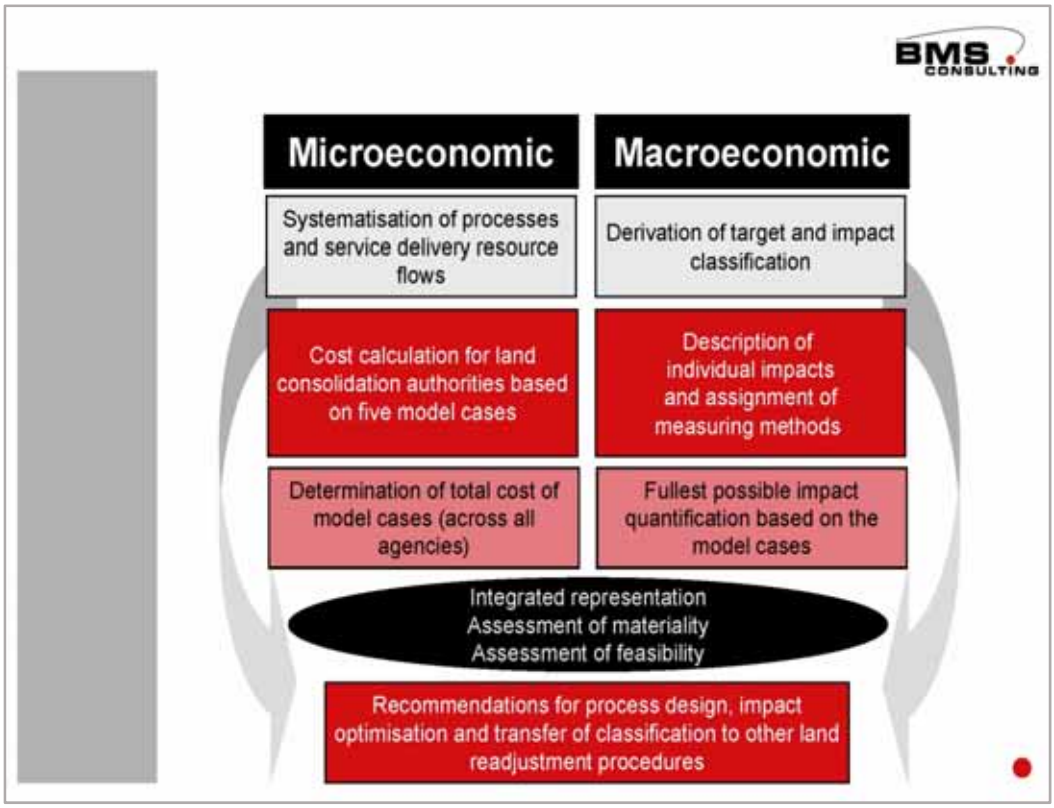


The model also describes, incorporates and analyses macroeconomic impacts under the Land Consolidation Act and those associated with its implementation. All costs and benefits are quantified – largely in monetary terms – in a comprehensive value added analysis; value added components that cannot be quantified monetarily are classified and given a qualitative ranking in the target system. A distinguishing feature of land consolidation in application of the described model is that land consolidation procedures extend over a long period, usually of several years. This makes it necessary not only to include annual resource use, but all public-sector implementation costs. Administration costs also have to be distinguished from implementation costs. The administration costs of a procedure are the staff and non-staff costs of the administrative organisation. Implementation costs mainly arise in creation of the rural infrastructure,

such as roads and tracks, water bodies, landscape preservation features, ecological compensation measures, measures to bring about compensatory land allocations of equal value and suchlike; these costs constitute capital expenditure.

Fig. 4.7-6: Systematic approach

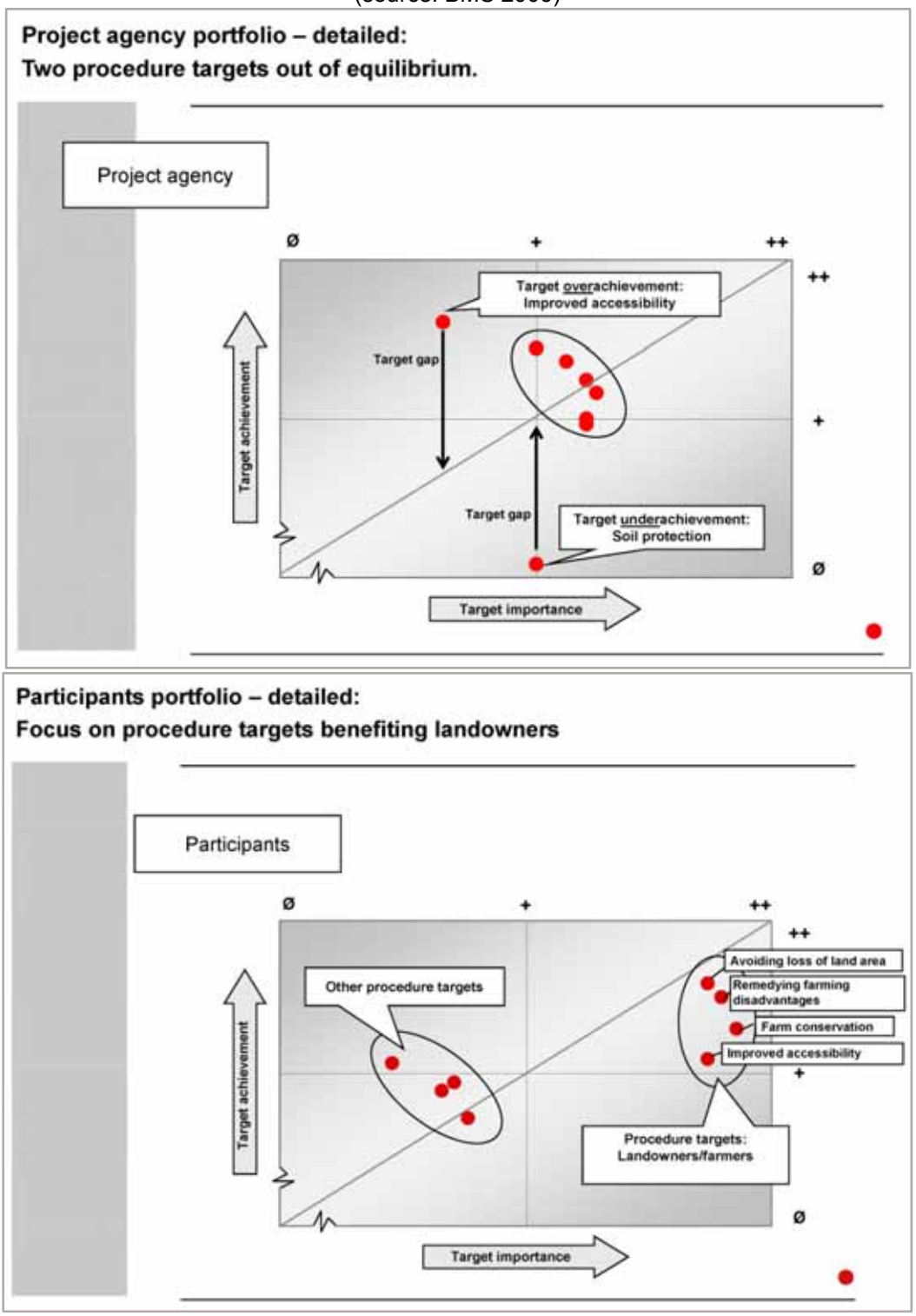
(source: BMS 2005)



A microeconomic analysis provides a comprehensive overview of the service delivery process, the associated resource inputs and differing service quality facets. All administrative levels involved in implementation are included with their resource inputs. These primarily comprise the land consolidation authority, its supervisory authority and the competent state-level government ministry. The relevant municipal administration, the body of participants, the cadastral registry and the land registry, the courts and bodies representing public interests are also included.

Aside from efficient resource use in service delivery, another key target criterion for the work of public administrations is client satisfaction (subjective effectiveness). Client satisfaction is therefore another thing that needs to be measured and analysed in land consolidation. It is determined by a representative systematic questionnaire-based survey of ‘clients’, divided where appropriate into client groups, and constitutes a measure of service quality and subjective perception of impacts.

Fig. 4.7-7: Target achievement in project agency and participants portfolio
(source: BMS 2006)



The written survey is accompanied by structured interviews with decision makers in the various client groups. These interviews serve to validate the findings of the client survey and to gain further insight into the interviewees' personal experience with land consolidation.

The societal impacts of land consolidation go much further than the provisions of the Land Consolidation Act would lead one to assume, and cannot be fully modelled with tangible value added components that can be assigned a monetary value. Once the tangible value added components from land consolidation have been dealt with in the macroeconomic analysis, it is therefore essential to go on and include the intangible components.

Tangible value added components:

- For the landowners and tenants group, these generally include improvements in farming conditions due to the reorganised plots and improved road and track network, fuel cost savings, labour savings, reduced machine wear, lower fees and greater legal certainty due to the updated land register system and (for large farms) savings in farmland administration due to the updated cadastral register system. If land consolidation includes built-up areas of a village, further benefits that can be assigned a monetary value follow from improved boundaries between adjacent plots, extinguishment of easements, improved plot layouts freeing up building land and so on. These tangible value added components are determined at farm level as described in section 4.7.3.1.
- For the municipality, the reworking of the cadastral register and the availability of digital cadastral maps make for major savings in municipal regulatory and planning responsibilities and in the provision of basic services. Village land reorganisation clears up the land ownership situation for roadbuilding and for renewing village water supply and sewage disposal systems. Work can start on building new sports, recreation and other community facilities immediately after the provisional transfer of possession, without time-consuming and costly negotiations to purchase land.
- Land consolidation also means large savings for other planning authorities – such as road, nature conservation and energy authorities – as land becomes available for measures in their area of responsibility without the usual land purchase, transfer and surveying costs.
- The general public has monetarily quantifiable benefits from the reworking of the cadastral register and land register, from the improved road network and indirectly from, for example, lower charges because utilities have lower operating costs.

From the above list of potential tangible valued added components, it is clear that they will vary from land consolidation to land consolidation and have to be determined in each particular case. The same applies to **intangible value added components**:

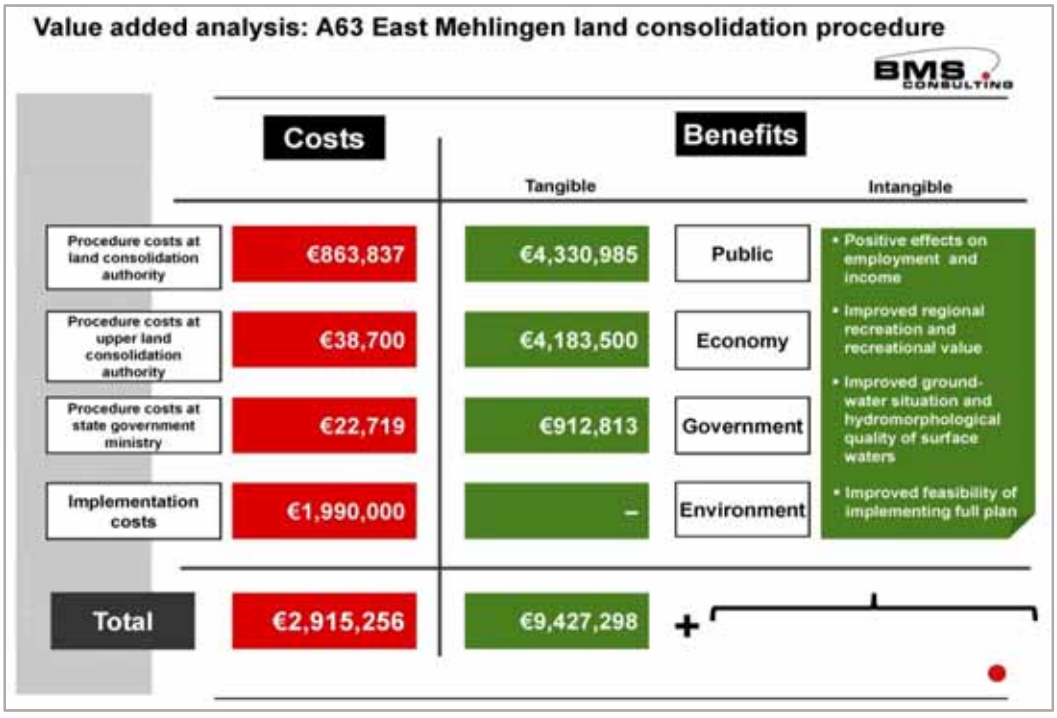
- For farmers (whether landowners or tenants), the improved prospects for continuing and possibly expanding operations and also for farm succession directly affect their entire livelihood. Avoiding any loss of land area due to land being earmarked for other purposes in public planning is also an intangible but significant benefit. Finally, clarifying and resolving boundary disputes is a

benefit that is hard to quantify in monetary terms but is of no less emotive significance for the parties involved and for the life of the village community.

- Where land is to be surrendered for projects carried out by outside entities, there is usually less resistance to project plan approval if the project is accompanied by land consolidation for a guided reorganisation of ownership. Also, far lower costs are incurred for legal disputes and compulsory purchases than in a situation where land has to be obtained and ecological offsetting measures implemented outside the context of a land consolidation.
- For the general public, a significant public acceptance bonus for the land consolidation project and for third-party projects is an important impact component. The same applies with regard to nature conservation, landscape preservation, regional recreation and tourism. Preparing a land consolidation project as part of an Integrated Rural Development Concept (IRDC – see section 4.1) generates a wealth of additional intangible value added components. These can include strengthening civil society in the village community, improved residential surroundings, public acceptance of and public identification with the project and the planned measures, local residents being more motivated to take on positions of responsibility in the village community, improving people's general understanding of nature, of the environment and of sustainability principles, a boost to regional economic growth, preservation of ecologically valuable farmland and woodland and conservation of biodiversity in the region.

The above list is by no means exhaustive, but gives an idea of where to look for additional value added components generated by a particular land consolidation project.

Fig. 4.7-8: Macroeconomic value added analysis (source: BMS 2006)



Finally, the separately prepared microeconomic and macroeconomic analysis levels are combined into a macroeconomic value added analysis. From experience, societal benefits quantified in monetary terms tend to predominate in the value added analysis, but it should be emphasised that the intangible impacts always reflect the objectives originally laid down by the creators of the land consolidation legislation.

4.7.4 Benefits for policymakers, the general public and the administration

The combined resource and impact analysis makes it possible to identify potential for further increasing societal value added. Such potential can be found both on the input side and on the output side of the analysis: value added can be increased both by improving resource efficiency – such as by cost reduction – or by increasing positive or avoiding negative impacts (see, for example, Vasiljević 2019).

This assessment model not only provides detailed information on resource inputs for specific products in rural development. Most of all, it enables the impact of service delivery to be properly evaluated and communicated to service recipients and budget setters. Matching up costs and benefits in a value added analysis makes it possible to make a more rational comparison of decision alternatives. It can help ensure more goal-oriented use of public resources and systematic impact assessment and evaluation in terms of target achievement for legislation, policies and their implementation. This can and should be used as a steering instrument in public administration and also in policymaking. For administration, this means the assessment of benefits should be incorporated in strategic planning and control. Under scarce resources, this makes it possible to prioritise services that have maximum positive impact (Pieper 2016).

4.8 The costs of land consolidation or land readjustment and their funding

The work and measures carried out in rural land readjustment as described in chapter 3 incur substantial costs that have to be met in some way. For this purpose, the Land Consolidation Act contains general provisions that are further elaborated by federal and state legislation and by administrative regulations.

4.8.1 Costs and funding entities in land consolidation

The Land Consolidation Act distinguishes between procedural costs (section 104), implementation costs (section 105) and special costs (section 107 of the Land Consolidation Act). With regard to the costs incurred in appeals before the land consolidation court, section 147 of the Land Consolidation Act contains a *lex specialis* provision in departure from the general Court Costs Act (*Gerichtskostengesetz*; GKG 2014).

Procedural costs under section 104 of the Land Consolidation Act

The personnel and non-personnel costs of a land consolidation authority are borne by the German state concerned.

This includes the land consolidation authority's staffing costs, including provisions for post-employment benefits for employees and civil servants.

Non-personnel costs comprise the costs of the authority's premises, office and other equipment, expenditure on energy and services, and the vehicle fleet for travel to

and from land consolidation areas. Procedural costs also include costs of contracting out administrative responsibilities and technical work, both desk-based and in the field, to private-sector service providers (section 2.5.7) and vested operators (section 2.5.8); the largest expenditure item tends to be geodetic work. Also included in procedural costs are consulting fees for purposes such as preparing a development concept ahead of a land consolidation, performing land valuation or carrying out ecological or structural engineering assessments.

Implementation costs under section 105 of the Land Consolidation Act

Implementation costs comprise all costs necessary for implementing the stipulations in the land consolidation plan, accelerated consolidation plan or voluntary land exchange plan. They are borne by the body of participants or, if a body of participants is not established, by the individual participants.

Implementation costs include the cost of constructing the common facilities, including the costs of surveying, tendering and contract award, construction oversight and formal acceptance of the completed facilities. Any costs of maintenance between the completion of individual common facilities and their transfer to the entity responsible for long-term maintenance also come under implementation costs to be borne by the body of participants. Maintenance or upkeep of this kind tends to be required in the case of extensive works that take a long time to complete. Other implementation costs include the costs of landscape preservation measures, compensation or substitution measures under nature conservation law, community measures for village renewal, compensation for foregone cultivation in the case of a provisional order under section 36 of the Land Consolidation Act (see section 3.3.3), monetary compensation for temporary disadvantages or inconveniences under section 51 of the Land Consolidation Act and, where applicable, organic farm conversion. Also included in implementation costs are administrative costs of the body of participants, such as costs of managing financial incomings and outgoings, out-of-pocket expenses of members of the board of the body of participants, room rental for meetings of participants and for board meetings, and losses on the sale of land. Expenditure for demarkation material to set out the boundaries of the new land parcels also comes under implementation costs.

The same principles apply to land reorganisation procedures to determine and reorganise ownership under the Agricultural Adjustment Act (*Landwirtschaftsanpassungsgesetz*; see sections 5.4 and 5.5). Under section 62 of the Agricultural Adjustment Act, the procedural costs are borne by the German state (*Land*) in which the procedure is carried out. With regard to the implementation costs, section 63 (2) of the Agricultural Adjustment Act stipulates that the Land Consolidation Act applies with the necessary modifications. Reorganisation procedures under the Land Consolidation Act and the Agricultural Adjustment Act differ only in the funding of the costs (section 4.8.2).

Assignment of costs to third parties

The above distinction in the assignment of costs between procedural and implementation costs applies to all rural land readjustment procedures in which rural land tenure is reorganised to the benefit of the participating landowners and thus as a private benefit measure. The procedural costs are borne by the state and the implementation costs by the participants. It applies to standard land consolidations under section 1 in conjunction with section 37, simplified land consolidations under section 86, accelerated consolidations under section 91 and voluntary land exchanges under section 103a of the Land Consolidation Act, in each case for all works and measures in the common interest of the participants. Where works and measures in a land consolidation procedure are

carried out for a third party or a land consolidation procedure is even initiated on a third party's request, how the costs are assigned depends on the degree of causation:

- Where, as part of an ongoing *simplified land consolidation procedure,* measures under section 86 (1) of the Land Consolidation Act are performed for a specific purpose at the request of a party carrying out a project, that party pays to the body of participants the implementation costs incurred. The same applies if the construction, alteration or removal of infrastructure facilities is to the detriment of the body of participants, in which case the party concerned is liable to pay a commensurate contribution under the land consolidation plan (section 86 (3) of the Land Consolidation Act).
- In a *land consolidation for a project of public interest* under section 87 of the Land Consolidation Act, the developer pays both the procedural costs and the implementation costs.

1. The developer has to pay the share of the procedural costs incurred on the developer's behalf. That share is assessed by the higher land consolidation authority after hearing the developer (section 88 no. 9 of the Land Consolidation Act). The share of the procedural costs is determined by the size of the 'impact area' of the project (see section 5.1.3.6) at a fixed price in €/ha that is set nationally and revised from time to time.

2. The developer pays the body of participants the share of implementation costs occasioned by provision of the allocated areas of land and construction of the common facilities made necessary by the project. That share is assessed by the higher land consolidation authority after hearing the developer. The developer may be ordered to make advance payments to the body of participants. These are likewise assessed by the land consolidation authority after hearing the developer (section 88 no. 8 of the Land Consolidation Act).

   Finally, the developer must redress any disadvantages incurred by the parties concerned in consequence of the project or, if that is not possible or the land consolidation authority does not consider it expedient, must pay monetary compensation (section 88 no. 5 of the Land Consolidation Act). The services to be rendered and any monetary compensation are assessed by the land consolidation authority after hearing the developer (section 88 no. 6 of the Land Consolidation Act).

Other costs in a land consolidation procedure

In addition to the above costs, which are the largest cost categories in a land consolidation or land readjustment, there are a number of other circumstances in which costs are incurred and for which the Land Consolidation Act specifies how they are dealt with:

No fees, taxes, charges or rates are levied for ***transactions or negotiations serving implementation of a land consolidation procedure*** (section 108 (1) of the Land Consolidation Act). These include costs incurred when the land consolidation authority requests inventory data from the land registry, cadastral registry or other public registers in preparation for a land consolidation and when it requests correction of the public registers once the land consolidation plan has been put into effect. The exemption from fees, taxes, charges and rates is recognised by other authorities without verification provided that the land consolidation authority gives its assurance that the transactions or

negotiations serve implementation of a land consolidation (section 108 (2) of the Land Consolidation Act).

This stipulation is also important with regard to real property transfer tax (*Grunderwerbsteuer*), which is normally payable on any land transaction outside of a statutory land readjustment procedure. Under section 1 (1) no. 3 of the Real Property Transfer Tax Act (*Grunderwerbsteuergesetz*; GrEStG 1997), most cases of land acquisition in a land consolidation are not subject to real property transfer tax provided that they involve transfers of ownership for compensation in land or involve allocation of land free of charge for common facilities, for example to the body of participants or the municipal community. The reorganisation of plots is thus exempt from real property transfer tax provided that the acquisition of land does not (even fractionally) exceed the compensation entitlement. Further information on tax matters in land consolidation is contained in a publication, *"Flurbereinigung und Steuern"*, by ARGE Landentwicklung, the Working Group on Land Development (ARGE Landentwicklung 2002).

Any costs attributable to **applications that are not required for implementation of the land consolidation procedure** are charged to the applicant (section 107 (1) of the Land Consolidation Act). This generally relates to privately requested extracts from the land consolidation plan or other official documents generated in the course of a land consolidation. The land consolidation authority fixes the amount in accordance with the actual costs incurred. Most applications of this kind tend to be made when the new legal status has already superseded the previous legal status but the public records have not yet been corrected. This is because the land consolidation plan serves at this stage as the official register of plots of land within the meaning of section 2 (2) of the Land Register Code (see section 3.5), so only the land consolidation authority can then provide information on the actual current legal status of the plots involved.

Costs of appeals are charged to the contesting party if an appeal is dismissed. On dismissal of an appeal, costs are charged as a lump sum that is set taking into account the cash expenses incurred by the proceedings (section 147 of the Land Consolidation Act). If an appeal is dismissed only in part, the contesting party may be ordered to pay a commensurate portion of the costs. In the event that an action is withdrawn, the contesting party may be ordered to pay the expenses incurred.

These provisions on the charging of costs in actions before the land consolidation court also apply to objections lodged with the higher land consolidation authority (section 147 (4) of the Land Consolidation Act).

4.8.2 Funding of implementation costs in a land readjustment procedure under the Land Consolidation Act

The costs of implementing a land consolidation are borne by the body of participants. This has applied as a basic rule in land consolidation legislation since the second half of the 19th century, ever since rural land readjustment first combined the division of jointly used land and plot consolidation with additional improvements in agricultural structure and infrastructure. The basic rule remains unaltered to this day, but considerable financial support has been made available in the case of land consolidation measures since the 1950s and land reorganisation measures from 1990 onwards.

Under the 1955 Federal Agriculture Act (Bundeslandwirtschaftsgesetz), funding began to be provided for land consolidation under a 'Green Plan'. Agricultural policy goals of the time included stimulating structural improvements in agriculture to place farms on a sound economic footing and providing food security for the

population. Following the conclusion of the Treaties of Rome in 1957, this policy approach was further bolstered by the need to strengthen the international competitiveness of German agriculture in the growing Europe. An amendment to the German Basic Law (Grundgesetz) in 1969 thus made the promotion of agriculture a joint task of the federal and state governments for the "Improvement of Agricultural Structures and Coastal Protection". Together with support from the European Agricultural Fund for Rural Development (EAFRD), this joint task is now a central policy instrument of rural development, as described in section 2.1. This is consistent with the fact that a reorganisation of rural land under the Land Consolidation Act is always also in the public interest and therefore goes far beyond the support of individual farms.

Participants' contributions

The body of participants in a land consolidation must ensure that the costs of implementing the land consolidation plan are covered. To this end, it may require participants – the landowners, tenants and holders of heritable building rights (see section 2.2.3) participating in the land consolidation procedure – to make contributions in money (financial contributions) or in kind, work or other services (material contributions), provided that the expenditure serves the interests of the participants. These days, financial contributions are the rule. Unless the land consolidation plan specifies differently, the size of the contribution to be made by each participant (the contribution ratio) is proportionate to the value of the participants' plots of land. The land consolidation authority sets the contribution ratio in the land consolidation plan and notifies each participant of it in the compensatory allocations register (*Abfindungsnachweis*) on publication of the plan. The size of the contributions and their collection is a matter for the body of participants and is triggered by a resolution of the board of the body of participants. If the contribution ratio has not yet been determined, the land consolidation authority sets a provisional contribution ratio for the charging of advance payments (section 19 (1) of the Land Consolidation Act). Such a provisional contribution ratio is generally based on the area of land contributed by each participant.

Where certain sections of the land consolidation area require exceptionally large expenditure for the construction of special infrastructure, the land consolidation authority may increase the amount of contributions to be made by the participants concerned in relation to the additional costs incurred (section 19 (2) of the Land Consolidation Act). In order to avoid evident and undue hardship, the land consolidation authority may, by way of exception and at the expense of the other participants, exempt individual participants in whole or in part from making contributions. To keep the burden on participants within reasonable bounds, the body of participants in the land consolidation may spread the collection of contributions over a suitable period of years and take out public or capital market loans for the cost-intensive construction phase. Under the rules on the provision of state grants for land consolidation, any surpluses from the sale of land are treated as contributions from the body of participants and therefore reduce the contribution burden on participants.

Third parties' contributions

In some instances, the municipalities involved relieve the burden on participants by taking over part of their contributions as a non-purpose-specific grant. The municipal council may be justified in approving such a grant where the condition of the new infrastructure in the land consolidation procedure gives rise to only minimal maintenance costs.

National and state-level subsidies

Funding for rural land readjustment under the Land Consolidation Act has its legal basis in section 10 (1) of the Act Concerning the Joint Task for the Improvement of Agricultural Structures and Coastal Protection, as promulgated on 21 July 1988 (Federal Law Gazette (BGBl.) I p. 1055) (GAKG 1988) and most recently amended on 11 October 2016 (BGBl. I p. 1934). Under that act, an average of 70% of eligible implementation costs are subsidised in the ratio of 60% by the German federal government and 40% by the German state concerned. For each funding period, funding criteria for funding measures are published in a framework plan by the Federal Ministry of Food and Agriculture (currently *Rahmenplan der Gemeinschaftsaufgabe Verbesserung der Agrarstruktur und des Küstenschutzes 2020 – 2023*).

European Union grants

The legal basis for European Union involvement in funding rural land readjustment in Germany is Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005 (EAFRD 2013). In line with Union aspirations regarding sustainable development and protection and improvement of the environment, member states are expected to devote at least 20% of budgetary resources from the European Agricultural Fund to rural development. A national rural development programme adopted by each EU member state (or by sub-national divisions such as the sixteen German states) specifies the share of Community funds to be used for rural land readjustment. This share determined by each member state reflects the policy value attached in the country concerned to promoting rural development by means of direct payments to farms and subsidies for farming regions.

The German federal government and states use this funding to refinance the budgetary resources they deploy under the Joint Task. Consequently, the Community funds do not directly or additionally benefit bodies of participants in land consolidation, but at best ‘stimulate’ the federal and state governments to set non-farm-specific Joint Task funding at a suitable level for rural development.

State-level funding guidelines (such as *NRW-Programm Ländlicher Raum* – the Rural Development Programme 2014-2020 for the state of North Rhine-Westphalia) specify the purposes for which funding is available, the application procedure and details on use-of-funds documentation.
www.umwelt.nrw.de/landwirtschaft/foerderung/nrw-programm-laendlicher-raum-2014-2020-eler/foerdermassnahmen

Except for interim land purchases, support is provided in the form of grants towards implementation costs, with the body of participants as the grant recipient. The grant level depends on the financial strength of the participants and the benefits from implementation of the land readjustment procedure. It generally goes up to 70% of the eligible implementation costs per hectare to be paid for. For each land readjustment procedure, the supreme land consolidation authority sets the level of eligible implementation costs in accordance with the guidelines. In specific cases, with the consent of the supreme land consolidation authority, the contribution to be made by the body of participants may be set at a different level. It may not then be less than 25%, however. Interest-free public loans are available to a limited extent for interim land purchases.

Grants for eligible implementation costs are applied for by the board of the body of participants. The approval authority for grants and loans is the land consolidation authority. Grants are made to the body of participants in the land consolidation.

Fig. 4.8-1: Funding of implementation costs in a land readjustment procedure under the Land Consolidation Act (example)

Land consolidation (Land Consolidation Act)						
Implementation costs						
Costs		Funding		Financing		Legal basis
		by grants from	amounting to %	€		
Total	€1,100,000					
Costs for third parties	€100,000			€100,000	Refunds by third parties	
Eligible implementation costs	€1,000,000	Federal government and states	70%	€700,000	Grants from the federal government and states	Joint Task for the Improvement of Agricultural Structures and Coastal Protection (GAK)
		State *	40%	€280,000		State-level rural development programme (e.g. 2014-2020)
		Federal government *	60%	€420,000		Framework plan of the Joint Task for the Improvement of Agricultural Structures and Coastal Protection
		*EU refinancing	of 25%	€175,000		EAFRD Regulation depending on the respective national policy plan
				€20,000	Surplus from the sale of land	
				€50,000	Non-purpose-specific municipal grant	e.g. due to savings in the maintenance of the network of rural roads and water bodies
				€230,000	Contributions by the body of participants	Land Consolidation Act; notifications of land consolidation contributions
Total	**€1,100,000**		**Total**	**€1,100,000**		

Figure 4.8-1 shows the funding and how the various funding sources come together in a land consolidation procedure covering 800 ha. In the example, it is assumed that the implementation costs total €1,100,000, of which €1,000,000 is eligible. The eligible costs are assumed to be subject to 70% funding under the Joint Task for the Improvement of Agricultural Structures and Coastal Protection. Together with the assumptions made for the surplus from the sale of land and the non-purpose-specific municipal grant, the participants are required to contribute €230,000. This works out at

€287.50 per ha of the procedure area assuming that the land consolidation authority does not have to exempt any participants from land consolidation contributions.

A farm taking part in the land consolidation with 50 ha of owned land would have to pay a total of €14,375 in land consolidation contributions.

4.8.3 Funding of implementation costs in a land readjustment procedure under the Agricultural Adjustment Act

Compared with the funding of implementation costs in rural land readjustment under the Land Consolidation Act, even better funding conditions are available for land reorganisation in eastern Germany under the Agricultural Adjustment Act (*Landwirtschaftsanpassungsgesetz*).

90% of the eligible implementation costs are met from grant funding provided by the European Union and by the German federal government and states. 75% of the grant funding is from EU resources, with the federal government and states providing the remaining 25%.

The European Union has shown recognition here of the particularly difficult conditions faced by rural agriculture in eastern Germany after the accession of the former German Democratic Republic to the Federal Republic of Germany, when the territory of the former GDR became part of the European Union effectively overnight. The particularly generous financial support from the European Union was also decided with the aim of achieving equivalent living conditions as quickly as possible in eastern Germany, including in agriculture and rural regions.

In some land reorganisation procedures under the Agricultural Adjustment Act, the land readjustment may pose special challenges such that it makes no sense to establish a body of participants. The costs of the procedure are then borne, and grants received, by the municipality in which the procedure is carried out.

Fig. 4.8-2: Funding of implementation costs in a land reorganisation under the Agricultural Adjustment Act (example)

Land reorganisation (Agricultural Adjustment Act)						
Implementation costs						
Costs		Funding		Financing		Legal basis
		by grants from	amounting to %	€		
Total	€1,100,000					
Costs for third parties	€100,000			€100,000	Refunds by third parties	
Eligible implementation costs	€1,000,000	EU, federal government and states*	90%	€900,000	Grants from the EU, federal government and states	Joint Task for the Improvement of Agricultural Structures and Coastal Protection (GAK)
		EU*	75 %	€675,000		EU Agricultural Financing Regulation depending on the respective national policy plan
		National funds*	25 %	€225,000		State-level rural development programme (e.g. 2014-2020)

		- of which state	40%	€90,000		Framework plan of the Joint Task for the Improvement of Agricultural Structures and Coastal Protection
		- of which federal government	60%	€135,000		Framework plan of the Joint Task for the Improvement of Agricultural Structures and Coastal Protection
				€20,000	Surplus from the sale of land	
				€50,000	Non-purpose-specific municipal grant	e.g., due to savings in the maintenance of the rural road and water body network
				€30,000	Contributions by the body of participants	Notifications of land consolidation contributions
Total	**€1,100,000**		**Total**	**€1,100,000**		

Figure 4.8-2 shows the funding of implementation costs and how the various funding sources come together in a land reorganisation procedure covering 800 ha. In the example, it is assumed that the implementation costs total €1,100,000, of which €1,000,000 is eligible. The eligible costs are assumed to be subject to 90% funding. 75% of this is provided as an EU grant, with the remaining 25% shared between the German federal government and states in the ratio specified for the Joint Task for the Improvement of Agricultural Structures and Coastal Protection. Together with the assumptions made for the surplus from the sale of land and the non-purpose-specific municipal grant, the participants are required to contribute €30,000. This works out at €37.50 per ha of the procedure area assuming that the land consolidation authority does not have to exempt any participants from land consolidation contributions.

A farm taking part in the land consolidation with 50 ha of owned land would have to pay a total of €1,875 in land consolidation contributions.

In addition, for the reasons just described, the European Union also contributes to the procedural costs of the land reorganisation (section 62 of the Agricultural Adjustment Act). It thus reimburses the eastern German states with 75% of procedural costs of land reorganisation.

5 Land reorganisation and land consolidation: examples illustrating the solution of typical land use problems

The sections that follow show with the aid of examples how specific land policy challenges are met methodologically in Germany using the policy instruments of rural land readjustment.

5.1 Land consolidation in cases where compulsory purchase is permissible for projects of public interest

Land consolidation also plays an important part in Germany for projects of public interest, such as for the construction of road, rail and water transport infrastructure, or for major public investment in other facilities of public utility such as water supply and flood prevention infrastructure. In a land consolidation for a project of public interest (*Unternehmensflurbereinigung*), the land readjustment objective that is intrinsic to all land consolidation is supplemented by the objective of obtaining land in a socially acceptable manner. This saves developers from having to use statutory compulsory purchase proceedings to obtain the land needed for a public infrastructure project.

- In cases where it is permissible for large quantities of farmland to be acquired by compulsory purchase for a particular purpose, the compulsory purchase authority may apply for a land consolidation procedure to be initiated so that the loss of land can be spread across a relatively large number of landowners or to prevent the project concerned from adversely affecting the general use and development of the land (section 87 (1) of the Land Consolidation Act).

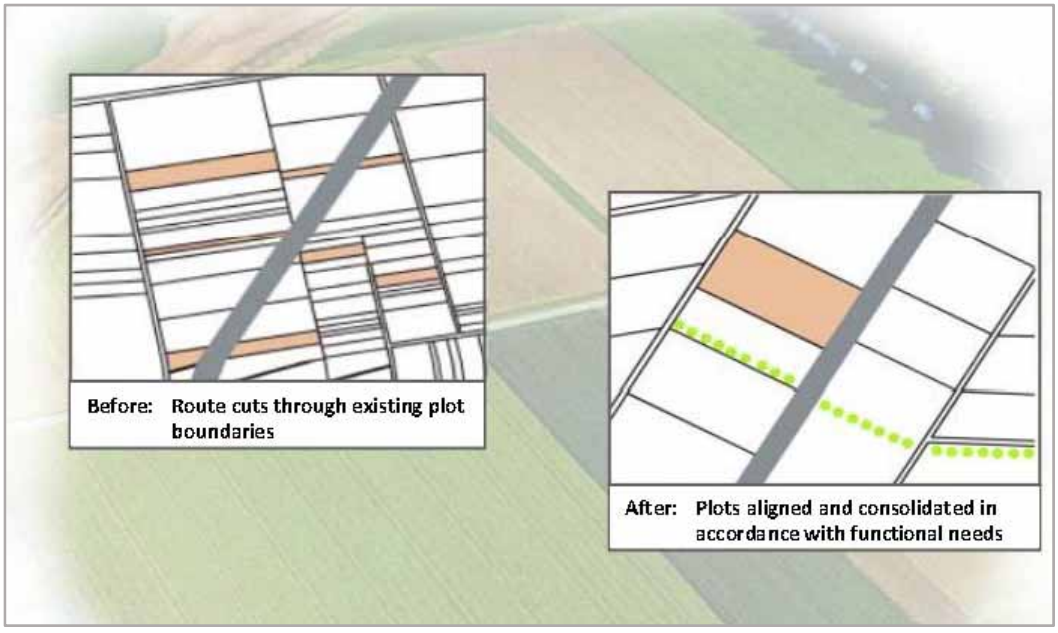
Procedures of this kind are mostly used in Germany for the construction of transportation and flood prevention infrastructure, but also for municipal-level projects that need large areas of land. The key criterion is that the applicable sectoral legislation must permit compulsory purchase for the infrastructure project in question.

Fig. 5.1-1: Public infrastructure projects take up large amounts of farmland and permanently alter the landscape.

5.1.1 Methodological approach

The methodological approach in a land consolidation for a project of public interest is based on that of a standard land consolidation: land owned elsewhere by the developer is exchanged for land where the project is to be carried out. If the developer does not have enough land to carry out the project, the shortfall is made up with equitable contributions of land from all participants in the land consolidation procedure, in return for monetary compensation.

Fig. 5.1-2: In the course of reorganisation, farm roads, fields and landscape features crossed by the project are adjusted in accordance with functional needs; farmland plots are consolidated (source: Hessische Verwaltung für Bodenmanagement und Geoinformation)



5.1.2 Formal and substantive legal framework of land consolidation for projects of public interest

With regard to procedure, a land consolidation for a project of public interest is based on the same legal provisions as a standard land consolidation except for a number of additional stipulations in sections 87 and 88 of the Land Consolidation Act. These relate to the public benefit nature of the land readjustment procedure.

- In the land consolidation decision and in the information provided to landowners (section 5 (1) of the Land Consolidation Act), specific reference must be made to the special purpose of the procedure (section 88 (1)).
- The land consolidation authority determines the land consolidation area in the land consolidation decision. On entry into effect of the land consolidation decision, the body of participants is established as a body corporate comprising all landowners with plots of land in the land consolidation area. Under section

88 no. 2 of the Land Consolidation Act, the developer is a second-order participant within the meaning of section 10 no. 2.

- The land consolidation decision can be issued as soon as a plan approval procedure (*Planfeststellungsverfahren*) under general administrative law, or an equivalent procedure under applicable sectoral legislation, has been launched for the project involving compulsory purchase. Publication of the land consolidation plan (section 59 of the Land Consolidation Act) and provisional transfer of possession of the new plots to participants (section 65 of the Act) are not allowed to take place until plan approval for the project or, as the case may be, the administrative act for the equivalent procedure, is final and incontestable or has been declared enforceable (section 87 (2) of the Act).
- On application from the authority responsible for the project, the land consolidation authority may issue a provisional order under section 36 of the Land Consolidation Act (section 88 no. 3 sentence 1 of the Land Consolidation Act). A provisional order under section 36 of the Land Consolidation Act may only be issued if there are urgent reasons requiring ownership or use of plots of land to be settled or other rights to be exercised before the land consolidation plan is or can be prepared and implemented. Requirements and conditions may be attached to the order, including the lodging of a security. The developer must pay compensation for any disadvantage that the provisional order causes to the parties concerned unless the disadvantage is offset by the temporary provision of replacement land. The amount of the compensation is set by the land consolidation authority and paid to the body of participants (section 88 no. 3 of the Land Consolidation Act).
- The plots are valued (sections 27 to 32) and the plan is prepared covering the common and public facilities with the accompanying landscape conservation plan (section 41 of the Land Consolidation Act).
- Before preparation of the land consolidation plan, all participants have to be heard with regard to their preferences for reorganisation of the land consolidation area (section 57 of the Land Consolidation Act).
- The land consolidation plan sets out the outcomes of the procedure. The participants contribute the land needed for the project according to the ratio of the value of their original plots to the value of all plots in the land consolidation area. Farms or horticultural enterprises are not required to contribute if it affects their ability to continue as a going concern. Under the land consolidation plan, the land provided is vested in the developer. The developer pays monetary compensation to the participants for the land they contribute (section 88 no. 4 of the Land Consolidation Act).
- After publication of the land consolidation plan, and once any appeals brought against it have been decided, the land consolidation plan becomes legally binding and the new legal status supersedes the prior legal states at the point in time specified in the implementation order (section 61 of the Land Consolidation Act).
- The developer must make good any disadvantage that the project causes to the parties concerned or, if that is not possible or the land consolidation authority does not consider it expedient, must pay monetary compensation (section 88 no. 5 of the Land Consolidation Act).

- What is to be done to make good any such disadvantages, or the amount of monetary compensation, is decided by the land consolidation authority after hearing the developer (section 88 no. 6 sentences 1 and 2 of the Land Consolidation Act). In the case of monetary compensation, the developer makes advance payments to the body of participants in an amount set by the land consolidation authority (section 88 no. 6 sentence 5 of the Land Consolidation Act).
- Appeals concerning the amount of the monetary compensation can only be brought before courts of general jurisdiction and in accordance with the legislation applicable to the project. A claim to monetary compensation for land contributed by a participant cannot be asserted in court until the compensatory land allocations for all participants are final and incontestable (section 88 no. 7 of the Land Consolidation Act).
- The developer pays to the body of participants the share of implementation costs (section 105 of the Land Consolidation Act) caused by providing the allocated areas of land and constructing the common facilities made necessary by the project. That share is decided by the (higher) land consolidation authority after hearing the developer (section 88 no. 8 of the Land Consolidation Act).
- The developer has to pay the share of the procedural costs incurred on the developer's behalf (section 104 of the Land Consolidation Act). That share is likewise decided by the (higher) land consolidation authority after hearing the developer (section 88 no. 9 of the Land Consolidation Act).

5.1.3 Practical considerations in the conduct of land consolidation for projects of public interest

5.1.3.1 Legal context of the normative framework

Land consolidation for a project of public interest pursues a public objective: the implementation of infrastructure projects that occupy land and are necessary in the public interest. It is therefore a 'public benefit' land consolidation. This is not altered by the fact that landowners can also expect private economic benefits from such a land consolidation, including an advantageous reshaping of rural infrastructure and of land ownership. Land consolidation for projects of public interest nevertheless always constitutes a 'soft' form of compulsory purchase, even in cases where successful private land acquisition by the land consolidation authority means that it no longer needs to impose any land deduction on participants.

This is because appeals against the amount of any compensation to be assessed by the land consolidation authority in the land consolidation plan are decided by the courts of competent jurisdiction for compulsory purchase matters. These are the ordinary law courts, as opposed to the land consolidation court, which is a division of an administrative court.

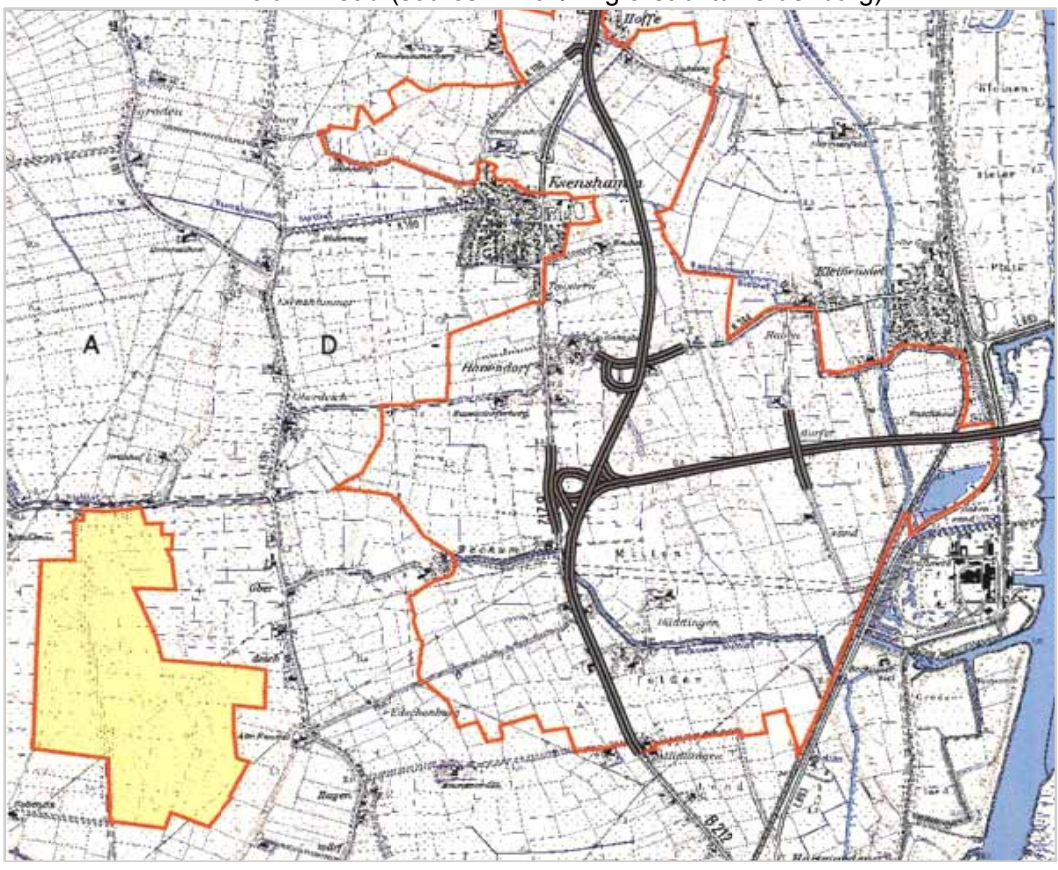
The provisions in the Land Consolidation Act on cost apportionment follow from the public benefit nature of the procedure, with strict application of the causation principle: the developer not only has to meet the implementation costs incurred by the body of participants, but also the personnel and non-personnel costs of the land consolidation authority (the procedural costs).

5.1.3.2 Early involvement by the land consolidation authority in planning a public infrastructure project

The provisions of the Land Consolidation Act on land consolidation for projects of public interest are designed to enable a project to be carried out as efficiently as possible in its final planned form. As the competent sectoral planning authority for agricultural structure and land improvement concerns, and as a body representing public interests, the land consolidation authority is therefore both permitted and required to be involved in the planning process from the earliest possible stage. Points to be looked into and analysed include the magnitude of any impacts on farms, negative impacts on the general use and development of the land, the area of land needed and options for acquiring land for the project. This analysis decides whether the developer will approach the compulsory purchase authority with a request for implementation of a land consolidation for a project of public interest.

At the early stages – during spatial planning and territorial planning consultation and when determining the project area or, for linear projects, the project route – the compulsory purchase authority is still able to exert a shaping influence on the project, and can do so in a way that keeps specific options open for later on. This is no longer the case following plan approval, after which all that remains for the land consolidation authority is for it to acquire the land for the project and fix the adverse effects on the use and development of the land as well as it can.

Fig. 5.1-3: The role of the land consolidation authority in deciding the route for the B 212 trunk road (source: Amt für Agrarstruktur Oldenburg)



Based on an analysis of various options for adapting the transport infrastructure in connection with a crossing of the River Weser (visible on the right), the following outcomes were achieved with the involvement of the land consolidation authority:

- The line of the road and its associated infrastructure was decided by mutual agreement among the bodies representing public interests
- The road construction authority requested a land consolidation for a project of public interest in order to prevent the project having a negative structural impact on farms
- The approximate perimeter of the land consolidation area was decided
- In addition, it was already agreed with the nature conservation authority that the interventions in nature and the landscape caused by the project should be offset as far as possible in the area to the west (marked in yellow).

The land consolidation authority is involved not only in planning, but also in informing potentially affected landowners. The early stages of planning for public infrastructure projects are full of uncertainties and create a breeding ground for rumours, scaremongering and all kinds of fears. This makes it necessary for the land consolidation authority to inform people as fully as possible about what a land consolidation for a project of public interest entails.

The parties likely to be involved should be informed in advance about the purpose of the land consolidation and about how it is carried out, the principles that apply and the cost and compensation arrangements. It always helps to show examples of completed land consolidations of a similar kind at information meetings, and perhaps to have participants from completed projects speak at the meeting.

If people directly affected by the planning of a public infrastructure project are reassured that they will not be left alone with their concerns and interests in the face of a developer that has the full force of planning law behind it, then that can take much conflict potential out of the whole planning process. This benefits the entire project.

Guidelines and recommendations have been drawn up and published for the working relationship between land consolidation authority and developer in road construction projects, which account for most infrastructure projects of this kind in terms of number and volume (FGSV 2003). The same guidelines can be applied by analogy to other public infrastructure projects.

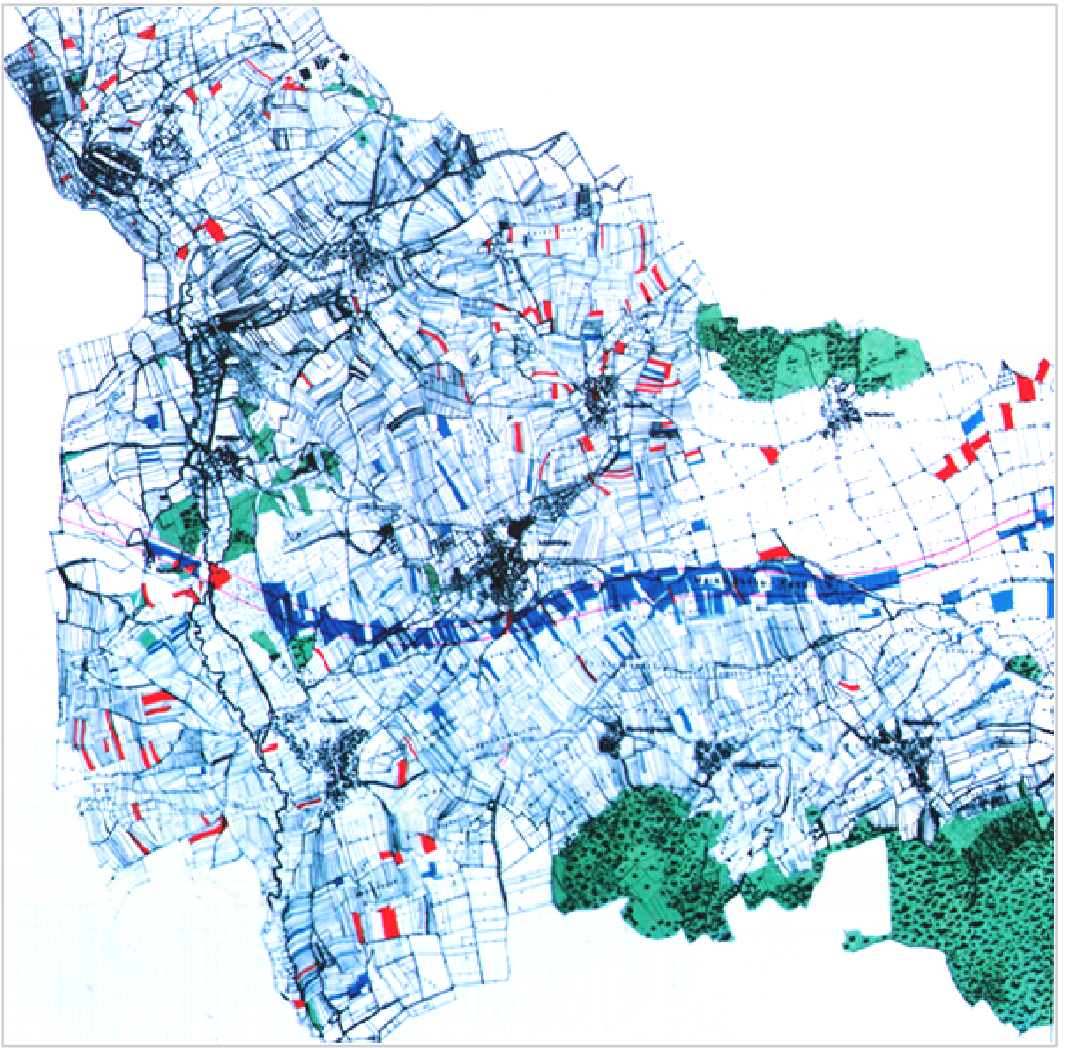
5.1.3.3 Acquisition of land for a public infrastructure project

The developer of a public infrastructure project is required, in accordance with the legislation applicable to the specific type of project, to acquire the land needed for the project by private purchase or to procure replacement land for exchange. There is generally very little scope for this at the location where the land is actually needed (on the route of a planned road, for example, or in the precise location of a planned reservoir or urban development project). Acquiring replacement land in the surrounding area of a project only makes sense if it can be used for land exchange, although without a land readjustment procedure this succeeds in only the very rarest of cases. The developer's sole option in such cases is a land consolidation procedure.

Once the land consolidation procedure has been formally initiated, the land consolidation authority becomes involved in the land acquisition. In a straightforward

process under section 52 of the Land Consolidation Act, the land consolidation authority then invites participants to waive compensation in land in favour of monetary compensation for land they are willing to surrender (see section 3.2.5.4), and in this way acquires further land for the developer throughout the land consolidation area until the expected land requirement is met. To finance the monetary compensation for participants waiving compensation in land, the developer makes advance payments for its subsequent land allocation under the land consolidation plan.

Fig. 5.1-4: A typical land acquisition situation, during construction of the Rhine-Main-Danube Canal (source: Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten)



The areas marked in blue are land acquired privately by the developer under notarialised contracts of sale in advance of plan approval. Areas marked in red are land acquired by the land consolidation authority by participants waiving compensation in land in the course of the land consolidation.

5.1.3.4 Determination of the land deduction

If not enough replacement land comes together where it is needed or in the surrounding area either by private purchase or by waivers under section 52 of the Land Consolidation Act, the shortfall is spread across all participants as a percentage land deduction relative to the ratio of the value of the parcels contributed in the land consolidation to the value of all parcels in the land consolidation area. The land deduction under section 88 (1) differs conceptually from the land contribution under section 47 (1) of the Land Consolidation Act. The 'consideration' for this communal contribution is the improved infrastructure in the land consolidation area in the form of the 'common facilities' under the land consolidation plan. In contrast, the land needed for a public infrastructure project is met by means of a land deduction against monetary compensation at market value.

Figure 5.1-5 shows how the percentage land deduction is arrived at. This ensures that all land needed for the project can be allocated to the developer under the land consolidation plan. The landowners involved receive financial compensation for the loss of land.

Fig. 5.1-5: Determination of the land deduction for a public infrastructure (road construction) project

• **Land needed for the road**	
o For the road itself and associated infrastructure	102 ha
o For ecological offsetting measures	88 ha
Subtotal	**190 ha**
• **Land available**	
o Already acquired by the developer	17 ha
o Acquired by the land consolidation authority in the land consolidation procedure	112 ha
Subtotal	**129 ha**
• **Land still needed (shortfall)**	**61 ha**
• **Size of land consolidation area**	**2,345 ha**
• **Percentage land deduction:** (61 ha / 2,345 ha)	**2.6%**

The rate of apportionment of the loss of land (and hence the size of the land deduction) is agreed upon in consultation with the farmers' association (section 87 (1) sentence 2 of the Land Consolidation Act).

With the loss of land spread over many shoulders, no farmer need fear a loss of livelihood as a result of the project. Instead, each farmer can expect equivalent compensation in land for the land taken up by the public infrastructure project. Land consolidation for projects of public interest thus avoids imposing a 'special sacrifice' on individual farms. The land deduction becomes a communal contribution by all participants that is compensated for in accordance with the law of compulsory purchase. This is a highly effective way of securing the general acceptance of all land consolidation participants.

Fig. 5.1-6: Determination of monetary compensation for the land deduction from landowner A

• Area and value of land belonging to landowner A based on the valuation framework* in the land consolidation	2.2500 ha; 21,050 value units (VUs)
• Percentage land deduction for the public infrastructure project	2.6%
• Land deduction from landowner A	547 VUs (corresponding to an area of about 5.85 ares based on the valuation framework)
• Monetisation coefficient**	€4/VU
Monetary compensation for land deduction from landowner A:	**€2,188**

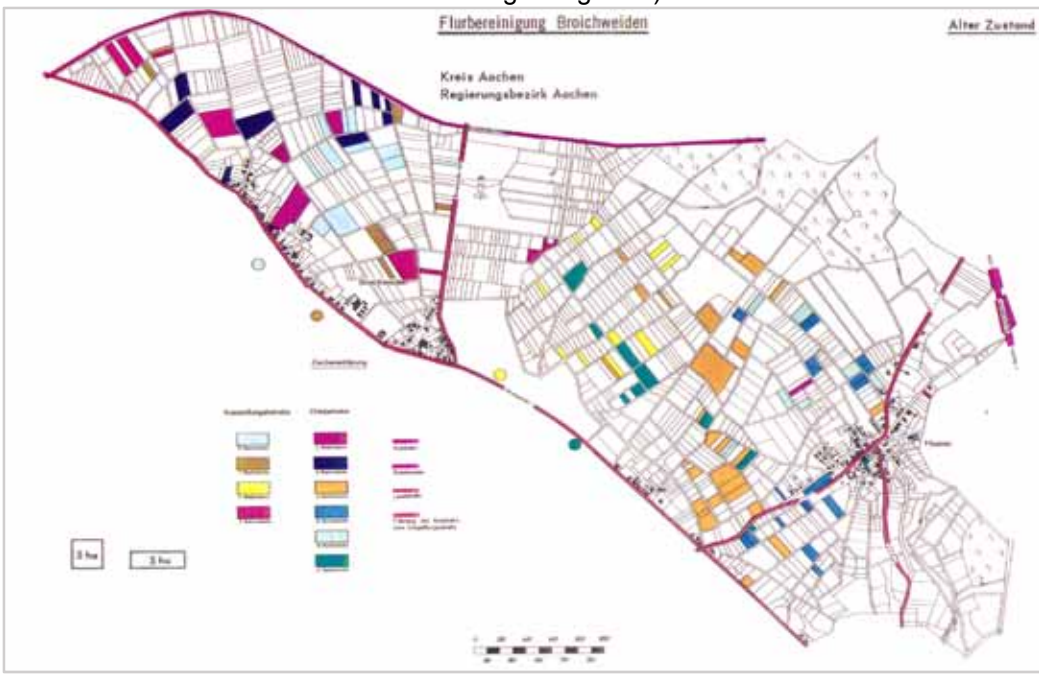
** See section 4.3.1.2*
*** See section 4.3.6*

5.1.3.5 Significance of the plan covering the common and public facilities with accompanying landscape conservation plan (plan under section 41 of the Land Consolidation Act)

Most public infrastructure projects rip apart the existing linear and planar field structures in the farming landscape: the farm road and track network, water channels and hedgerows that give structure to the countryside. Planned infrastructure may well create a barrier between farmsteads and their fields. The infrastructure will not always use the contributed areas of land in their entirety, leaving unfavourably shaped plots and odd scraps of land at the margins. Drainage and irrigation systems are disrupted and generally only repaired by the developer to the extent that they just about work again, without restoring their functional relationship with the land improvement scheme that they were originally laid out for.

In land consolidation for a project of public interest, the plan covering the common and public facilities and the accompanying landscape conservation plan is designed to remedy the project's adverse effects on the use and development of the land. The aim of the plan under section 41 of the Land Consolidation Act is to ensure that, once the project is completed, the functioning of natural systems is restored in a farming landscape that is suitable for rational cultivation. Figure 5.1-7 below shows the extent of the changes that can be necessary to achieve this.

Fig. 5.1-7: Impacts of the infrastructure project on reorganisation in the Broichweiden land consolidation procedure (prior and new status) (source: Bezirksregierung Köln)



The spatial orientation of the project made it necessary to completely realign the rural road and track network in the course of the land consolidation. Aligning the rural roads and tracks to the two intersecting stretches of autobahn made it possible to create convenient field shapes for agricultural cultivation.

A more detailed discussion of the plan under section 41 of the Land Consolidation Act is provided in Fehres (2014) and Schumann (2014).

5.1.3.6 Defining the boundaries of the land consolidation area

The general task assignment under section 7 of the Land Consolidation Act, under which the land consolidation area is to be defined in the way that will best serve the purpose of the land consolidation, gives rise to specific considerations in land consolidation for a project of public interest:

1. The land consolidation area needs to be defined in such a way that the land needed for the public infrastructure project, including for any required ecological offsetting measures, can be provided in full under the land consolidation plan. Ensuring that this is the case is up to the land consolidation authority, which must carry out the necessary calculations before finally setting the area boundary in the land consolidation decision.

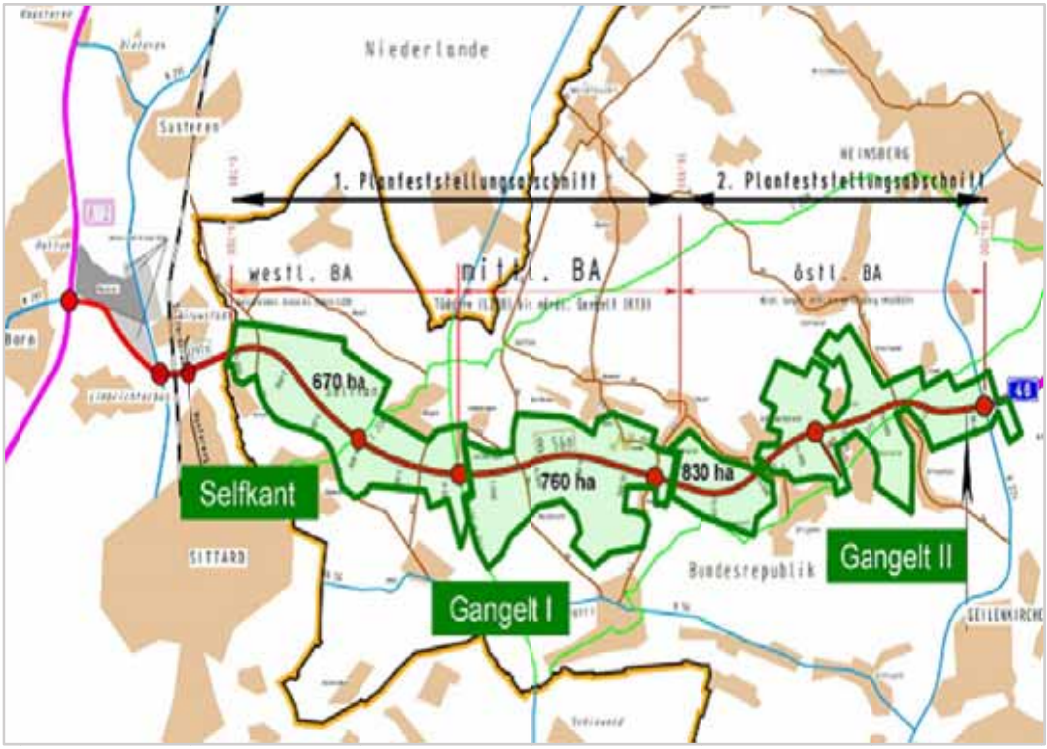
2. The area must also be delineated such that the land consolidation procedure has the scope to remedy the project's adverse effects on agricultural structure and on the use and development of the land. This also defines the 'impact area' of the infrastructure project – the area in which the developer has to meet all costs incurred in the land consolidation procedure.

3. In some cases, farmers affected by such an infrastructure project ask for the land consolidation area to be extended beyond the project's actual impact area, so as to address structural deficits for farming in peripheral areas and/or to upgrade the rural road and track network in line with present-day needs in terms of farming practices and machinery. This can be done, but the land consolidation authority then has to maintain – both by defining the project impact area at cadastral parcel level and by specifying different procedural objectives for different sub-areas in the land consolidation decision – a clear separation, at all stages of the land consolidation procedure and in all administrative acts along the way, between the areas in which compulsory purchase law applies to the public-benefit land consolidation for the infrastructure project and the areas in which plots of land are reorganised on a private-benefit basis to remedy structural deficits in agriculture. In the sub-areas subject to private-benefit reorganisation, the body of participants bears the costs.

4. Linear projects, such as the construction of new trunk roads, flood prevention measures involving dike relocation, or inland waterways, can easily extend over tens or even hundreds of kilometres. Projects of this kind are implemented in lots. It makes little sense to conduct a land consolidation procedure for the entire length of the project. Instead, land consolidations for a project of public interest are initiated in accordance with project progress on the basis of objectives laid down in the land consolidation decision. The result is a 'chain' of land consolidation procedures with the same purpose.

This has the benefit that the land consolidation process – and in particular the (provisional) transfer of land to the developer at project commencement (see section 3.3.3) – can be kept in step with the progress of the infrastructure project as a whole. Apart from that, participants in the procedure for each lot are then free to put the land consolidation behind them even though the project as a whole is not yet complete.

Fig. 5.1-8: Chained land consolidation procedures for construction of a trunk road in the Selfkant region (source: Bezirksregierung Köln)



Two land consolidations for projects of public interest were initiated for the first plan approval section. Preparations for a further land consolidation procedure for the second plan approval section began at a later date.

The areas covered by a chained land consolidation do not have to be contiguous. Depending on the nature of the project and where land is needed for it, the individual land consolidation areas can indeed be separate from each other. The point is that the individual parts of the chained land consolidation are materially linked by the procedure objectives specified in the land consolidation decision. Figure 5.1-9 shows a section of the River Rhine close to the point where it enters the Kingdom of the Netherlands. Under an agreement between France, Germany and the Netherlands, a number of dike relocations were planned on German territory in the interests of flood protection. Dikes along the length of the Rhine are to be relocated further inland to provide more retention space in the event of high water and to flatten flood peaks.

Fig. 5.1-9: Land consolidation for flood prevention along the River Rhine
(source: www.gisile.nrw.de)

The small areas marked in yellow between the land consolidation areas are plots of land added later to individual procedure areas so the land consolidation authority could acquire them in the course of the land consolidation for exchange with land surrendered by farmers.

5. Carrying out multiple land consolidation procedures in a region at the same time also provides a straightforward solution to another problem. In many cases, farms are affected at several or even all stages of a major infrastructure project. This could prevent an optimum consolidation of their land because the construction stages are carried out one after the other. The solution is provided in section 44 (6) of the Land Consolidation Act: Where it is deemed expedient for implementation of the land consolidation procedure, participants may receive their entitlement by way of exchange in plots allocated in another land consolidation area. In such cases, the new plots are dealt with in the land consolidation plans for the land consolidation areas in which they are allocated.

5.1.4 The importance of land consolidation for projects of public interest in Germany

Land consolidation for projects of public interest is indispensable in Germany for the provision of essential public services and for meeting the associated need to acquire land. This is partly because of the ongoing high level of demand for land in Germany, in urban and rural areas alike. In urban areas, this relates to land for housing developments and improvements in residential surroundings and for the commercial and industrial sector. In rural areas, demand is driven by farms looking for available farmland in order to expand. Demand pressure is further increased in Germany's border regions by farms from across the border additionally competing on the land purchase and lease market. This situation has long been addressed in the relevant literature (see, for example, Thomas 1992 and 2011a, and DLKG 2016 and 2017). When plans are announced for major public infrastructure projects, the call for a land consolidation of this kind to be carried out generally comes from the farming community. Increasingly, however, land consolidations for projects of public interest are requested by municipalities planning an urban development project. When such a project has been decided upon, municipal councillors want to be able to implement it as consensually as possible with the affected landowners.

Over the last 30 years, land consolidation procedures for projects of public interest have consequently accounted for about a quarter of all land consolidation activity. At the end of 2018, the figure was 17.1% by the number of all ongoing land consolidation procedures and 24.1% by procedure area.

Fig. 5.1-10: Land consolidation activity in Germany

Year	Procedures in progress at the end of 2018							
	Standard land consolidation, sections 1 and 37 of the Land Consolidation Act		Simplified land consolidation, section 86 of the Land Consolidation Act		**Land consolidations for projects of public interest**, sections 87 and 90 of the Land Consolidation Act		Accelerated consolidation, section 91 of the Land Consolidation Act	
	Number	ha	Number	ha	**Number**	**ha**	Number	ha
2018	987	473,546	1,345	838,222	**509**	**460,867**	140	142,739

(source: ARGE Landentwicklung 2020)

5.1.5 Balancing public and private interests in land consolidation for projects of public interest

Land consolidation for projects of public interest plays an important role in maintaining the constitutional balance between safeguarding public interests and leaving landowners free to arrange their own affairs. In a land consolidation for a project of public interest, the priority is on land acquisition for the project and having land available at the points in time scheduled in the project. However, the material provisions of the Land Consolidation Act are calculated to minimise the adverse effects of a project on the affected parties and to compensate for any disadvantages they incur as fully as possible. What this means in detail for the project and for participants is shown in the figure below.

Fig. 5.1-11: Synopsis of public and private interests in land consolidation for projects of public interest

Benefits for the project	Benefits for participants
• Transfer of all land needed for the project • Formal transfer of possession of all land needed at start of construction • Transfer of possession by the land consolidation authority in a uniform procedure • Formal compulsory purchase proceedings are avoided • Monetary compensation for land deductions is set in the land consolidation plan • Monetary compensation for temporary use of land and other compensation for standing crops and the like is set in the land consolidation plan • Modifications to the road and track network, landscape features and land improvement infrastructure in line with functional needs take place in the land consolidation procedure based on the plan under section 41 of the Land Consolidation Act • The plan under section 41 of the Land Consolidation Act also stipulates on and makes provision, in line with functional needs in the farmland within the land consolidation area, for other adverse effects on the use and development of the land, and for ecological offsets triggered by the project • Reorganisation of the farmland avoids or minimises leftover scraps of land that are uneconomic to farm • Skilful planning of the reorganisation of the land consolidation area avoids or minimises circuity (additional travel distances) caused by the project separating farmsteads from their fields.	• No 'special sacrifices' imposed on individual participants • No land losses imposed that threaten farm livelihoods • Incidental consolidation of scattered plots of land • Incidental improvement of the farm road and track network • Incidental improvement of soil water conditions • Ecological offsets are aligned to the agricultural structure • The statutory land deduction is compensated for at market value • The compensation is set by the land consolidation authority in the land consolidation plan • The same applies to all other detriments incurred in the course of the project • The principles for the reorganisation of the land consolidation area made necessary by the project are agreed with the board of the body of participants • Preparation of the plan covering the common and public facilities and the accompanying landscape conservation plan is carried out by the land consolidation authority in agreement with the board of the body of participants • Costs of implementing the land consolidation plan are not to be borne by the body of participants • At the request of the body of participants, for reasons of improving agricultural structure or the use and development of the land, the land consolidation area may be extended beyond the impact area for which the developer is responsible, with the additional costs borne by the body of participants.

5.1.6 Macroeconomic value added analysis of land consolidation for projects of public interest

Macroeconomic value added in a land consolidation for a project of public interest is estimated using the approach described in section 4.7.

The benefits to affected landowners are determined for all measures to improve production and working conditions in agriculture and forestry and to promote the general use and development of the land. Next, the benefits to the developer are determined.

From these are deducted the costs of implementation and the administrative organisation costs of all public entities involved in the land consolidation.

In a land consolidation for a project of public interest, as a 'public benefit' procedure, there is also the question of whether it makes economic sense to involve the land consolidation authority in implementation of the infrastructure project, or whether it would be more cost-effective at macroeconomic level to obtain the land for the project by compulsory purchase and to pay monetary compensation for all other detriments incurred.

In 2004, a cross-sectional study of various mutually independent land consolidations for projects of public interest with differing procedural objectives showed, using the above approach, that the macroeconomic value added in land-consuming major public infrastructure projects in rural areas is on average 1.5 times greater than if they had been done without using this form of land consolidation procedure (Seyer; Pieper 2006). This means, for example, that making use of the procedure for land consolidation for projects of public interest boosts the added value of a public project with an investment spend of €10 million to around €15 million *in addition* to the added value that would be generated by the project itself*.

** In economics and budgeting, public investment projects in general and major public infrastructure projects in particular are assumed to generate macroeconomic value added at least equal to their investment cost.*

Fig. 5.1-12: Macroeconomic value added analysis of land consolidation procedures for projects of public interest

Macroeconomic value added in land consolidation procedures for projects of public interest						
Land consolidation procedure		**Costs**		**Benefits**		**Intangible**
				Tangible		
Werl B1		**€586,650**		**€1,531,825**	p l u s	• Avoiding loss of owned land • Conserving and securing farm livelihoods • Less opposition and fewer legal challenges against plan approval and transfer of possession • Improved chances for implementing other subsequent projects • Increased acceptance of the construction project • Optimised and fit-for-purpose ecological offsetting measures • Decreasing the farmland rededication rate
Würselen-Euchen		**€2,604,976**		**€3,156,086**		
Lövenich		**€622,188**		**€1,910,886**		
Königswinter		**€2,437,543**		**€3,928,809**		
Bislicher Insel		**€2,340,551**		**€2,603,554**		
Total		**€8,591,908**		**€13,131,160**		**Cost-benefit ratio: 1:1.5**

(Source: BMS 2005)

More recent value added analyses of land consolidations for projects of public interest not only confirm the above result but, due to conservative estimates made for project and developer, suggest that the cost-benefit ratio of 1.5 given above is likely to

be at the lower end of the actual range (see, for example, Eyter 2013). This finding is supported by a wide variety of other benefits that arise incidentally for society as a whole:

- Savings in land acquisition
- Savings in the cost of cadastral surveys for the completed infrastructure
- Reduction of administrative costs at cadastral and land registries
- Faster project progress and reduced disruption from construction work
- Reduced construction costs
- Improved cadastral register quality
- No litigation costs due to compulsory purchase proceedings.

Various intangible benefits come on top:

- Safeguarding of farm livelihoods
- Promotion of farm competitiveness
- Safeguarding of jobs in farming and in upstream and downstream sectors
- Stabilisation of the property market
- Improved legal certainty in public registers
- Less litigation among landowners
- Improved availability of land for lease
- Reduced administrative effort and expense in plan approval and transfer of possession
- Reduced land take
- Hindrances to the use and development of the land eliminated in line with prevailing needs
- Nature conservation offset requirements triggered by the project can be met in an ecologically optimum manner
- Increased general acceptance of the project.

5.1.7 Conclusion

Land consolidation for projects of public interest is an effective instrument for supporting public infrastructure projects that take up large areas of land. It safeguards individual farms from any threat to their livelihood due to loss of land and spreads the land loss over many shoulders in a socially acceptable manner so that no individual landowner has to make a ‘special sacrifice’ for the good of all. Over the course of the procedure, participants are able to take an active part in the reorganisation process and can shape the new situation that will be brought about by the project. In terms of the legal system, the methodological approach bridges the gap between the constitutional guarantee of property and use of real property by the state for urgent public needs. Land

consolidation for projects of public interest is a land readjustment instrument that meets present-day requirements for solving land use conflicts in a democratically constituted pluralistic society (Thomas 2014 c).

5.2 Land consolidation in the case of provision of land for a mining company

Opencast mining changes the earth's surface more radically than almost any other public or private endeavour. Excavation of an opencast mine requires villages to be resettled and all transportation and other infrastructure to be moved elsewhere. Removing the overburden destroys the entire cultural landscape shaped by humankind through cultivation of the land over many centuries. Nature and the landscape are eradicated. But an opencast mine not only blights the landscape. It also up-ends the underlying legal and social structure of the affected area. Its impacts on agrarian structures speak for themselves.

Fig. 5.2-1: Opencast lignite mine in the western German coalfield
(source: Bezirksregierung Köln)

The free alienability of real property – legal dominion over land – is curtailed in German mining law. Land needed for an opencast mine and its ancillary infrastructure is ceded to a mining operator for a long period of time and can no longer be used by the landowner.

After extraction of the mineral resources, the pit is refilled with overburden and covered with topsoil. A planned recultivation is embarked upon and a new landscape comes into being. Land reclamation measures relate to the landscape and natural systems. The measures to restore the underlying legal structure follow from the property and other rights of the affected parties. It is not possible to return all land to its prior state as the extraction and use of the mineral resources leaves a mass deficit that usually manifests itself on the surface as 'pit lakes' and inevitably results in major changes to the landscape in the course of recultivation.

5.2.1 The formal and material legal framework for the assignment of land under German mining law

Under German mining law, the appropriation right to key minerals is held by the state. Ownership of a piece of land therefore does not include 'freely mineable' mineral resources (such as metals, petroleum, natural gas, coal, salts, fluorite or baryte). Only 'freehold' mineral resources (such as sand, gravel, gypsum, clay, natural stone, roofing slate or peat) are the property of the landowner, provided they are not extracted underground. The extraction of near-surface resources in Germany is governed by legislation specific to each of the German states (see, for example, AbgrabG NRW 1979).

Mineral resources to which the state holds the appropriation right are initially ownerless, with mining operators able to acquire claims by grant of proprietorship in a state-controlled procedure. The legal basis for this is the Federal Mining Act (*Bundesberggesetz*), which entered into force on 1 January 1982 (BBergG 1980). This harmonised prior mining laws of the German states, which in turn went back to the General Mining Act for the Prussian States (*Allgemeines Berggesetz für die Preußischen Staaten*) of 24 June 1865. The scope of the Federal Mining Act was extended on 3 October 1990 to cover the territory of the former German Democratic Republic.

Besides various procedural stipulations, the Federal Mining Act also governs legal relationships between the mining proprietor (mining operator) and affected landowners. Landowners are entitled to compensation if they have to cede their land for construction of mining infrastructure or extraction of mineral resources. The Federal Mining Act also stipulates on the recultivation of exploited opencast mines. Under section 77 (1) of the Federal Mining Act, an operator can apply for assignment of real property if use of the piece of land is necessary for establishing or operating an extraction operation or treatment operation. The purpose of the land assignment is to grant temporary possession of the land for mining purposes in return for compensation. As a precondition for a formal assignment procedure, the mining operator must have made earnest but unsuccessful efforts to freely acquire the piece of land to or reach an agreement on land use sufficient for executing the project. Real property assignment may be executed only in the scope required for realising the purpose of assignment (section 81 of the Federal Mining Act).

When a mining company invokes these provisions, it can pose a threat to farm livelihoods. Section 90 of the Land Consolidation Act is designed to avert such a situation:

- Where, in the case of rural land, the large-scale provision of land in accordance with regulations of mining law is implemented or permissible and the landowners lodge a justified claim requiring the mining company to acquire title of ownership in the land in question, the loss of land incurred by the parties concerned may be distributed among a relatively large number of owners (section 90 sentence 1)
- In such cases, the mining operator acquires proprietorship by means of the land consolidation plan (section 90 sentence 2)
- The special provisions on land consolidation for projects of public interest provisions in section 88 of the Land Consolidation Act apply analogously (section 90 sentence 3 of the Land Consolidation Act).

This provision in the Land Consolidation Act goes back (according to Steuer 1967) to suggestions from the mining sector and was already contained in section 4 (3) of a Land Consolidation Act adopted by the Bizonal Economic Council on 23 June 1949. That

latter act never entered into force, however, due to the founding of the Federal Republic of Germany in May 1949. The stipulations in section 90 of the Land Consolidation Act from 1953 onwards can be interpreted – analogously to those in sections 87 and 88 for large public infrastructure projects – as a provision to mitigate the impact of statutory land assignment under the Federal Mining Act. It is clear from the general context that land assignment here exclusively serves the interests of the mining company and hence a public benefit objective, meaning that it is not predominantly in the private interest of the affected parties (see section 2.1.4).

5.2.2 Methodological approach

It is in the nature of land assignment for mining purposes that possession of the affected land has to be surrendered for a long period of time. This also extends beyond excavation of the mine and extraction of the mineral resources themselves and includes the time needed for shaping the post-mining landscape and recultivating for agricultural use – generally 20 or 30 years in all. During this time, landowners can no longer engage in their usual farming activities on the affected land. For many farms, this is an untenable situation. The law therefore gives the affected parties the right to require the mining operator to purchase their land. This right is not intended to result in parties surrendering all of their land in a 'special sacrifice' in favour of others, but is mitigated by sharing the burden among landowners – as described in section 5.1.3.4 for land acquisition in a land consolidation for a project of public interest.

If the landowners affected by a land assignment under mining law assert the right to require the mining company to purchase their land and a land consolidation under section 90 of the Land Consolidation Act is carried out for the purpose, then all participants in the land consolidation must provide a land deduction in return for monetary compensation. The land consolidation area has to be delineated such that the land deduction does not exceed a materiality threshold that the German supreme courts have set at 5% of the affected parties' farm area. As can be seen from Fig. 5.2-2, the required size of the land consolidation area depends not on the area for which the mining operator has requested land assignment, but only on the area of the plots of land for which affected parties assert the right to have their land purchased.

Fig. 5.2-2: Estimation of the size of the required land consolidation area

• Area of land for which the mining operator requests land assignment	1,500 ha
• Area of land for which individual landowners assert the right to require the mining operator to purchase	180 ha
• Maximum permissible land deduction for participants	<5.0%
• **Minimum size of land consolidation area** (180 ha x 100 / 5.0)	**3 600 ha**

After the approximately 20 to 30-year transfer of possession, all other landowners affected by the land assignment under mining law have the right to have their land returned in a cultivatable state by the mining company.

In practice, however, mining companies avoid a formal land assignment procedure by private purchase or by agreeing a long-term lease. This has meant that no land consolidation has yet to be carried out to avert a land assignment under mining law. Land consolidation has nevertheless played a key part in connection with opencast lignite mining in Germany ever since the introduction of the Land Consolidation Act.

5.2.3 Land consolidation in the shaping of the post-mining landscape

The use of the Land Consolidation Act to help manage the impacts of mining by means of land readjustment and shape the post-mining landscape does not differ in principle between western German and eastern German opencast mining regions. There are, however, differences due to the differing socioeconomic conditions under which lignite mining has been operated over the past 70 years.

5.2.3.1 Land consolidation in the western German lignite mining region

a. Land procurement

The western German lignite mining region is located in the state of North Rhine-Westphalia, in the Zülpicher Börde, a region within the triangle between Aachen, Mönchengladbach and Cologne. *Börde* is a word for a fertile plain with deep loess soils, on which large farms grow cereals and root crops at high levels of productivity. The mining operator in this region does not make use of formal land assignment or compulsory purchase proceedings. Instead, it uses a long-term land banking scheme in which it procures the land needed for opencast mining by private purchases from landowners who no longer engage in farming. In some cases, the operator involves the land consolidation authority competent for the region. Purchases are made in an area that extends far beyond the actual opencast mining region. This means that the mining operator is able to offer replacement land to affected farmers as and when the need arises. Sometimes, entire farms are relocated to a completely new site far removed from the opencast mining operations. If only parts of a farm's land are affected by opencast mining, private leases are signed with the affected parties, with a contractual undertaking to return the land following recultivation and land consolidation.

b. The planning basis for lignite extraction and recultivation

Lignite mining takes place on the basis of a comprehensive master plan that is drawn up with public consultation and has to ensure that the project is coordinated with state-level territorial planning and all relevant areas of sectoral planning. The plan is formulated in phases that build on each other and become increasingly detailed, and in the course of which the land consolidation authority is also involved.

Planning starts with definition of the lignite mining plan area under an implementing order to the state-level Territorial Planning Act (*Landesplanungsgesetz*; LPlG 2001). The lignite mining plan area includes the areas for lignite extraction, spoil tips and necessary resettlements and areas whose topmost aquifer is affected by dewatering (section 25 (1) of the Territorial Planning Act).

The planning body for the lignite mining planning procedure is the Lignite Board (*Braunkohlenausschuss*), an elected body consisting of municipal and regional representatives together with representatives of civil society groups. Under section 26 (6) of the Territorial Planning Act, the higher land consolidation authority is an *ex-officio* member of the Lignite Board. The Lignite Board makes the substantive and procedural decisions for the drafting of lignite mining plans by the mining company and orders their preparation. It must also satisfy itself on an ongoing basis that the lignite mining plans are properly adhered to and notifies the competent authorities of any deficiencies found (section 31 of the Territorial Planning Act).

Once the extraction of mineral resources is complete, the affected land is reclaimed. To this end, a lignite mining plan contains general stipulations as to surface

covering and land reclamation in mining and tip sites, including the development of the landscape envisaged in recultivation. The land reclamation principles require the restoration of a landscape that meets the following objectives as far as possible (section 24 of the Territorial Planning Act):

- Suitability for productive agriculture and forestry
- Varied and natural landscape appearance
- Successful long-term reintroduction of biodiverse native flora and fauna communities
- Extensive recreational opportunities.

The lignite mining plan also specifies that its objectives are to be implemented by means of a land consolidation procedure.

When lignite extraction in an opencast mine approaches completion, the pit is filled in as specified in an end-of-operations plan derived from the lignite mining plan and the surface is reshaped; the surface appearance will of course be different from before.

Fig. 5.2-3: The opencast pit is filled in and covered with two to three metres of loess soil (source: Bezirksregierung Köln)

c. Simplified land consolidation for 'repossession' of land ceded to the mining company

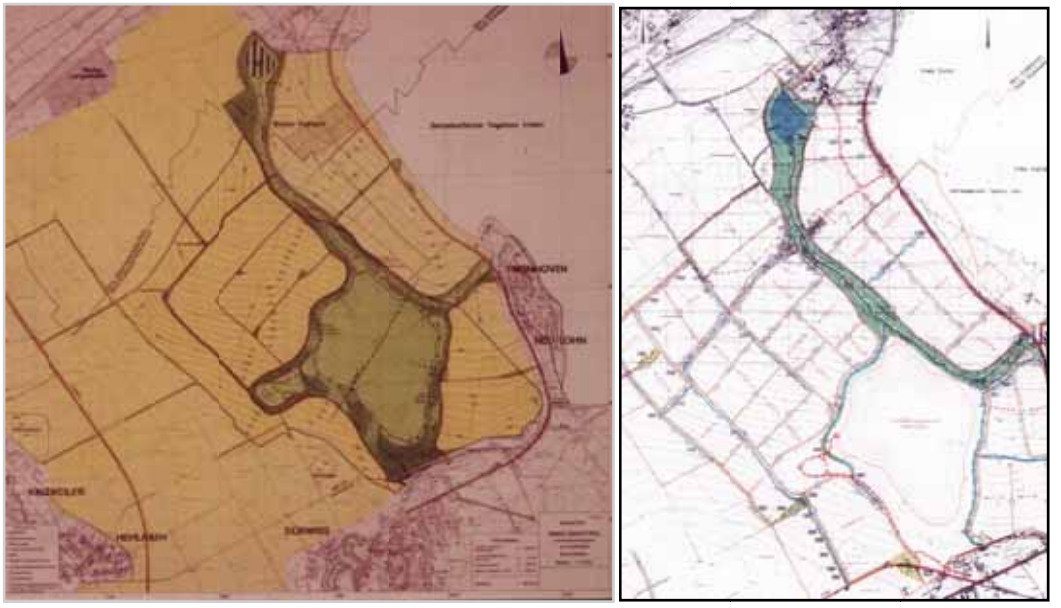
Landowners affected by an opencast mine who have not sold their land to the mining company have the right to have their land returned. This right applies under mining law and may be governed by more detailed stipulations in lease terms. Landowners regain control over their land after leasing it to the company for a 20 to 30-year period. As it would make no sense, economically or otherwise, to restore ownership and tenure structures to the way they were before mining, 'repossession' takes place in a planned manner in a simplified land consolidation under section 86 of the Land Consolidation Act.

All measures included in the list of objectives in section 86 (1) of the Land Consolidation Act are options for the sustainable shaping of a post-mining landscape (see section 2.4.1.2): The area in question is rearranged, and scattered or uneconomically shaped plots are consolidated to meet modern managerial requirements and reshaped to obtain units of a more favourable shape and size. Roads, tracks, water bodies and other common facilities are provided, soil-conserving and landscaping measures are implemented and the legal situation is clarified.

The simplified land consolidation is requested by the mining company (section 86 (2) no. 2 of the Land Consolidation Act). As the party carrying out the measures under section 86 (1) of the Land Consolidation Act, it must reimburse the body of participants for the implementation costs incurred on its behalf (section 86 (3) of the Land Consolidation Act).

The plan under section 41 of the Land Consolidation Act provides the planning basis for creating the agricultural and landscape infrastructure whose main features have already been specified in consultation with the land consolidation authority in the end-of-operations plan.

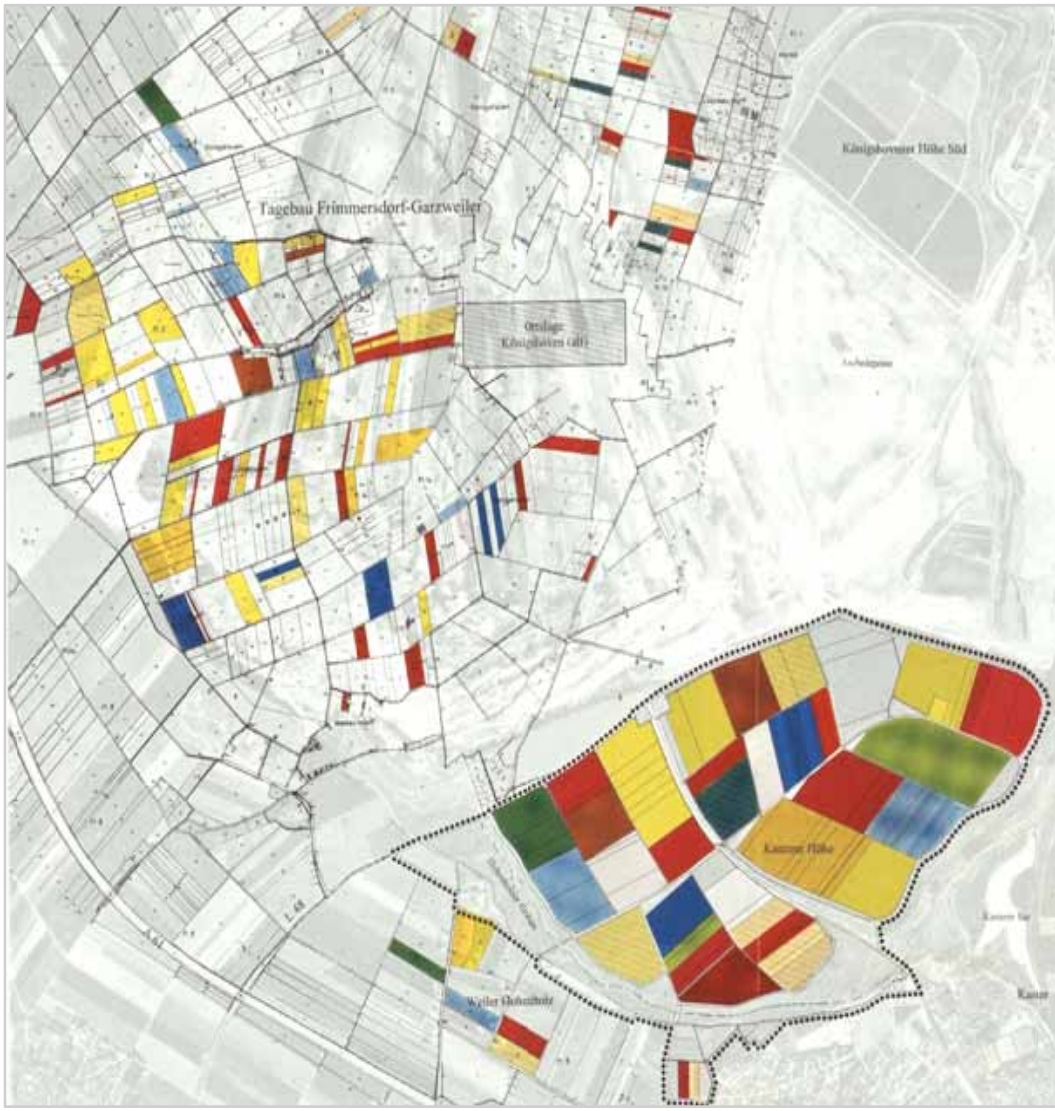
Fig. 5.2-4: End-of-operations plan (left) and the plan under section 41 of the Land Consolidation Act (right) covering the common and public facilities with the accompanying landscape conservation plan (source: Bezirksregierung Köln)



The participants' original plot values are determined from the yield indices (value units times area in ares) from the soil appraisal under the Soil Appraisal Act (see section 4.3.1.1) as things stood at the time the land was assigned for mining. Based on a 'warranty' for virgin soil, participants are assigned a 10% markup on the yield indices if they take over virgin land. The land needed for common facilities is provided by the mining operator. A land contribution under section 47 of the Land Consolidation Act is

not imposed. On this basis, the participants' compensation entitlements are determined and met in the land consolidation plan.

Fig. 5.2-5: Reorganisation of former land tenure in the recultivated Kasterer Höhe pit area within the Frimmersdorf opencast mine (source: Bezirksregierung Köln)



Following surface covering and recultivation of the exploited opencast mine areas, the mining operator itself takes the land intended for agricultural use into cultivation for an initial period of seven years. During this time, special land cultivation techniques are used to ensure the development of fertile new soil with a soil structure corresponding to naturally developed soil in terms of soil physical, soil mechanical and microbiological properties.

Fig. 5.2-6: Seven-year interim cultivation of the new land by the mining company
(source: Bezirksregierung Köln)

5.2.3.2 Land consolidation in the eastern German lignite mining region

a. Land appropriation and reclamation

The eastern German lignite mining region encompasses the opencast mines in the territory of the former German Democratic Republic (GDR), comprising the Lausitzer Revier, Mitteldeutsches Revier, Helmstedter Revier and Wetterau-Revier (a *Revier* is a mining area). In the former GDR, the General Mining Act for the Prussian States (*Allgemeines Berggesetz für die Preußischen Staaten*) of 24 June 1865, derived from earlier Prussian laws, continued to apply all the way through to 1990. After the founding of the GDR in 1949 and the ensuing nationalisation of mining operations, interpretation and further application of mining law regarding matters such as land appropriation, opencast mine excavation and operation, recultivation and reclamation mainly took the form of ministerial decrees and directives (Eberl 1955). When the planned economy increasingly took hold under state socialism in the 1950s, mining enterprises were stripped of their general responsibility for all mining operations by decree in 1952, with the tasks of reclamation and recultivation assigned to farming and forestry enterprises (Hildemann 1998). This meant that when it came to reclamation and recultivation, agriculture and forestry always had to take a back seat due to the economic importance of lignite as a primary energy source. Berkner (1998) thus noted that in the years from

1960 to 1990, post-mining measures were always planned as an afterthought, based on the situation left after extraction. There was no going back to the 'pre-mining' landscape, Berkner concluded.

After 1990, this proved true for almost all opencast mines in the region – whether closed or still in operation – and the orderly winding down of opencast mining operations following normal legal procedure mutated into a process of remediating contaminated or partially contaminated industrial sites and shaping a post-mining landscape determined by the legacy situation. There was also the matter of satisfying landowners' and farmers' restitution claims on the basis of leases entered into with the mining enterprise at the time. Based on the factual situation as described, the only way many such claims can be settled is by monetary compensation. Proper recultivation of the legacy sites today is made even more difficult or impossible by the fact that topsoil and overburden were frequently dumped on one and the same tip, and that pit lakes were allowed to form haphazardly of their own accord, in many cases with any economic use of the land prevented by contamination or unstable margins.

The differences illustrated here with regard to the approach used in shaping post-mining landscapes in the western and the eastern German lignite regions are therefore due not to differences in the underlying mining legislation, but mainly to political influence having been exerted on proper administrative implementation of the provisions enshrined in that legislation.

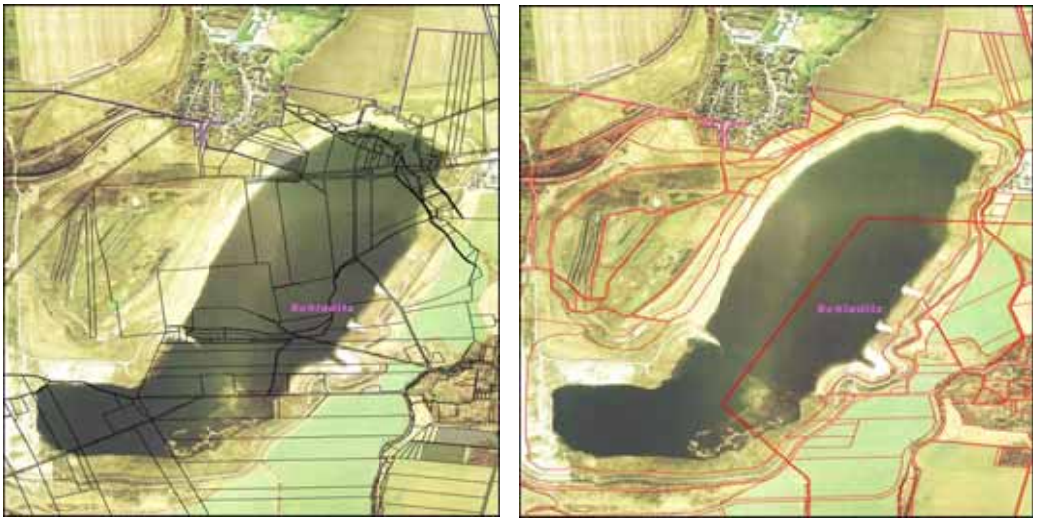
b. Simplified land consolidation for the satisfaction of restitution claims

The remediation and resolution tasks in eastern Germany have been assigned to an incorporated mining administration entity for the region, Lausitzer- und Mitteldeutsche Bergbau-Verwaltungsgesellschaft (LMBV). After extensive exploratory talks and with advice from the then Rheinbraun Aktiengesellschaft, the mining company operating in the Rhineland lignite region, LMBV requested the competent land consolidation authorities to reorganise and secure ownership rights in simplified land consolidation procedures under section 86 of the Land Consolidation Act with the body of participants in each affected area.

Ownership of the land in the land consolidation procedure is investigated by the land consolidation authority. Valuation is done on the basis of soil value equivalence indices determined by the University of Giessen Institute for Soil Science, marked up or down for farming difficulties, increased fertiliser needs, disturbed soil profiles and suchlike. The participants' legitimate claims are satisfied where possible in land of equal value. Equalisation payments for over and under-allocations are determined in the land consolidation procedure. Fields in farmland are made accessible by new rural roads and tracks on the basis of the plan under section 41 of the Land Consolidation Act (plan covering the common and public facilities with accompanying landscape conservation plan). The implementation costs of the land consolidation procedure are borne by the applicants (Kammer; Tinz 1998).

Fig. 5.2-7: Recultivated opencast mine in the Rhineland lignite region
(source: Bezirksregierung Köln)

Fig. 5.2-8: Reorganisation of ownership in the eastern German lignite region



5.2.4 Conclusion

As has been demonstrated, the instruments provided by the Land Consolidation Act are also suitable for the purpose of settling land use claims in connection with opencast mining. They are designed to balance interests between the various public and private land use claims, extending into the domain of private property. The body of participants in the land consolidation and its board play an important role here in representing the common interests of the affected parties (Thomas 1998). This role is particularly challenging when, as in the opencast mining regions of the former GDR, it is no longer possible to draw upon a formal legal framework for reclamation and recultivation.

5.3 Voluntary land exchange in a statutory land readjustment procedure

Voluntary land exchange is a quick and simple procedure for the reorganisation of rural land. It is particularly well suited for dealing with fragmented ownership in a limited area where the parties to the exchange are in agreement.

A voluntary land exchange may be carried out under section 103a of the Land Consolidation Act:

- As a quick and simple method to reshape rural land parcels so as to improve the agrarian structure
- For reasons of nature conservation and landscape management.

The formal requirements are therefore aimed at ensuring that the land exchange can be carried out quickly and easily.

Since its introduction in 1976, voluntary land exchange has been used throughout Germany as an independent land readjustment procedure under the Land Consolidation Act. When it comes to settling ownership structures in eastern Germany, voluntary land exchange under section 54 (1) of the Agricultural Adjustment Act should also be considered. More on that in sections 5.4 and 5.5.

5.3.1 The provisions on voluntary land exchange under the Land Consolidation Act

Under the provisions of the Land Consolidation Act, a land exchange is agreed upon by the owners of the land to be exchanged (the parties to the exchange).

- The parties to the exchange have to apply to the land consolidation authority for a land exchange to be carried out
- In their application, they must credibly demonstrate that a land exchange is practicable
- The aim is to consolidate the land into generously sized units
- Entire plots should be exchanged where possible, and works involving roads or water resources should be avoided
- Consent must be obtained from all affected rights holders (including holders of other rights *in rem*)
- The land consolidation authority draws up a voluntary land exchange plan and discusses it with the parties to the exchange in a hearing
- The voluntary land exchange plan is read out to the parties to the exchange and handed to them for approval and signing
- If there is agreement on the voluntary land exchange plan, the land consolidation authority orders its implementation
- At the point in time specified in the implementation order, the new legal status takes the place of the prior legal status (*in rem* subrogation – see section 3.3.1.1)

- The land consolidation authority requests correction of the cadastral register to reflect the voluntary land exchange plan.

The parties' application for a voluntary land exchange to be carried out is accepted if the land exchange pursues the objectives stated in section 103a of the Land Consolidation Act and the parties to the exchange credibly demonstrate that the land exchange is practicable.

Contextual note

In the early days of rural land consolidation during the second half of the 19th century, the states of Hesse and Bavaria, seeking to put farms on a sounder economic footing, tried to encourage private voluntary land exchanges by exempting them from tax, provided that the competent authority (the 'special commission') endorsed the parties' land exchange as being expedient. Although these tax exemptions for private voluntary land exchanges remained in place for over a century, they never acquired any kind of significance as a means of improving agrarian structure. Even if parties acting on their own initiative reached agreement on a land exchange, they frequently found themselves caught up in lengthy negotiations with creditors on the extinguishment of land charges. Many exchanges became stuck at this stage and were not carried through to completion.

As part of the major revision of the Land Consolidation Act in 1976, voluntary land exchange was established in sections 103a to 103i as a land readjustment procedure guided by a public authority and governed by public law. The aim was to make the process faster and simpler. Putting voluntary land exchange on a public-law basis at last let it take on the role that lawmakers had intended for it from the outset – and the role that it always should have had under the German system of property law – namely to be the method of preference whenever necessary improvements in agrarian structure can be achieved by an agreement between parties willing to exchange land (see section 2.3.1). The same goes for nature conservation and landscape management measures. When these can be carried out on a voluntary basis, then voluntary land exchange takes priority over statutory land readjustment. The land consolidation authorities of the German states consequently carry out an average of around 500 to 600 land exchanges a year.

Fig. 5.3-1: Annual volume of voluntary land exchanges in Germany

	Voluntary land exchanges under section 103a of the Land Consolidation Act				
	Exchanges		Parties	Pieces of property and area exchanged*	
Year	Number	ha	Number	Number	ha
2017	551	9,408	1,759	4,277	8,277
2018	605	11,220	2,277	6,566	8,532

** In the reporting year, which may not be the same as the year in which each land exchange is applied for*

5.3.2 Capabilities and limits of voluntary land exchange

5.3.2.1 The purpose of the exchange must be covered by the Act

Voluntary land exchanges under the Land Consolidation Act (or the Agricultural Adjustment Act) may be carried out solely for the purposes specified in the Act. The envisaged land exchange must recognisably improve the working and production conditions of the farms cultivating the land to be exchanged. However, exchanges are by no means limited to farmland. A voluntary land exchange under the Land Consolidation Act can also be carried out in a village or other built-up area, and even in an area covered by a binding land-use plan. It can also be used as a 'boundary adjustment' procedure to bring built development into line with the local land-use plan or to rectify a situation that is not compliant with building law. Other reasons in inlying areas of a village include improving a farm entrance or enabling the expansion of farm operating buildings; there merely has to be an agrarian structure context. The parties to the exchange just have to agree.

5.3.2.2 Ownership must be settled

A voluntary land exchange requires a settled ownership situation. *Ex officio* appointment of a proxy (section 119 of the Land Consolidation Act) in cases of doubt is not an option. The necessary legal declarations must be made by the owners or their appointed representatives. If ownership and other legal relationships *in rem* cannot be conclusively determined, then no land exchange can be carried out. This is because declarations of consent to the land exchange also have to be obtained from any rights holders (such as mortgage creditors, usufructuaries and beneficiaries of easements). That is necessary for the protection of rights holders in the context of the general freedom of contract between parties to the exchange.

Problems always arise if the plots of land to be exchanged have a significant difference in value that has to be settled in money. If the outcome of the exchange is a lower-value plot and there is a lien on the property, the creditor will only say yes to the exchange if the lien is redeemed first, or at least if the agreed monetary compensation is used to pay back enough of the loan to take the smaller plot out of negative equity (that is, to leave it worth more than the remaining land charge). The recipient of the more valuable plot can also expect to pay real property transfer tax to the revenue authority on the value difference between the old and the new property. In light of all this, parties to an exchange are well advised to arrange the land exchange so as to minimise any differences in value.

5.3.2.3 Public-law permits have to be applied for

While works involving roads and water resources ought to be avoided in voluntary land exchanges for legal and cost reasons, this does not mean such works cannot be carried out in a particular case for a better outcome in the land exchange. However, this brings up the problem of permits under public law. As the voluntary land exchange procedure expressly precludes approval or acceptance of a land consolidation plan, which would settle all public law matters with formal and substantive 'concentrating effect' (see section 3.2.3.1), any permits that are needed have to be applied for separately (section 103e, sentence 3, in conjunction with section 103f (5) of the Land Consolidation Act). It is then necessary to check what statutory requirements under planning law, building law, nature conservation law, water resources law and so on are

affected by the necessary works. This is generally a time-consuming and costly process, and the official permits that are applied for tend to come with conditions and restrictions attached to them.

5.3.2.4 Incentives for voluntary land exchange

Various incentives for voluntary land exchange are provided for in law. These are based on the idea that the structural improvements that can be brought about by land exchange not only benefit the parties to the exchange, but are also of general benefit, if on a small scale.

Parties to the exchange in the statutory land readjustment procedure have the following incentives:

- The land exchange does not require notarisation
- In proportion to the value of the plot of land received in exchange, parties to the exchange are exempt from the real property transfer tax that they would be liable to pay in a private law land exchange
- Parties to an exchange under the Land Consolidation Act are exempt from all associated fees, such as for the necessary excerpts from the cadastral register and land register or for updating the public registers to reflect the outcome of the exchange (section 108 of the Land Consolidation Act)
- Under the act establishing the Joint Task for the Improvement of Agricultural Structures and Coastal Protection (GAKG 1988), voluntary land exchanges to improve agricultural structures and for nature conservation or landscape management purposes are funded in Germany on the basis of similar principles to land consolidation in general. Parties to the exchange thus receive, on application, government grants for preparing and implementing the land exchange, for carrying out the necessary surveying work and for any follow-up work such as connecting drains, fencing or modifying overhead irrigation systems. Remuneration for a facilitator is also eligible.

5.3.2.5 A voluntary land exchange can be prepared by an authorised facilitator

To relieve the burden on the land consolidation authority, an authorised facilitator (*Helfer*) can be brought in for preparation and implementation of a voluntary land exchange. This reduces the work of the land consolidation authority to issuing the necessary legal acts.

The facilitator has the following tasks:

- Providing the prospective parties to the exchange with full information and advice
- Obtaining the necessary application documents
- Drafting the voluntary land exchange plan
- Obtaining declarations of consent from affected rights holders
- Applying for official permits.

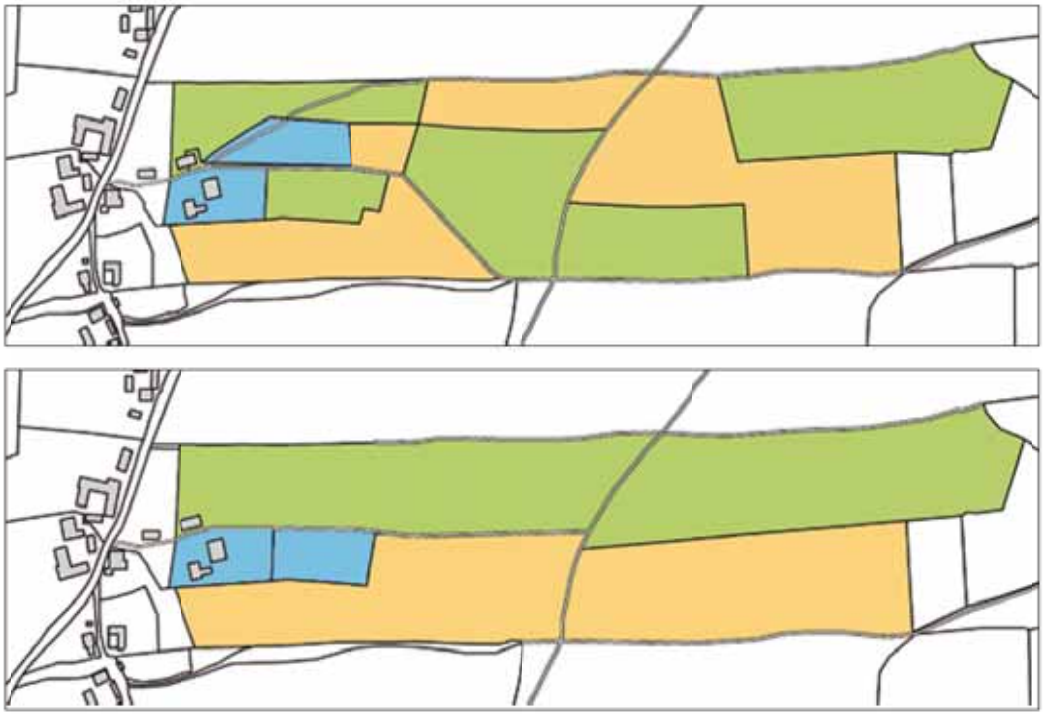
The facilitator may also submit the cost estimates needed for implementing the voluntary land exchange plan and the grant application for the land exchange.

Authorised facilitators include non-profit rural associations (*Siedlungs- und Landgesellschaften*), the farmers' association, publicly appointed surveyors and engineering consultancies with experience in agriculture. Facilitators are assigned by law with even greater powers in voluntary land exchanges in connection with determination and reorganisation of ownership in eastern Germany under the Agricultural Adjustment Act (section 53 (4) of the Agricultural Adjustment Act).

5.3.3 Voluntary land exchange for the improvement of working and production conditions

Voluntary land exchanges for this purpose require the interests of the prospective parties to the exchange to be well aligned. This requirement is generally considered to be met if the application for implementation of a voluntary land exchange is submitted jointly by both parties. In some cases, a meeting with a representative of the land consolidation authority is needed for advice and clarification.

Abb.5.3-2: Simple voluntary land exchange to improve farm structure
(source: www.landentwicklung.bayern.de)



Fragmented land ownership that had evolved over the centuries, with unfavourably shaped fields bisected by farm tracks, was rectified here to the benefit of all three parties to the exchange. Twelve scattered plots were combined into three contiguous areas suitable for cultivation.

Fig. 5.3-3: Voluntary land exchange with a complex ownership structure and extensive need for reorganisation (source: StMELF)

before after

In this example, the voluntary land exchange plan (right) provided for some stretches of farm road to be rerouted and others to be eliminated. One new farm road had to be created from scratch. Obtaining the necessary public permits involved a lengthy application and confirmation process with several different authorities. Adding in the many hours of negotiations needed to get the five parties involved to sign off on the voluntary land exchange plan (visible from the less-than-satisfactory consolidation of ownership), one might well ask if the evident need for a reorganisation of the farm structure would have been met more efficiently by an accelerated land consolidation procedure (section 91) or a simplified land consolidation procedure (section 86 of the Land Consolidation Act).

5.3.4 Voluntary land exchange for nature conservation and landscape management purposes

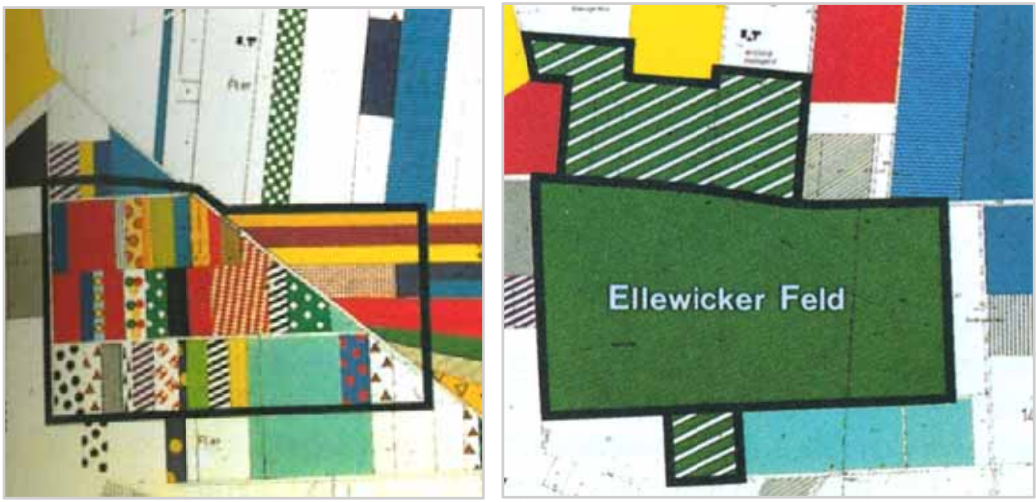
In the case of voluntary land exchanges for nature conservation and landscape management purposes, the impetus usually comes from the competent nature conservation authority seeking to protect an area for ecological or species conservation reasons while avoiding opposition from landowners, which rules out the imposition of prohibitions and requirements under statutory conservation orders. As to the landowners, the nature conservation authority's activities will have woken them up to the fact that they will not be able to continue using their land as they have so far – a typical land use conflict. Since the year 2000, conflicts of this kind have additionally arisen along watercourses as a result of national implementation of the EU Water Framework Directive (EU WFD 2000). As amicable resolution of the conflict is in the interest of both sides, voluntary land exchange is the appropriate land readjustment form. The solution is for the nature conservation authority and the affected farmers to agree on an exchange of land in the protected area for land outside it. To this end, the nature conservation authority needs to procure replacement land from the state or municipality, or with the aid

of the land consolidation authority from private landowners. Such land must of course be suitable for ongoing agricultural use and also be in an accessible location for the farmers concerned.

Fig. 5.3-4:
The Ellewicker Feld site of community importance (SCI) and special area of conservation (SAC)
(photo: Bezirksregierung Münster)

Fig. 5.3-5: Ellewicker Feld voluntary land exchange for nature conservation and landscape management purposes (section 103a (2) of the Land Consolidation Act)
(source: Bezirksregierung Münster)

before *after*



The Ellewicker Feld SCI and SAC is a breeding area for the Eurasian or common curlew (Numenius arquata), which is rare and critically endangered in western Germany. Its preferred habitat in the breeding season consists of large, open, easily surveyed raised bogs and wet grassland. Agricultural use of the damp meadows in Ellewicker Feld posed a threat to the curlew population. In a voluntary land exchange, the entire protected area was transferred to public ownership and the farmers surrendering the land were provided with suitable replacement land, in many cases by means of consolidation with existing land holdings.

5.3.5 Voluntary land exchange in connection with the determination and reorganisation of ownership

The details of voluntary land exchange in connection with the determination and reorganisation of ownership in eastern Germany are covered in sections 5.4 and 5.5.

5.3.6 Value added in voluntary land exchange

As can be seen from the wording of section 103a of the Land Consolidation Act, voluntary land exchange is intended for very specific procedural objectives. In land exchanges geared to improvements in agrarian structure, all other common-interest expectations placed in reorganisation necessarily have to fall by the wayside. The focus is on the individual interest of the parties to the exchange in a better arrangement of their parcels of land. Consequently, the added value is limited to the level of the individual farm, and it is also very limited in scale because only specific parcels of land are included in the reorganisation rather than entire farms.

The situation is different with regard to value added in voluntary land exchanges for nature conservation and landscape management purposes and in connection with the determination and reorganisation of ownership in eastern Germany. In these cases, the statutory provisions themselves place the common interest on at least an equal footing with landowners' individual interests, as a result of which the tangible valued added benefits are supplemented by intangible benefits of at least equal magnitude.

For this reason, in land exchanges directed solely at improvements in farm structure, the rationale for approving individual farmers' applications for implementation of a voluntary land exchange becomes questionable at a higher economic level if the need for a comprehensive land readjustment is evident in the region concerned. There is even a risk that reorganising individual plots of land could sow the seed of problems for a later more comprehensive reorganisation. For this contingency, section 103i of the Land Consolidation Act specifies that implementation of a voluntary land exchange does not preclude a later accelerated or standard land consolidation procedure. This should be brought to the attention of the parties to any voluntary land exchange carried out ahead of such a procedure, especially since the costs of implementing the voluntary land exchange plan are borne by the parties to the exchange (section 103g of the Land Consolidation Act).

5.3.7 Conclusion

Voluntary land exchange under the Land Consolidation Act is a quick and simple procedure for the reorganisation of rural land with the aim of reducing ownership fragmentation and resolving land use conflicts. It should always be the method of choice wherever it appears likely that the prospective parties to the exchange will reach agreement. Voluntary land exchange is not suited for the pursuit of public interest objectives. It therefore represents a necessary adjunct to the instruments of statutory land readjustment. Voluntary land exchange realises its greatest potential when the interests of all participants are aligned.

5.4 The determination and reorganisation of land ownership following the dissolution of collective farms after 1990 in eastern Germany

Collective farms in eastern Germany (*landwirtschaftliche Produktionsgenossenschaften*, or LPGs) were established under the *LPG-Gesetz* ('LPG Act'; LPGG 1952), which granted them, free of charge, a full, perpetual right to use the land assigned to them as they saw fit, without consulting the owners of the land. Decisions made on this basis related not only to tillage but also to all other measures considered necessary for rational farming. Land was thus consolidated into large blocks of fields without any regard to ownership or existing farm tracks. Drainage or overhead irrigation systems were added for land improvement. Farm tracks were removed and new tracks laid. Watercourses were straightened or rerouted. Large-scale agriculture completely altered the farming countryside.

Fig. 5.4-1: The legally still prevailing ownership structure from pre-socialist times (source: G. Thiede)

In many cases, the new network of farm roads, tracks and watercourses created under socialist agriculture criss-crosses private land, while farm tracks from earlier times have disappeared under the cultivated field blocks. Much of the present-day network of farm roads and tracks is also in a state unsuited to modern agricultural practices and machinery. Farmland in many places is accessible only by unpaved tracks that force heavy farm vehicles to take the long way round.

Fig. 5.4-2: Condition of tracks before land reorganisation (source: G. Thiede)

5.4.1 The formal and material legal framework for the determination and reorganisation of ownership

The above situation provided the rationale for the Agricultural Adjustment Act (*Landwirtschaftsanpassungsgesetz*; LwAnpG 1991):

- Private ownership of land and cultivation on the basis of private ownership is to be fully restored and guaranteed (section 1 of the Agricultural Adjustment Act)
- Landowners are to be allowed to leave a former LPG or a 'registered cooperative' formed voluntarily by farmers after 1990
- Farmers are to be enabled to form standalone farms
- The unity of independent ownership of buildings, facilities and plantings is to be restored (section 53 of the Agricultural Adjustment Act).

In addition, the Agricultural Adjustment Act specifies that members of a collective farm or registered cooperative each have the right to terminate their membership by giving notice (section 43 (1) and (3) of the Agricultural Adjustment Act). On termination, an outgoing member, except as otherwise stipulated, regains the full right of alienation and direct possession of the member's contributed farmstead and pieces of land (section 45 of the Agricultural Adjustment Act).

The objective of these measures is "to develop diversely structured agriculture and create the conditions for the re-establishment of efficient and competitive agricultural holdings so that the people working on them may participate in the growth of incomes and prosperity" (section 3 of the Agricultural Adjustment Act).

- For all other aspects of the determination and reorganisation of ownership, the provisions of the Land Consolidation Act apply analogously (section 63 (2) of the Agricultural Adjustment Act).

All that is needed to set such a land reorganisation procedure in motion is an application from one of the parties concerned (section 53 (1) of the Agricultural Adjustment Act). All remaining decisions, such on the suitable delineation of the reorganisation procedure, other procedure objectives, valuation principles, preparation of a plan covering the common and public facilities and so forth, are made on the material and formal basis of the Land Consolidation Act.

The Agricultural Adjustment Act thus establishes a comprehensive reorganisation mandate that virtually asks for the necessary land readjustment measures to be combined with contemporary land development measures (in the meaning of land development described in section 2.1.4).

5.4.2 The reorganisation task in the Dalwitz land reorganisation

Dalwitz is located about 30 km south of Rostock among the glacial deposition landscape of Mecklenburg and has a history going back to the 11th century. Originally the site of a Slavonic moated castle, the Dalwitz estate was run in the 19th century by one Heinrich Graf von Bassewitz (1829-1912), who modernised the manor house and farm buildings. Most of the resulting Tudor-style buildings are still there today and form the heart of Dalwitz village. The estate was transferred in the 1950s to a collective farm (an LPG) and a state-owned farm (*Volkseigenes Gut*, or VEG). Discontinuation of farming activities by the LPG and the VEG in the early 1990s and the ensuing population exodus left 15 of the approximately 60 houses and farm buildings in Dalwitz standing empty. The main obstacles to urgently needed investment in the farm, houses and buildings were fragmented ownership, land use not conforming to property boundaries and disputes among joint heirs (Staatliches Amt für Landwirtschaft und Umwelt mittleres Mecklenburg (SALUM)).

Fig. 5.4-3: Burg Bassewitz before and after restoration
(source: SALUM)

Fig. 5.4-4: Dalwitz with the moated Burg Bassewitz (source: SALUM)

The procedure was initiated at the request of landowners. The **objectives of the land reorganisation procedure** were as follows:

- Restoring ownership of land and buildings and reversing the separation of land and building ownership
- Reorganising and suitably shaping ownership to meet modern managerial requirements in the interests of the parties concerned as weighed against each other
- Settling legal relations, including for common and public facilities such as paths, roads and water bodies
- Resolving land use conflicts between farming and nature conservation in connection with an adjacent Habitats Directive site
- Provision of land for municipal infrastructure.

Fig. 5.4-5: Ownership structure before the land reorganisation (source: SALUM)

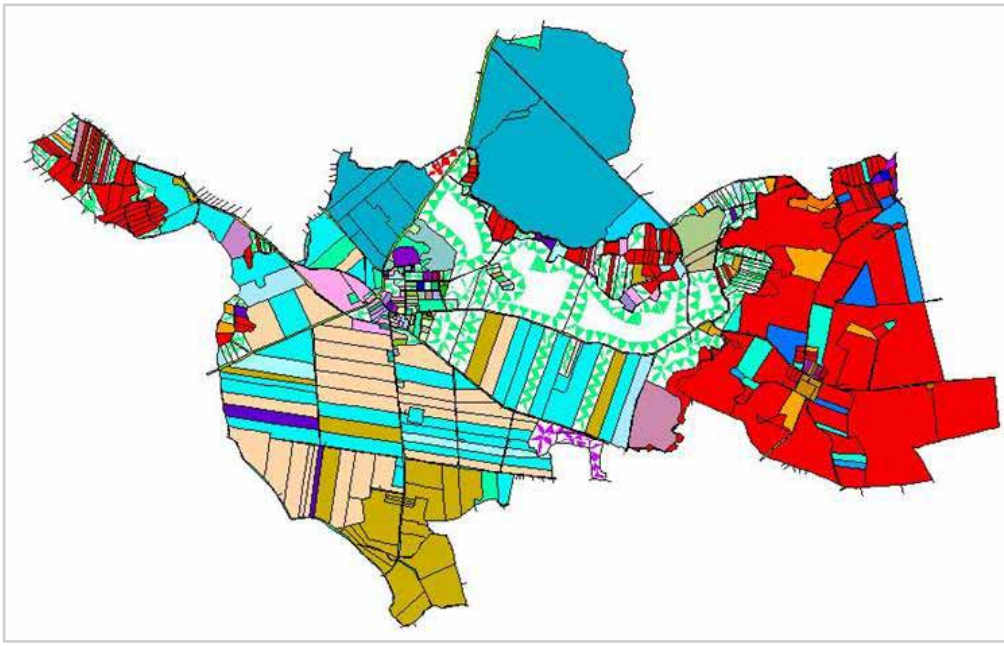
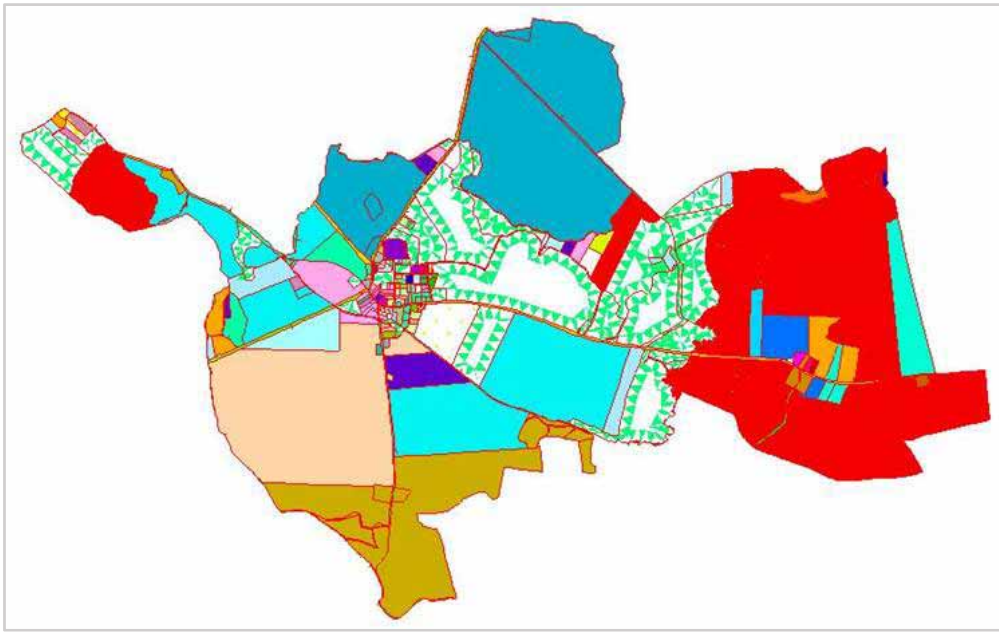


Fig. 5.4-6: Ownership structure after the land reorganisation (source: SALUM)



In close consultation with all parties concerned, **development potential** was identified in various forms and also realised in a number of initial successes:

- Re-establishment of agriculture with an organic farm
- Reopening of the primary school, which had closed in 1998
- Child daycare facility saved from closure
- Jobs created by farm diversification
- Realisation of the region's tourist potential
- Utilisation of bioenergy and expansion of the district heat system
- Support for local clubs and societies.

Besides reorganisation of the farmland, various other measures were carried out and funded:

- Investment to preserve the historic building fabric with funding for private village renewal
- Funding to convert vacant buildings for private and tourist use
- Investment to improve road and path infrastructure
- Investment to promote farm diversification
- Expansion of a district heat network
- Plantings to enhance the scenic beauty of the village
- Formulation of a sustainable tourism development plan for the 'Mecklenburger ParkLand' region.

Fig. 5.4-7: Farm shop before and after restoration (photo: SALUM)

After 30 years of reorganisation activity in eastern Germany, the number of reunification-induced land readjustment procedures is naturally now falling, but there is still a considerable need for land consolidation procedures for land development (see fig. 2.4-2).

Fig. 5.4-8: Volume of land reorganisation procedures under section 56 of the Agricultural Adjustment Act in conjunction with the Land Consolidation Act
(source: BMEL 2002 and 2018)

Year	Procedures under the Agricultural Adjustment Act	
	Number	ha
2002	568	486 501
2018	188	129 849

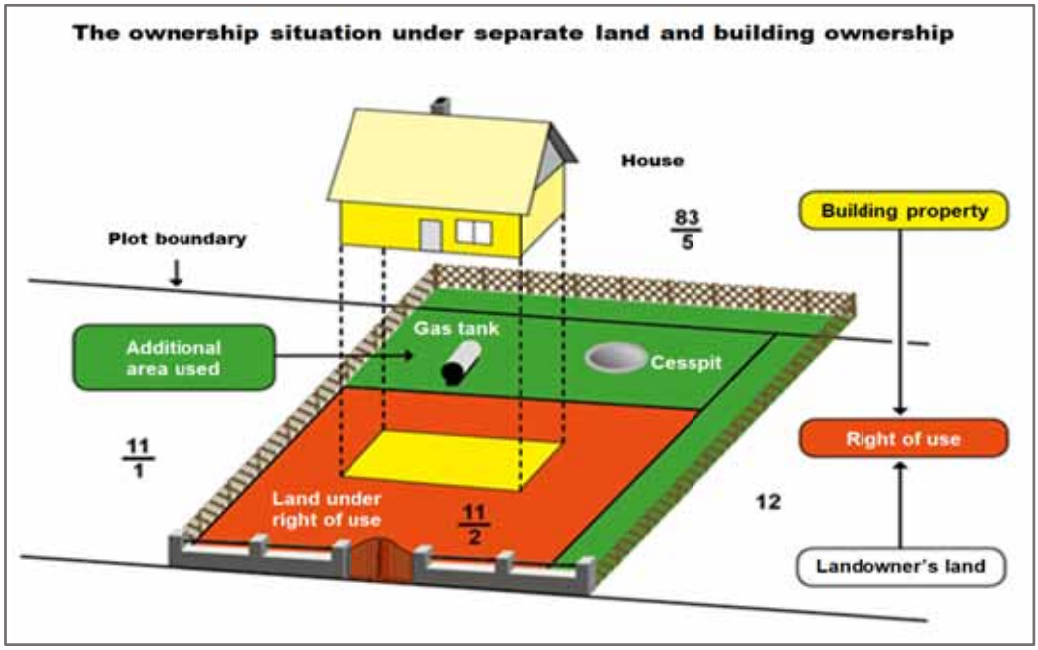
5.4.3 Conclusion

At first glance based on their wording, sections 53 to 63 of the Agricultural Adjustment Act on land reorganisation in eastern Germany appear to be solely focused on resolving problems in farming caused by reunification. Yet a closer look reveals potential for comprehensive rural land development. The challenge is for this potential to be recognised by local representatives – mayors, municipal councillors, county councillors and the land consolidation authority – and communicated to the parties concerned. If that happens, then development processes can be set in motion that go far beyond adjustments in agriculture.

5.5 Reversing the separation of land and building ownership after 1990 in eastern Germany

Beginning in the early 1950s, the establishment of ‘collective’ rights of use under section 18 of the LPG Act (*LPG-Gesetz* – see previous section) created independent ownership of buildings separate from ownership of the land. Whereas in the case of houses, such building ownership was generally recorded in a separate building register folio in the land register, this was not the case for farm buildings, outbuildings and other built structures.

Fig. 5.5-1: Situation of the building in relation to the right-of-use parcel
(source: after Thöne 1993)



The landowner's land is green.
The land under the granted right of use is red.
The land occupied by the separately owned building is yellow.

5.5.1 The formal and material legal framework for reversing the separation of land and building ownership

The formal and material legal framework is set out in the Agricultural Adjustment Act (*Landwirtschaftsanpassungsgesetz*):

- Ownership of the pieces of land on which, on the basis of a right of use governed by law, buildings and facilities have been erected that are independently owned by an LPG or third party, is to be reorganised in accordance with the provisions of Division 8 of the Agricultural Adjustment Act at the request of the owner of the piece of land or building or facilities. Previous rights remain in place until the procedure is completed (section 64 of the Agricultural Adjustment Act).
- The LPG must return or transfer any farm buildings it uses to an outgoing member. If this is not possible for objective reasons or if it is untenable for the LPG or the outgoing member, another building owned by the LPG is to be transferred in replacement or appropriate compensation paid (section 47 of the Agricultural Adjustment Act).
- If the LPG intends to lease or sell agricultural land in its ownership, it must first offer that land to members or former members who intend to establish or have established an agricultural holding of their own in the area of operation of the LPG (section 48 of the Agricultural Adjustment Act).

5.5.2 The administrative procedure for reversing the separation of land and building ownership

The administrative procedure required for reversing the separation of ownership is initiated at the request of the landowner(s) or building owner(s). The procedural steps to be worked through by the land consolidation authority are based on the procedures required in any land readjustment procedure and also in land consolidation (see chapter 3):

a. Determination of the objective
b. Investigation to identify the parties concerned and the basis of their claims
c. Identification of the area actually used relative to the area under the right of use granted on the plot of land
d. Determination of the land value and calculation of compensation entitlements
e. Negotiation of a mutually agreed solution, if possible, with the parties concerned
f. Procurement of replacement land (if necessary) for landowners surrendering land
g. (In the absence of unanimous agreement) statutory decision by the land consolidation authority.

Once the land consolidation authority has received the application and verified that it is admissible, it determines the objective and course of the administrative procedure in an initial meeting with the parties concerned, the building owners and the landowners. If the necessary information on building and plot ownership is not recorded beyond doubt in the land register, the parties are asked to provide evidence. This tends to be necessary in particular if a right of use has been transferred by lease or is asserted to have been transferred by an LPG manager “acting with the consent of state authorities” (see section 1.3). The same applies if the land or building has been inherited in the meantime.

As the cadastral record does not match the situation on the ground because of failure to carry out field surveys of buildings, the land consolidation authority surveys the status quo – buildings, facilities, other elements deemed essential parts of the land, topography and positions relative to plot boundaries – and uses this to compile a survey map. From this, it is possible to see which landowners (plots owned) and building owners (parcels used) are affected. The survey map serves as the basis for negotiations with the affected landowners and building owners. It is also used to define the procedure area needed to resolve the matter.

In valuation of the plots, the quality level assumed for determining plot values is that of unbuilt land ripe for development (see sections 4.3.3 and 4.3.4). The cost of connecting infrastructure is deducted from the market value. This is because such infrastructure was not added or paid for by landowners, but by building owners in a ‘voluntary’ socialist work programme.

The legal entitlements of building and landowners follow from section 64 of the Agricultural Adjustment Act.

- Building owners are entitled to allocation of a plot of land conforming to the granted right of use.
- Landowners are legally entitled to receive land of equal value for the area to be surrendered.

As landowners will not have contributed towards the conversion of their land into land ripe for development, the landowner's compensation entitlement is determined as half of the value of a plot of land ripe for development less the costs of connecting infrastructure. The other half constitutes the value of the building owner's right of use. In other words, the right of use reduces the value of the plot by 50%. This fifty-fifty approach (*Teilungsmodell*) was incorporated in 1994 into the Property Law Adjustment Act (*Sachenrechtsänderungsgesetz*; SachenRÄndG 1994).

If the joint hearing with all parties concerned (section 59 (2) of the Agricultural Adjustment Act) produces **unanimous agreement** on an exchange of plots of land that are of equal value and are also acceptable in terms of location and shape to the landowner(s) to be compensated, the land consolidation authority sets out the outcome of a 'voluntary land exchange' under section 103a of the Land Consolidation Act in a voluntary land exchange plan. The voluntary land exchange plan consists of records and maps of the old and new plots together with a text part containing the reasoning for the arrangements made. It is presented to and then signed by the parties concerned in a meeting. Further details on voluntary land exchanges are provided in section 5.3.

Once the voluntary land exchange plan has been made final and incontestable, the land consolidation authority orders its implementation. At the point in time specified in the implementation order, the new legal status takes the place of the prior legal status. The compensatory land allocations are subsequently surveyed on site. Following that, the land consolidation authority requests the registries to correct the land register and the cadastral register.

In the **absence of unanimous agreement** on reversing the separation of land and building ownership between the parties concerned, the land consolidation authority initiates and carries out a land readjustment procedure under section 56 of the Agricultural Adjustment Act.

The land consolidation authority carries out the necessary preliminary work and investigations as for a voluntary land exchange, determines the arrangements that, based on the outcome of the hearing with the parties concerned, best balance their conflicting interests and concerns, and incorporates those arrangements into the land readjustment plan. The land readjustment plan consists of records and maps of the old and new plots together with a text part containing the reasoning for the determinations made. The land readjustment plan is announced to the parties involved.

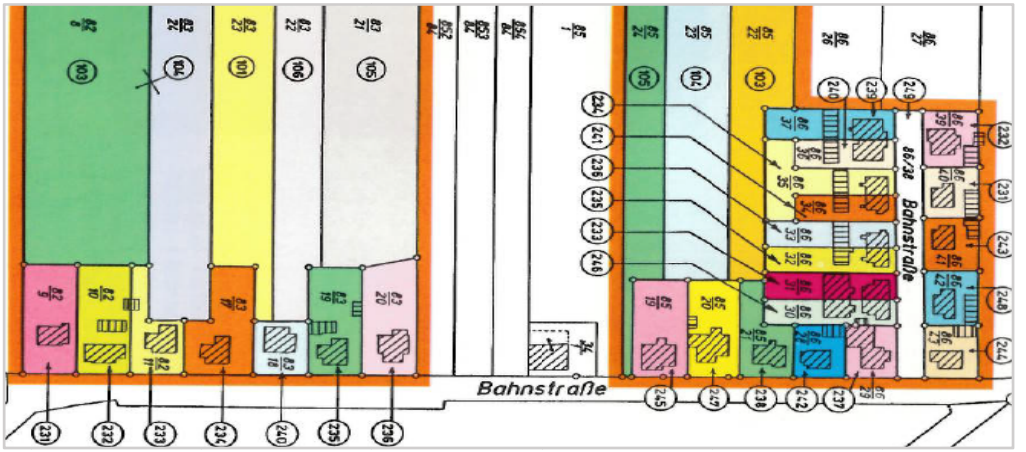
If no objections are lodged against the land readjustment plan and it therefore becomes final and incontestable, the land consolidation authority issues the implementation order. At the point in time specified in the implementation order, the new legal status takes the place of the prior legal status. The cadastral and land registers are then corrected.

If all efforts to reach a mutually acceptable solution to the land readjustment problem prove fruitless, then the land readjustment procedure under the Agricultural Adjustment Act has to be discontinued. The only remaining option for the parties is then to proceed under the Property Law Adjustment Act (SachenRÄndG 1994):

The building owners can then either require the establishment of a heritable building right (similar to a leasehold, see section 2.2.3) or purchase the land, although the latter is only possible with the landowner's consent in the form of a waiver of compensation in land. According to a decision of the Federal Administrative Court (*Bundesverwaltungsgericht*), monetary compensation cannot be imposed (decision of 17 December 1998; case citation BVerwG 11 C 5.97).

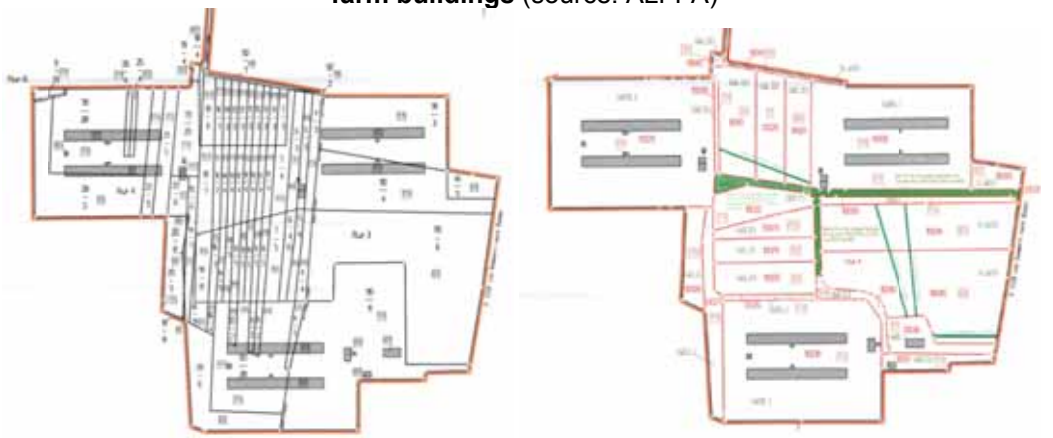
In proceedings under the Property Law Adjustment Act, the landowner is again only entitled to one-off payment of a purchase price of half of the land value or periodic payment of half of the ground rent.

Fig. 5.5-2: Reversal of the separation of land and building ownership in the case of owner-occupied houses (source: Amt für Landwirtschaft, Flurneuordnung und Forsten Altmark/ Sachsen-Anhalt (ALFFA))



Left: the situation resulting from the socialist period; right: the outcome of reversing the separation at the end of the procedure under section 64 of the Agricultural Adjustment Act.

Fig. 5.5-3: Reversal of the separation of land and building ownership in the case of farm buildings (source: ALFFA)



Left: the situation resulting under management by an LPG during the socialist period; right: the outcome of reversing the separation at the end of the procedure under section 64 of the Agricultural Adjustment Act. The need for land readjustment not only relates to the farm operations developed under the LPGs. Land use situations have also developed on farms contributed by farmers in the course of collectivisation that call for a reorganisation of ownership and tenure and the provision of functional access roads.

Fig. 5.5-4: Reorganisation of ownership and tenure in old farms and reversal of the separation of land and building ownership (source: ALFFA)

By reparcelling in line with functional needs, it was possible to satisfy the legal entitlements under section 47 or 48 of the Agricultural Adjustment Act described in section 5.5.1.

It is in the nature of the matter that most work to reverse the separation of land and building ownership took place between 1991 and around 2010. In the State of Saxony-Anhalt during that period, for example, a total of 2,954 procedures under section 64 of the Agricultural Adjustment Act were carried out involving 18,368 ha of land and 16,600 participants; in the process, land and building ownership were recombined for 4,738 owner-occupied houses and 10,395 farm buildings. Today, this work of the land consolidation authorities in eastern Germany is gradually coming to an end, as can be seen from the table below. The remaining applications that still come in are dealt with wherever possible in current land consolidation procedures.

Fig. 5.5-5: Volume of procedures to reverse the separation of land and building property in 2019 (source: BMEL 2018)

Procedures still ongoing	Num-ber	ha	Completed in 2018				
			Number of proce-dures	ha	Number of buildings	Plots exchanged	Number of exchange parties
Procedures under section 64 of the Agricultural Adjustment Act (without land readjustment)	75	249	7	82	37	64	
Procedures under section 64 in conjunction with section 54 of the Agricultural Adjustment Act (voluntary land exchange)	107	2 060	30	179		177	105
Procedures under section 64 in conjunction with section 56 of the Agricultural Adjustment Act (land readjustment)	362	102 735					

Applications for reversal of the separation of land and building ownership are not dealt with under section 64 of the Agricultural Adjustment Act in the case of dachas or garages. These are settled under the Law of Obligations Adjustment Act (*Schuldrechtsänderungsgesetz*; SchuldRÄndG 1994). The right-of-use agreements are converted into rentals or leases. The Law of Obligations Adjustment Act protected holders of rental or lease rights from termination by notice until 2015.

5.6 Land consolidation in organic farming

Farmers who operate according to organic farming criteria have become a significant target group for general land consolidation activity. For recognition as an organic farm, farms have to meet various requirements in cultivation of their own and leased land. These mostly relate to farming methods and how they are embedded into the field layout of conventionally managed land. If an organic farm is involved in a land consolidation procedure, this fact has to be taken into account when reorganising land tenure.

5.6.1 Status of and conditions for organic farming in Germany

The term ‘organic farming’ refers to the cultivation of agricultural products using production methods that are as environment-friendly as possible. Organic farming largely does without the use of synthetic mineral fertilisers and pesticides, avoids genetic engineering and places emphasis on closed nutrient cycles.

Recognised organic farms in Germany can be divided into two groups. The first comprises farms that operate in accordance with Regulation (EC) No 834/2007 in conjunction with Regulation (EC) No 889/2008 and are also referred to as EU organic farms. The second group comprises farms that have additionally committed themselves to compliance with specific requirements of organic farming associations. Recognised organic farming associations in Germany include Bioland, Demeter, Ecoland, Ecovin and Naturland. A farm can only become a member of one of the recognised associations if it converts the entire farm to organic farming. In the case of EU organic farms, it is possible for only specific agricultural activities to be converted to organic farming (Schumann; Fehres et al. 2015).

For recognition as an organic farm, the requirements must be met under Regulation (EC) 834/2007 in conjunction with Regulation (EC) 889/2008 (see, for example, MKULNV (2013) for further details). Before crop products may be labelled as organic, however, a conversion period has to be completed during which the rules for organic farming are observed on the crop land. This serves to deplete the soil of previously used fertilisers and pesticides. The period is 24 months for annual or perennial forage and 36 months for other perennial crops. For the duration of the conversion period, products grown on the land in question may not yet be labelled as being organically produced. In the course of the conversion period, the crop species and varieties grown in conventional agriculture are exchanged for more resistant varieties with greater weed tolerance.

Fig. 5.6-1: Growth of organic farming in Germany by numbers of farms and area farmed since 1996 (source: BMEL)

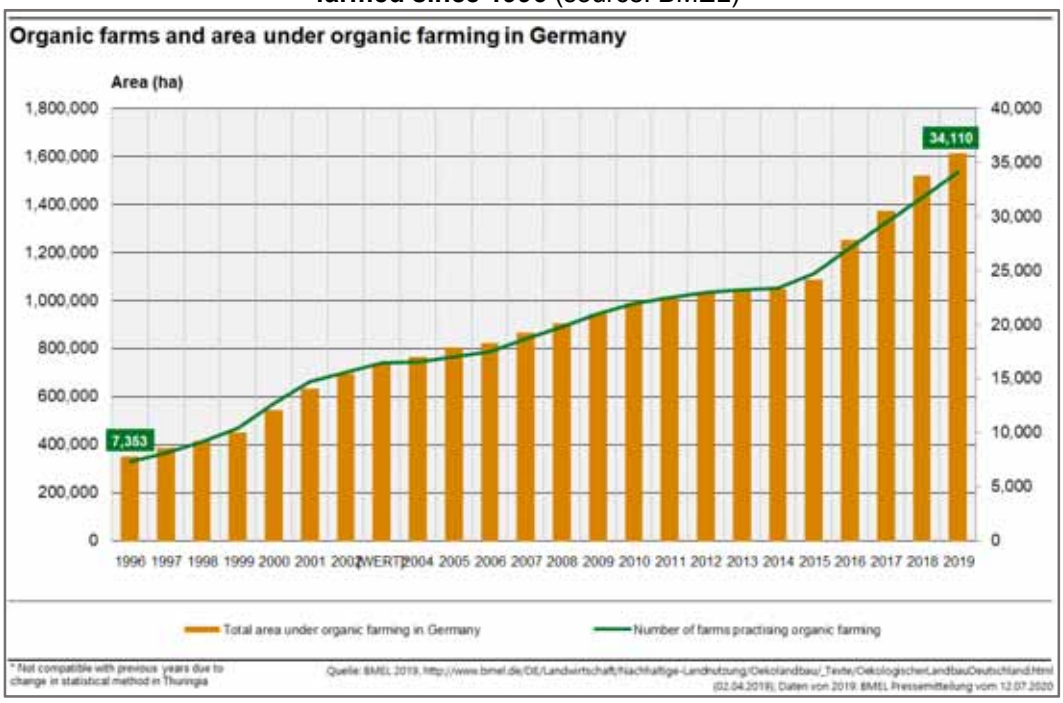


Fig. 5.6-2: Growth of organic farming relative to all farming (source: BMEL)

Year	Area (ha)	Share of total farmland (%)	Number of organic farms	Share of all farms (%)
1996	354 171	2,1	7 353	1,3
2004	767 891	4,5	16 603	4,1
2013	1 060 669	6,4	23 271	8,2
2019	1 613 814	7,3	34 110	12,9

5.6.2 Meeting the needs of organic farming in land consolidation

First of all, organic farms have the same requirements and expectations of land consolidation as conventional farms: improved production and working conditions combined with improvements in the size and shape of fields, field access and provision with other rural infrastructure. Other, specific requirements may be encountered with particular farms in relation to specialised crops and their marketing. This includes the length of fields for such crops along with their location and road access. If a farm sells on site, it needs to be connected to the public road network, with parking at the farm shop.

A high priority for organic farms with regard to their compensatory land allocations is to try and avoid being allocated perimeter land adjoining conventionally farmed areas. This is the most effective way to minimise the risk of pesticide and fertiliser spillover from conventional farming. Accordingly, organic farmers often seek a compensatory land allocation in contiguous blocks of land in which no conventional farming is practised. If that is not possible, it is necessary to provide for unfarmed perimeter strips or other linear landscape features between conventional and organic farms. That should not be a problem when planning the reorganisation, as organic farms are generally in favour of preserving and promoting the development of a diverse farming landscape. Edge strips, hedgerows, nesting opportunities for birds and other means of encouraging beneficial organisms for crop protection are all part of organic farms' crop protection strategies (Richter 2015).

Finally, management requirements have to be taken into account with regard to crop rotation, selection of varieties, fertiliser application and crop protection, as these can also affect planning decisions in the land consolidation procedure with regard to the following points:

- Initiation and delimitation of the land consolidation procedure
- Performance of the land valuation
- Compensatory land allocation in preparation of the land consolidation plan
- Transfer of possession to the new plots.

5.6.2.1 Delimiting the land consolidation area and directing that a land consolidation be carried out (section 4 of the Land Consolidation Act)

If an envisaged land consolidation procedure involves one or more organic farms, this raises the question right at the very beginning of the procedure as to whether it will be possible to exchange land between farms in the first place, and hence also as to the suitable delimitation of the land consolidation area. This is because the interchangeability of pieces of land is crucial in determining how far a reorganisation of ownership can achieve its objectives. Answering this requires knowledge of where the organic farms are, their business orientation and the precise location of their organically farmed fields. A thought exercise has to be carried out, using scenarios if appropriate, as to how far the envisaged objectives of the land consolidation can be achieved taking into account the needs of organic farms, and whether a land consolidation will still be tenable in terms of the cost-benefit ratio. Such preliminary deliberations should keep all options open:

- Changing the delimitation of the land consolidation area
- Excluding specific plots of land from the land consolidation procedure
- Negotiations with individual farmers to rule out specific consolidation options
- As the final option, deciding against a land consolidation.

In conducting this preliminary work, the land consolidation authority should involve the board of the body of participants, the municipal community, the organic farmers and also organic farming consultants or organic farming association inspectors. This is to ensure that the land consolidation authority indeed does cover all bases in reaching its ultimate decision.

5.6.2.2 Land valuation (section 28 of the Land Consolidation Act)

To date, recognised organically farmed land has always been valued for the purposes of land consolidation in the same way as conventionally farmed land, meaning that organic farming is classified together with ordinary land use. It is therefore assessed on the basis of the lasting gains that it yields to the owner if farmed in an ordinary way. These follow from natural soil fertility, meaning physical and biochemical characteristics of the soil, and not the yield resulting from the type of management or other economic factors (see section 4.3). Where necessary, economic factors affecting yield are considered not in valuation but in the compensatory land allocation. This is done, for example, by ensuring for organic farms in the land consolidation procedure that the net length of their shared boundaries with conventionally farmed land is not greater in the compensatory land allocation than it was for the original plots.

5.6.2.3 Preparation of the plan covering the common and public facilities with accompanying landscape conservation plan (section 41 of the Land Consolidation Act)

The considerations taken into account ahead of the land consolidation decision continue to apply when preparing the plan covering the common and public facilities. However, they now progress to a greater level of detail:

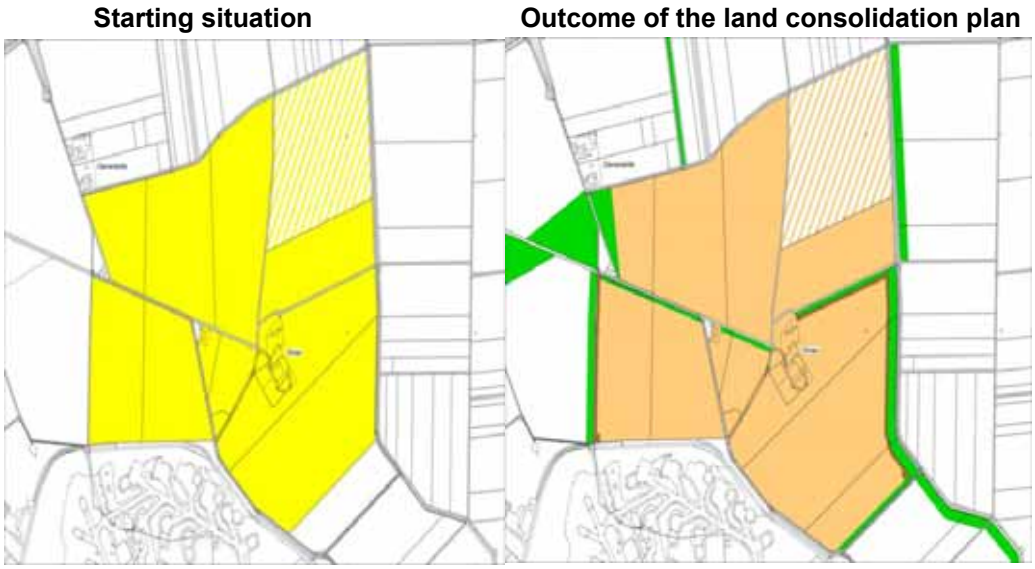
- Whether and how to provide road and track access to farmland
- Identification of functional needs for existing and new roads and tracks
- Road and track construction specifications to meet the identified functional needs.

When routing roads, it is important to ensure that affected areas of organically farmed land retain their organic status, because loss of that status can have major cost implications, as shown in section 5.6.1. Other the other hand, skilful routing of roads and tracks with landscaped margins can reduce conflicts between conventionally and organically farmed land. Roads and tracks cutting across plots of organically farmed land should be avoided at all events if the plot boundaries remain unchanged and the plots do not change hands in the reorganisation of the farmland. This all makes it necessary to think ahead to the allocation process when shaping the new road and track network. The state of planning therefore already needs to be communicated to the affected parties at this early phase of the land consolidation procedure and where necessary secured in written agreements. This also applies if an organic farm creates the need for a more elaborate road and track network as regards density and construction specifications than

would be the case for conventional farming. For this purpose, the Land Consolidation Act permits the benefiting participant's land contribution to be based on a contribution ratio that differs from that applied in the remainder of the land consolidation area (section 47 (2) of the Land Consolidation Act). The scale for the land consolidation contribution to be paid by participants to cover the costs of implementing the land consolidation plan can be set in the same way (section 19 (2) of the Land Consolidation Act). An example is where an organic farm needs a wider and better-quality access road to enable safe two-way car access because of on-site sale from the participant's farm shop.

The figure below shows the reorganisation outcome for an organic farm in the Bergerbusch land consolidation (owned land is shaded in yellow and leased land hatched in yellow). This example illustrates how, by imaginative adjustment of the plan covering the common and public facilities and by creative allocation of necessary ecological offsetting measures (green strips and green area west of the farm), an optimum economic outcome can be provided for the organic farm, for the third-party planning entity and for nature conservation and the landscape with completion of an ecological network.

Fig. 5.6-3: Economically optimum reorganisation of land ownership in the area of an organic farm (source: Bezirksregierung Köln)



Use of the organic farm's land for the necessary ecological offsetting measures was largely avoided. Linear hedgerows were supplemented with vegetation strips 10 m to 30 m wide, thus completing an existing but previously rudimentary ecological network and better screening the farm from neighbouring conventionally farmed land. The outcome was the kind of compartmentalisation sought for organic farming reasons without interfering with rational cultivation of the land. It was also possible to preserve lines of sight between farmyard and fields as the organic farm requested, thus enabling a close watch to be kept over the organically grown crops (Schumann; Fehres et al. 2015).

5.6.2.4 Preparation of the land consolidation plan (section 58 of the Land Consolidation Act)

When planning compensatory land allocations for an organic farm, there is often a goal conflict between the individual farm's interest in comprehensive land readjustment (ideally resulting in land around the farmstead) and compensation entitlements for yield losses incurred when such a comprehensive consolidation leads to the organic farm being allocated other participants' plots of land that have previously been conventionally farmed. This goal conflict already needs to be brought up at the preferences hearing (section 57 of the Land Consolidation Act). Any solution found and acknowledged as acceptable in the preferences hearing should be set down in a written plan agreement to avoid later changes of opinion by the participant that could require extensive changes to the land consolidation plan. If the land in question is leased, the landowner and tenant must be made parties to the plan agreement. This is because the cost of compensation for temporary disadvantages under section 51 of the Land Consolidation Act paid due to the conversion period is met by all participants and the land consolidation authority therefore has to keep that cost to a minimum. This can be achieved by judiciously organising a phased transfer of possession to the new plots.

5.6.2.5 Transfer of possession to the new plots (section 65 of the Land Consolidation Act)

Transfer of possession, provisional or otherwise, is complex enough in land consolidation involving conventionally farmed land. It needs to be coordinated among the parties in such a way that the economic interests of everyone affected by the transfer of possession are taken into account (see section 3.3.1.2). Transfer of possession presents a particular challenge if a land consolidation procedure also includes organic farms. This because it then generally involves, at least to an extent, consolidating farmland that already has organic status with land that has so far been farmed conventionally. If consolidation takes place within a single field block, the previously recognised organically farmed area loses its organic status. The entire new field block, including the area previously recognised as organic, then has to complete the conversion period. If the geometry of the field block allows, the newly added area should therefore go through the conversion period as a separate piece of land before combining the two areas at the end of that period. The same problem presents itself when an old and now superfluous farm track between two recognised organically farmed areas is eliminated and recultivated in order, for example, to obtain a longer or better-shaped block. This also causes the areas to lose their organic status when they are combined with the cadastral parcel previously assigned to the track. Here, too, it is advisable to have the (recultivated) area of the track go through the conversion period first and only then to combine it with the neighbouring areas.

If an organic farm receives previously conventionally farmed areas of land in its compensatory land allocation, it incurs yield losses for two to three years that place it at a disadvantage relative to the other, conventional farms. During this time, the allocation

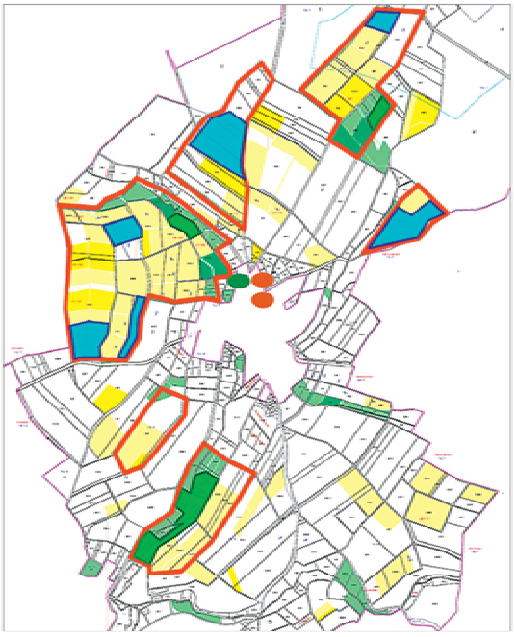
does not yet constitute compensation in land of equal value within the meaning of sections 44 *et seq.* of the Land Consolidation Act; it only meets this criterion once all previously conventionally farmed parts of the allocation have completed the conversion period. This constitutes a 'temporary disadvantage' to an individual participant in excess of similar disadvantages incurred by other participants, for which section 51 (1) of the Land Consolidation Act provides for equalisation payments.

The example below from the State of Rhineland-Palatinate shows a phased transfer of possession for a land consolidation participant that is calculated to minimise the conversion problems for an organic farm and hence the compensation entitlement for any yield losses.

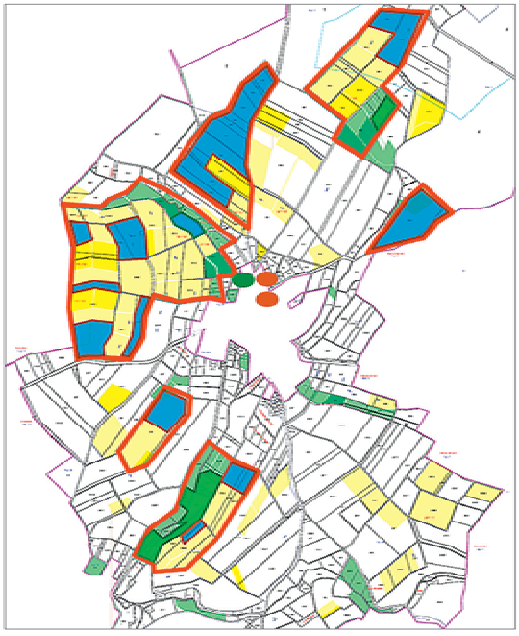
Fig. 5.6-4: Phased transfer of possession to minimise conversion problems for an organic farm (source: DLR Westerwald-Osteifel)

Situation at the start of the land consolidation procedure
The above image shows the land belonging to the organic farm. Arable land is shown in yellow, grassland in green; the darker shade indicates freehold, the lighter shade leasehold land.

Second phase of the reorganisation plan
Field blocks shown in orange have been designated as future farmland of the organic farm in consultation with the farm manager and the potentially affected landowners.



Third phase of the reorganisation plan
The areas shown in blue began going through the conversion period three years prior to the planned transfer of possession in the land consolidation procedure.



Fourth phase of the reorganisation plan
The areas shown in blue began going through the conversion period two years prior to the planned transfer of possession in the land consolidation procedure. About half of the previously conventionally farmed plots have therefore already completed the conversion period by the time of the main transfer of possession in the land consolidation procedure. After one more year, all additional previously conventionally farmed land can be farmed organically.

Phased transfer of possession of the new plots begins two or three years before the main transfer of possession. The approach is based on the principle that owners of the conventionally farmed land involved in the transfer are to be provided with replacement land until the main transfer of possession. This can be land that the organic farm (an EU organic farm) has previously farmed only conventionally. Alternatively, it can be land that the body of participants has been able to acquire from individual participants who have waived compensation in land (section 52 of the Land Consolidation Act). In this way, conventionally farmed land can go through the conversion period before the main transfer of possession, as a result of which the organic farm's compensatory land allocation then constitutes compensation in land of equal value.

It is an approach that has to be organised on a voluntary basis and demands a great degree of goodwill from all involved.

The complexity of the many conceivable permutations here requires early coordination of the transfer of possession between the land consolidation authority and the board of the body of participants with the involvement of the farmers concerned and an organic farming consultant from the farmers' association or relevant organic farming association.

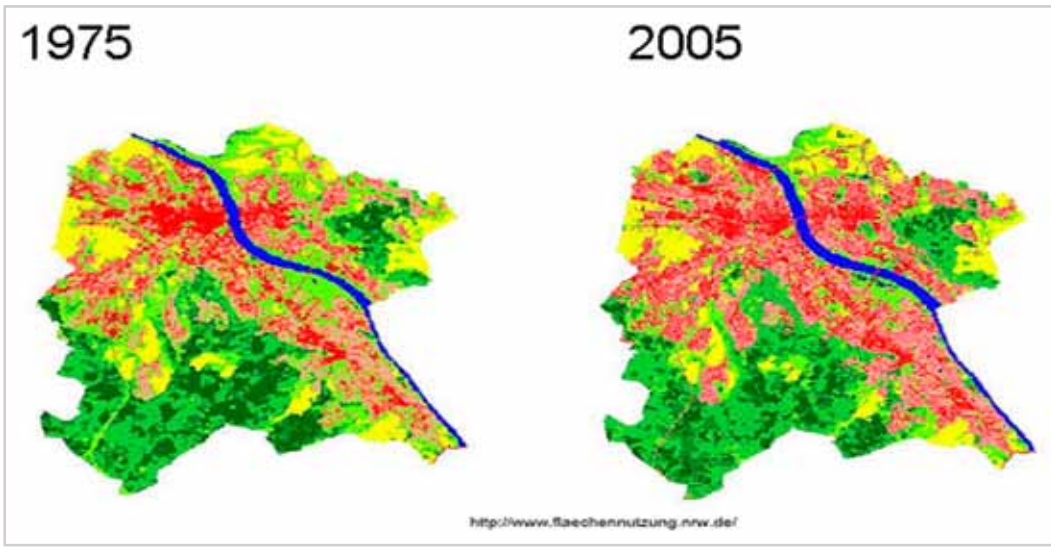
5.6.3 Conclusion

Organic farms have the same interests as conventional farms in improved production and working conditions as a result of a reorganisation of land tenure. If organic farms are involved in a land consolidation procedure, they are treated according to the same legal provisions and technical rules. There are only specific differences to consider at individual stages of the procedure due to organic farming requirements for the management of farmland with recognised organic status. These mainly relate to the necessary conversion process when an organic farm receives previously conventionally farmed land in its compensatory land allocation. The more land an organic farm brings into a land consolidation, the greater the care with which the conversion process has to be organised, but the greater are the benefits from comprehensive realignment of the farmland. This can generally be achieved by entering into contact with the farms to be involved in the conversion process from an early stage and by involving organic farming consultants (Platen 2015).

5.7 Land readjustment and land management in urban areas and conurbations

As described in chapter 2.1.1, it is difficult in a highly urbanised country like Germany to strike a balance in land use among the various interests in spatial development in the interplay between municipal planning autonomy, state-level territorial planning and public sectoral planning. The difficulties already begin with arriving at a scientifically rigorous classification of rural and urban regions. In particular, rural regions are less and less able to be defined with reference to agriculture, with which they were once virtually synonymous. Nevertheless, most people have a clear idea about what distinguishes urban and rural regions (Kötter; Fehres et al. 2020).

Fig. 5.7-1: Urban sprawl in the Cologne-Bonn conurbation (source: MUNLV)

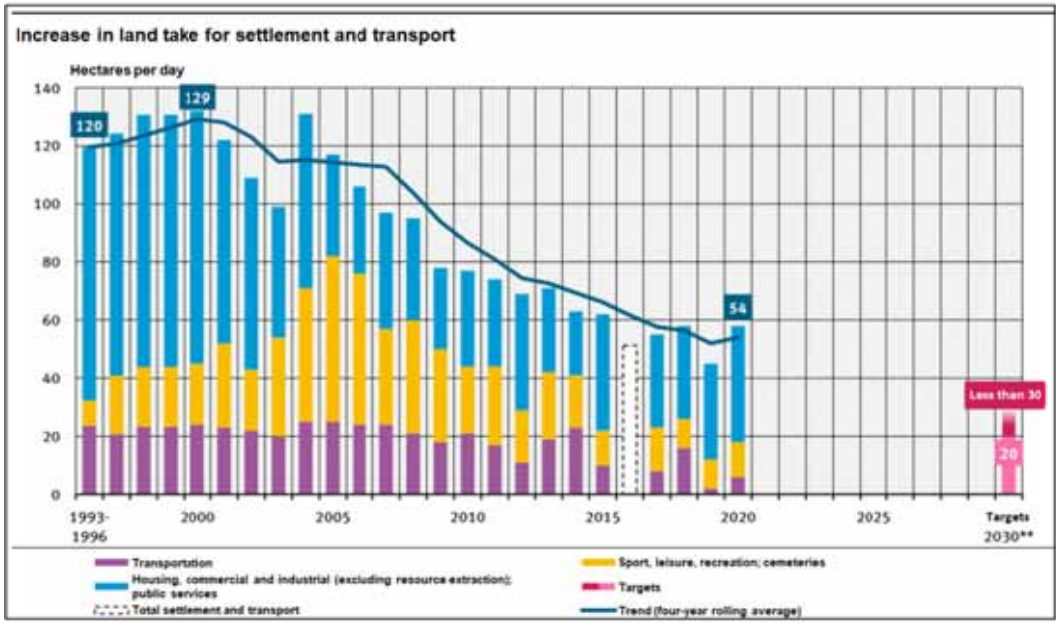


The balance referred to needs to be found in any case, because spatial development is not going to be held up by any lack of a rigorous scientific classification, and it triggers planning activities by municipalities and sectoral authorities. While the principles to be observed in those activities are laid down in law, they still have to be applied appropriately in each particular case. At the implementation stage, this includes deciding on what land readjustment instrument to apply.

5.7.1 Land readjustment as a challenge in unspecified spatial categories

Rural regions on the outskirts of prospering urban regions are subject to demand pressure for land driven by dynamic spatial development. Land is needed for housing developments, for transport infrastructure, for recreation and tourism, for related nature conservation, flood protection and climate change mitigation measures and for the extraction of mineral resources. Land competition and land use conflicts tend to play out to the detriment of agricultural land use and result in irreversible rededication of agricultural land ('land take').

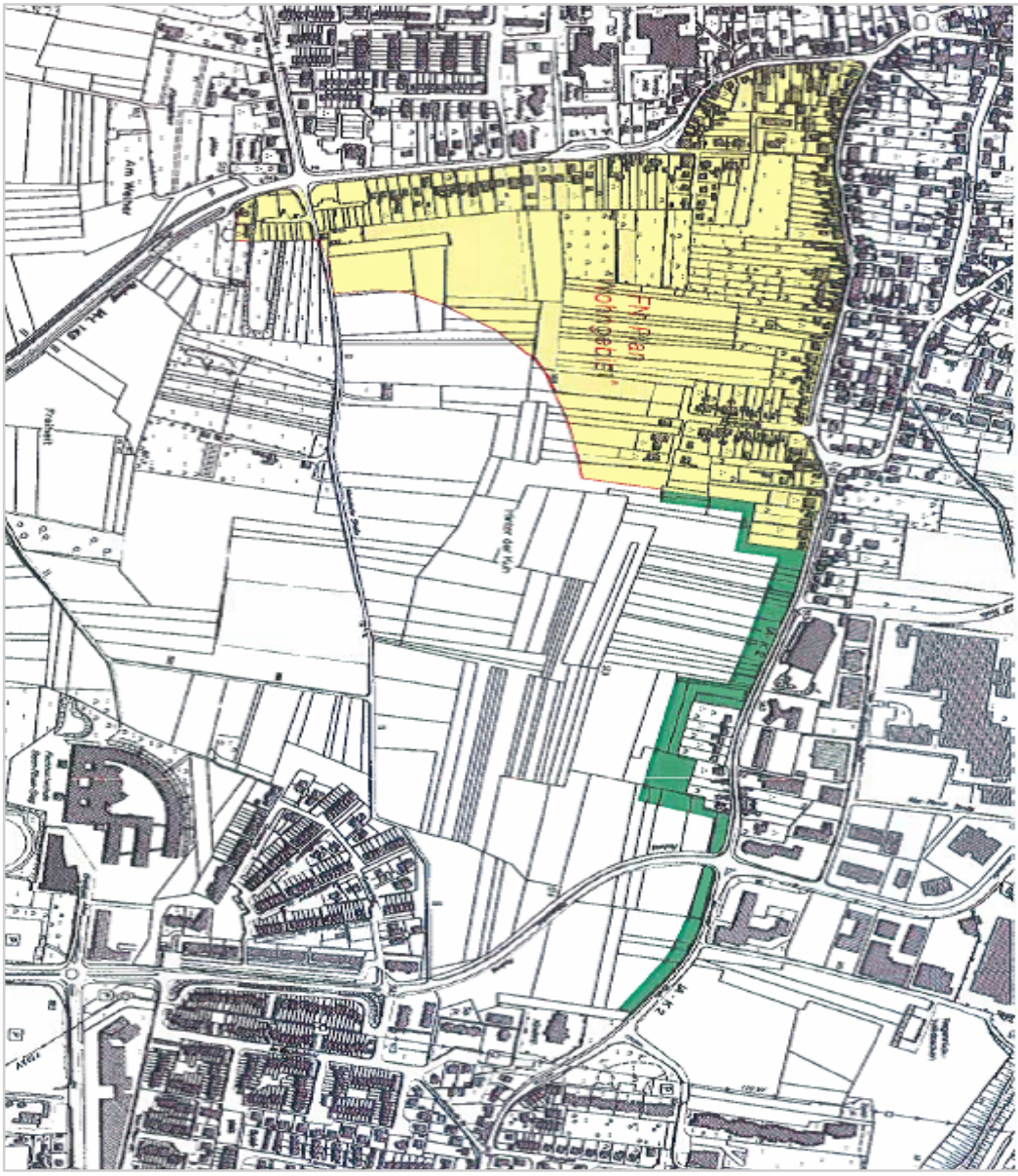
Fig. 5.7-2: Land take and the land take reduction target in Germany
(source: StBA 2022)



In 2000, agricultural land was rededicated in Germany at an average of around 131 ha per day. The German government consequently set a target in the National Sustainability Strategy of reducing land take to 30 ha per day by 2020. This target for 2020 was not met, with only a reduction to around 54 ha per day up to 2020. The target now stands at "less than 30 ha" per day by 2030 (StBA 2022).

Land take is a creeping phenomenon. The public and public decision makers do not perceive it as a real environmental and land use problem because people have the impression that there is enough land to go round (Thomas 2011 a).

Fig. 5.7-3: A typical example of creeping urbanisation in a vegetable and fruit-growing region in the greater Cologne-Bonn area (source: Fehres)



The yellow area is earmarked for residential development in the land-use plan. In the green-coloured strip, a green ribbon is to be implemented to screen off the commercial area east of the fields.

The loss of available farmland is further exacerbated by the fact that German nature conservation law allows offsetting measures required for built development to be relocated to outlying areas, and this is indeed what takes place (section 16 of the Federal Nature Conservation Act).

Besides the loss of farmland for primary agricultural production, land take has a major impact on the price trend for farmland on the property market and, in conjunction with tax implications, results in a real loss of net worth for farms (Fehres 2020).

5.7.2 Coordination between municipal urban land-use planning and agricultural sectoral planning

The outlined scenario requires ongoing coordination between municipal and sectoral planning authorities, if only for general spatial planning purposes. This is why the land consolidation authority, as the agrarian structure authority, is among the sectoral planning authorities that have to be heard as bodies representing public interests in municipal urban land-use planning and in spatially relevant projects pursued by other sectoral planning authorities (section 2.5.5).

The general requirement to coordinate spatially relevant planning is supplemented with more detailed provisions on inter-agency cooperation in the Federal Building Code (BauGB 2017) and the Land Consolidation Act (FlurbG 1976).

5.7.2.1 Preparation and implementation of urban development measures

Under section 187 (1) of the Federal Building Code, in the preparation and implementation of urban development measures, account is also to be taken of measures for the improvement of the agrarian structure, and in particular the outcomes of preliminary planning (agricultural structure development planning) under section 1 (2) of the Act Concerning the Joint Task for the Improvement of Agricultural Structures and Coastal Protection (GAKG 1988). Where measures to improve agrarian structure may be expected to affect building development within municipal territory, the municipality must determine whether urban land-use plans are to be prepared and whether any other urban development measures are to be undertaken. In this connection, supra-local sectoral plans overrule general municipal planning autonomy and therefore limit the scope for municipal action (Kötter; Linke 2015).

Section 187 (2) of the Federal Building Code requires the higher land consolidation authority to examine during preparation of an urban land-use plan whether land consolidation measures or other measures to improve agrarian structure are to be initiated in connection with the land-use plan. Under section 187 (3), the municipality is required to involve the land consolidation authority – along with other bodies carrying out any other measures to improve agrarian structure – from the earliest possible stage in the preliminary work for preparing urban land-use plans.

5.7.2.2 Urban land-use planning and land consolidation

If a land consolidation authority gives notice that a land consolidation on the basis of the Land Consolidation Act is planned in a municipality, or such a land consolidation

has already been decided, then the municipality must prepare urban land-use plans in good time unless the consolidation is not expected to affect building development in its territory (section 188 (1) of the Federal Building Code). Timely preparation of urban land-use plans is necessary to enable accurate valuation in the land consolidation, to lay the basis for compensation of equal value and to exploit all opportunities for cost-effective and efficient reorganisation. The unique opportunity in land consolidation to disentangle conflicting land use interests in urban development within a municipal community and to realise plans for other sectoral authorities generally delivers a development boost for the municipality. It also presents a chance to give greater account to long-term development needs in urban land-use planning than is usually the case.

The land consolidation authority and the municipality are required to coordinate their intentions for the municipal territory as early as possible. Until completion of the land consolidation, plans should only be changed in mutual agreement between the land consolidation authority and the municipality or if there are compelling reasons to make the changes (section 188 (2) of the Federal Building Code).

5.7.2.3 Procurement of replacement land

If all or part of an agricultural or forestry operation is required for an urban development measure, the municipality is required to clarify whether the owner intends to set up another agricultural or forestry operation or to claim replacement agricultural or forestry land. There is also a legacy provision that if the operation required is a settler's holding (*Siedlerstelle*) within the meaning of the Reich Settlement Act (*Reichssiedlungsgesetz*; RSiedlG 1919), the competent settlement authority in the state in question has to be involved. The municipality is required to take action to procure or provide suitable replacement land and to make land belonging to it available as replacement land provided that the land concerned is not required for tasks incumbent on the municipality (section 189 of the Federal Building Code).

5.7.2.4 Land consolidation in the case of an urban development measure under section 190 of the Federal Building Code

In cases where agricultural or forestry land is required for urban development measures, the municipality may, with the consent of the higher administrative authority, apply under section 87 (1) of the Land Consolidation Act for a land consolidation procedure to be initiated so that the loss of land can be spread across a relatively large number of landowners or to prevent the urban development measures from adversely affecting the general use and development of the land (section 190 (1) of the Federal Building Code; BauGB 2017). The land consolidation decision can already be issued even if a binding land-use plan has not yet been prepared. In that event, the binding land-use plan must have entered into force before publication of the land consolidation plan (section 59 (1) of the Land Consolidation Act). The municipality is the developer within the meaning of section 88 of the Land Consolidation Act.

An advance implementation order for the land consolidation plan under section 63 of the Land Consolidation Act may already be issued if the land consolidation plan has been published (section 190 (2) of the Federal Building Code).

Initiation of the land consolidation procedure does not affect the permissibility of compulsory purchase (in favour of the municipality) under sections 85 *et seq.* of the Federal Building Code (section 190 (3) of the Federal Building Code).

5.7.3 Land readjustment needs in urban regions and conurbations

Land readjustment instruments are available for the implementation phase of urban land-use planning both under the Federal Building Code and under the Land Consolidation Act. Their use is to be coordinated between the land consolidation authority and the municipality according to the reorganisation need in the particular case; the decision as to whether a land readjustment procedure is required and who carries it out is made according to expediency.

5.7.3.1 Urban land reallocation under sections 45 *et seq.* of the Federal Building Code

The traditional instrument created by the lawmakers for implementation of a binding land-use plan is a 'land reallocation' (*Umlegung*) under the Federal Building Code.

Land reallocation under the Federal Building Code has its roots in the thinking and methods prevailing in the early days of rural land readjustment at the beginning of the 19th century (see section 1.1). Industrial development in the second half of the 19th century created the need for land readjustments also to be carried out in the urban setting. However, this did not initially lead to purpose-specific changes in the law. Instead, under state-level legislation, the legal provisions on and the methods of rural land readjustment were extended to land readjustment for the purpose of land reallocations necessitated by rapid urban expansion (Dieterich 2006). For certain areas affected by wartime destruction, land consolidation law was once again declared applicable for urban land reallocation in 1940 under secondary legislation concerning reorganisation measures to clear war damage. It was as a result of this that the completely devastated 'Altstadt' in Bonn (the 'old town' of narrow streets and rear courtyards) was reorganised after 1947 on the basis of land consolidation law in preparation for reconstruction (Thomas 1990). The basis for today's law of urban land readjustment in the Federal Building Code (BauGB 2017) was laid in the 1960 Federal Building Act, which created a nationally uniform body of law to replace the 'reconstruction acts' (Aufbaugesetze) previously enacted in the various German states.

Purpose and scope

For the development or reshaping of an area, built or unbuilt plots of land may be reorganised to create plots that are suitable in terms of location, shape and size for built development or other uses. The land reallocation may be carried out:

1. In the area of a binding land-use plan within the meaning of section 30 of the Federal Building Code

2. In a built-up area within the meaning of section 34 of the Federal Building Code, if the character of the local surroundings or a basic binding land-use plan within the meaning of section 30 (3) of the Federal Building Code presents sufficient criteria for the reorganisation of plots of land.

Responsibility and preconditions

A land reallocation is decided and carried out by the municipality (in its capacity as land reallocation authority) if and when it is necessary for implementation of a binding land-use plan or for reasons of orderly urban development for the realisation of land use allowed in a built-up area.

The governments of the States may stipulate by statutory instrument:

1. That municipalities are required to establish land reallocation boards with autonomous decision making powers for the implementation of land reallocations
2. The composition and powers of land reallocation boards
3. That a land reallocation board may delegate decisions on procedures of minor importance under section 51 of the Federal Building Code to another body that prepares decisions of the land reallocation board
4. The establishment and composition of higher land reallocation boards to decide appeals in land reallocation procedures
5. That the land consolidation authority or another suitable authority is required to prepare decisions to be made in land reallocation procedures at the request of the municipality (as land reallocation authority).

There is no legal entitlement to the ordering and implementation of a land reallocation.

A municipality may delegate its authority to carry out a land reallocation to the land consolidation authority or another suitable authority for all or part of the municipal territory. Details of the delegation of authority, including the municipality's rights of involvement, may be laid down in an agreement between the municipality and the authority carrying out the land reallocation. The municipality may also contract out to publicly appointed surveyors the preparation of decisions to be made in the land reallocation procedure and the surveying and cadastral work necessary for its implementation.

Urban land reallocation under section 45 of the Federal Building Code is thus carried out at the instigation of a municipality in a statutory land readjustment procedure, including in cases where implementation of the land readjustment procedure is delegated to another authority. The procedural requirements applicable to urban land reallocation are set out in sections 45 to 79 of the Federal Building Code, which are not covered in further detail here. Reference is made to the relevant literature, such as Dieterich (2006). Depending on the urban development measure in question, land reallocation may be a redevelopment land reallocation, an initial development land reallocation or an infill development land reallocation.

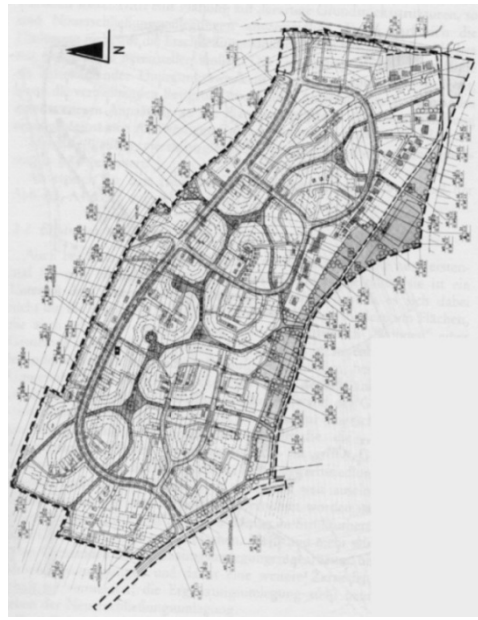
Fig. 5.7-4: Redevelopment land reallocation

Top left: survey map
Top right: binding land-use plan
Bottom left: reorganisation plan

(Source: Dieterich 2006)

A redevelopment land reallocation is carried out if the existing residential or commercial/industrial built development in an area no longer conforms to present-day or foreseeable future needs and is therefore to be brought into line with contemporary requirements in terms of traffic conditions, residential surroundings or urban climate. A redevelopment land reallocation almost always involves the alteration or demolition of existing buildings.

Fig. 5.7-5: Initial development land reallocation



Top left: survey map
Top right: binding land-use plan
Bottom left: reorganisation plan

(Source: Dieterich 2006)

An initial development land reallocation is carried out for the initial development of previously unbuilt and usually previously agricultural land. The purpose of the land reallocation is to provide suitable plots for residential construction or commercial use. It also provides the necessary vehicular and pedestrian areas, green areas and other areas serving public needs.

Fig. 5.7-6: Infill development land reallocation

(Quelle: Dieterich 2006)

An infill development land reallocation is a special case of initial development land reallocation. Here, too, plots of land are made available for building development for the first time and reshaped as necessary. The difference compared with an initial development land reallocation is that the area to be developed is on the inside (see survey plan on the left) of an area that has already been developed and built on from the outside but has so far only been used for agricultural smallholdings or market gardening.

All three of these categories of land readjustment can also be carried out in conjunction with land consolidation.

5.7.3.2 Reorganisation of urban land tenure on the basis of the Land Consolidation Act

Urban development measures can also be implemented by a land consolidation authority on the basis of the Land Consolidation Act.

Simplified land consolidation

Under section 86 (1) no. 1 of the Land Consolidation Act, a simplified land consolidation procedure (section 2.4.1.2) may be carried out to enable or implement urban development measures, village renewal or measures reshaping the townscape or landscape.

Land consolidation for projects of public interest

Under section 87 (1) of the Land Consolidation Act in conjunction with section 190 (1) of the Federal Building Code, a municipality may, with the consent of the higher administrative authority, apply for a land consolidation procedure for a project of public interest (see section 2.4.2.1) to be initiated so that the loss of land for individual farms due to urban development measures can be spread across a relatively large number of landowners or to prevent adverse effects on the general use and development of the land.

Standard land consolidation

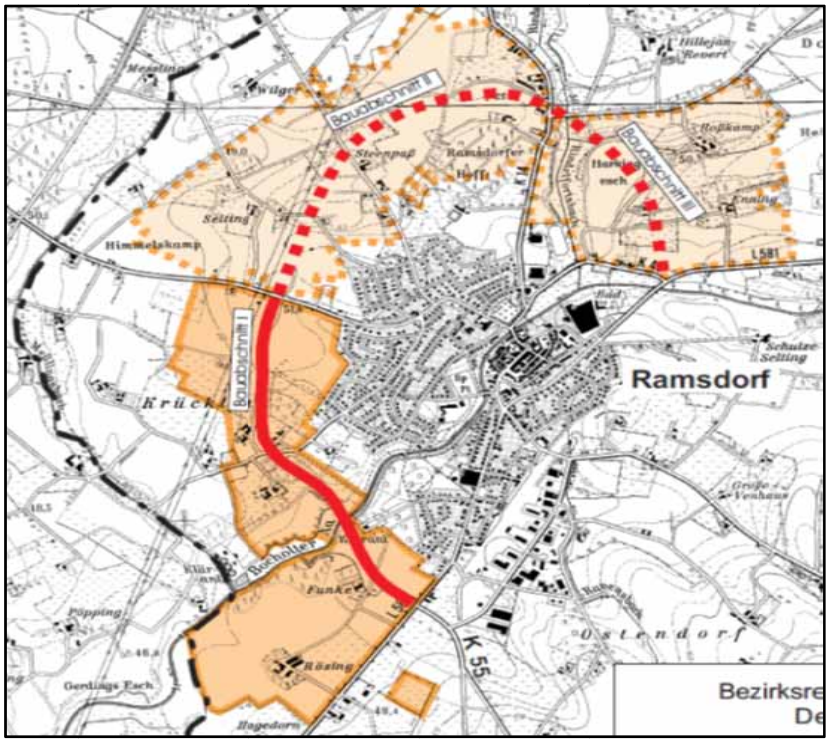
Finally, in an area that in an ongoing land consolidation procedure is covered by municipal land-use planning, a reorganisation of land tenure may be carried out 'incidentally' to an agricultural land consolidation procedure (such as under section 1 and section 37 of the Land Consolidation Act).

The following section shows with the aid of examples how land readjustment instruments can be deployed for a made-to-measure solution of land use competition and land use conflicts of the kinds commonly encountered in urban areas and conurbations.

5.7.4 Made-to-measure problem solving with flexible use of land readjustment instruments

German law pertaining to the reorganisation of land ownership in urban areas and conurbations thus provides two different procedural approaches – under the Federal Building Code (BauGB 2017) and under the Land Consolidation Act (FlurbG 1976). The choice of approach depends on whether a land consolidation is planned or in progress at the same time or in the same area as the urban development measures in question, and how the urban development goals can best be achieved. The main focus in the decision on the choice of approach is on the impact on the affected landowners.

Fig. 5.7-7: Land consolidation for a project of public interest under section 87 of the Land Consolidation Act in preparation for urban development (source: Bezirksregierung Münster)



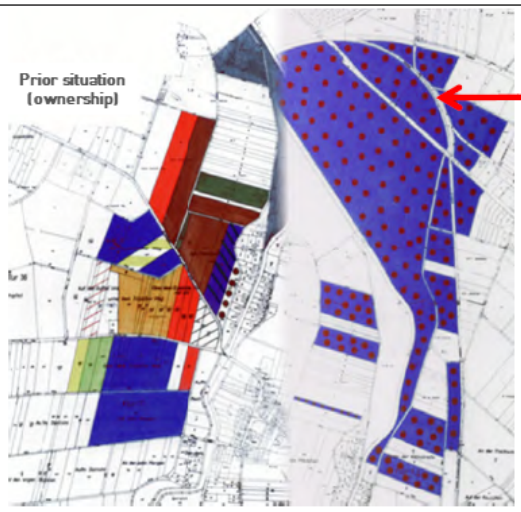
	Municipal area
	Land consolidation area (construction phase I)
	Planned land consolidation area (construction phases II + III)
	Route of district road K 55n (construction phase I)
	Route of district road K 55n (construction phases II + III)

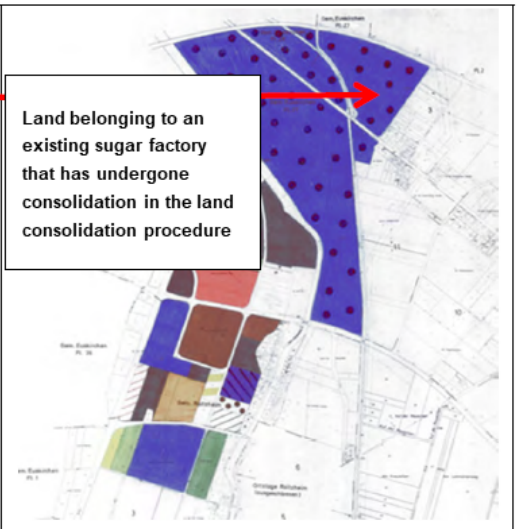
To relieve the in-town traffic situation in Ramsdorf, a bypass is to be built with county funding. According to the political will of the municipality of Ramsdorf, the route of the new bypass is intended to frame the town's urban development for the foreseeable future. This will have a major impact on the structure of agriculture around the town.

Farmland extending to the edges of the residential development will no longer be available. The bypass will cut off outlying farms from that land. This means the farms will not only lose the land needed for the bypass, but in the medium term will no longer be able to farm the area between the bypass and the edge of town.

In this case, the reorganisation of land ownership in a land consolidation for a project of public interest under section 87 of the Land Consolidation Act (see section 5.1) not only serves to obtain land for the bypass, but also to obtain replacement land for the farms that have to cede land for the urban development of Ramsdorf.

Fig. 5.7-8: Development of a business park as part of a land consolidation procedure under sections 1 and 37 of the Land Consolidation Act
(source: Bezirksregierung Münster)





(Source: Bezirksregierung Münster)

(Photos: J. Thomas)

The area of the land consolidation, which was initiated to improve production and working conditions in the fertile farmland extending to the south of the plan area, is

immediately to the west of existing business park in the town of Euskirchen. The town's preparatory land-use plan provides in the medium term for the business park to be extended to the rail line running from north to south through the plan area, but the town was not in a position to draw up a binding land-use plan for the area in question in time for the land consolidation. There was a lack of clarity as to actual demand, and external and internal site preparation was still pending.

In the land consolidation procedure, external site preparation (running from east to west) was completed with county funding; internal site preparation and the compensatory land allocations for the future business park were done in such a way as to create plots of land suitable for rational agricultural cultivation. Demand from regional businesses materialised immediately after the land consolidation plan entered into force. Rather than selling the land, most farmers leased it to applicants in the form of a heritable building right (see section 2.2.3). The ground rent provides them with significant additional farm income.

Fig. 5.7-9: Site preparation for a new housing development and infill preparation for an existing development in a land consolidation under sections 1 and 37 of the Land Consolidation Act (source: Bezirksregierung Köln)

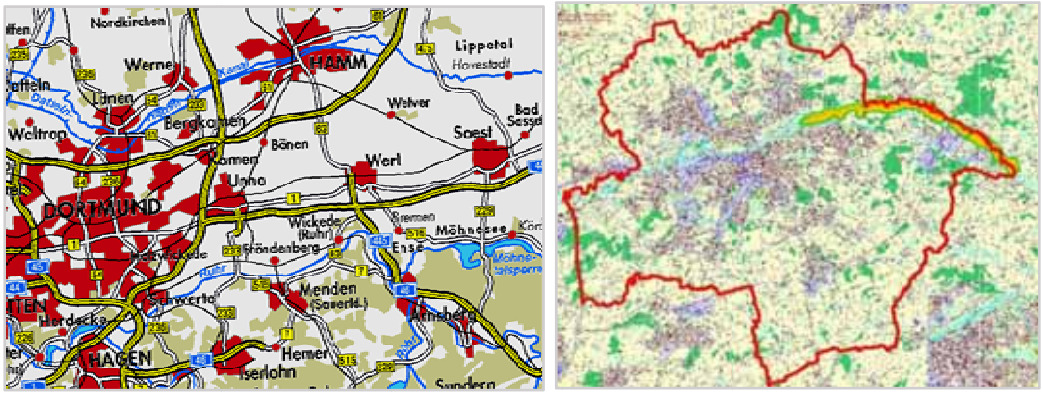
Formerly rural villages on the periphery of Cologne – a city of a million inhabitants – are seeing strong demand for building land, especially in places that boast good public transport and road links into the city. The demand comes from young families and others who are no longer willing or able to pay the soaring urban housing and living costs. One such place is the village at the centre of the Olpe land consolidation, which as in the previous example was initiated to improve

agricultural structures and land development under sections 1 and 37 of the Land Consolidation Act. For the land consolidation, the municipality prepared binding land-use plans for the Olpe district in order to guide housing development under an urban development plan.

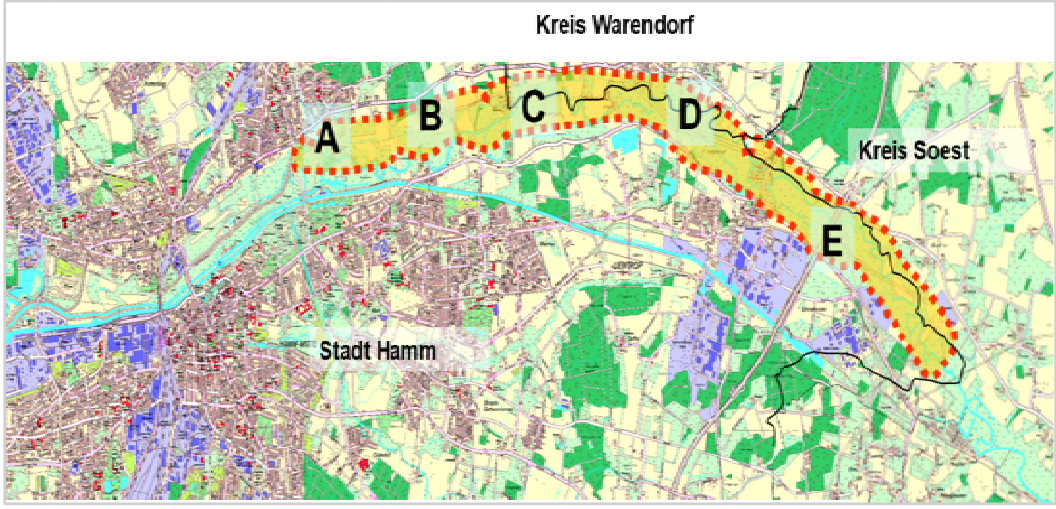
The land readjustment needed to implement the urban development plan was carried out incidentally as part of the land consolidation procedure. Under the classification of land readjustment discussed in section 5.7.3.1, this constituted both an initial development land reallocation and an infill development land reallocation.

Fig. 5.7-10: Simplified land consolidation as a means to meeting offsetting obligations under nature conservation law arising from sectoral planning and urban development measures (section 86 of the Land Consolidation Act) (source: Bezirksregierung Arnsberg)

Location of the project area:



Pooling the necessary ecological offsetting measures in a conurbation for restoration of a river:



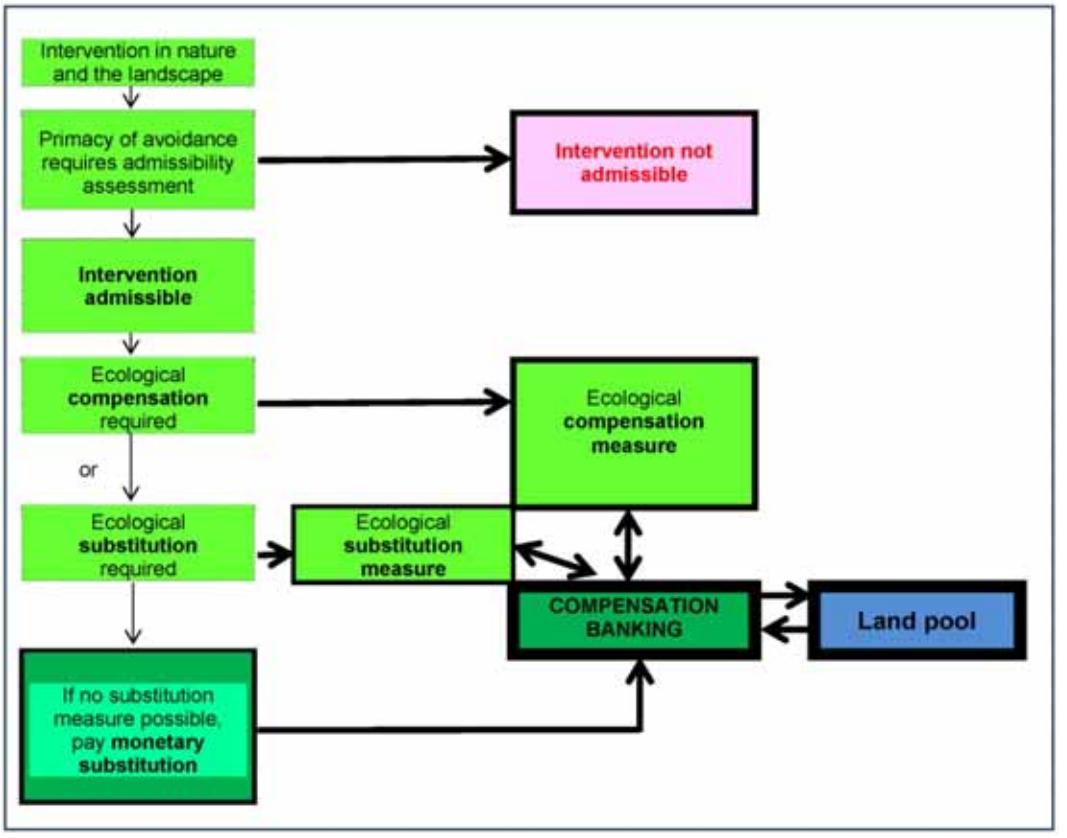
Plan for semi-natural restoration of the river

Initial preparatory work to leave the river to develop of its own accord

Under section 86 (1) no. 1 of the Land Consolidation Act, a simplified land consolidation procedure may be initiated to enable or implement, among other things, ecological water engineering, nature conservation or landscape preservation measures. For this purpose, a simplified land consolidation procedure

was carried out at the northern edge of the Ruhr conurbation, north-east of the City of Dortmund and on the territory of the City of Hamm. The location of the project area can be seen from the above map details. While the project area covers the entire territory of the city, the project in fact only related to farmed land.
The objective of the land consolidation procedure was a near-natural restoration of the river flowing through the city in the area A to E.
The guiding principle of the land readjustment was for the ecological offsetting measures under nature conservation law triggered in the metropolitan region by urban development in the City of Hamm and numerous sectoral plans to be pooled in the near-natural restoration of the River Lippe. Neighbouring counties and cities were also invited to take part in the project.
By pooling the ecological offsetting obligations under a wide variety of plans and taking into account the economic constraints of farms in the area, it was possible to obtain unanimous agreement from affected farmers for implementation along the selected stretch of river. In some cases, the project also brought about improvements in land tenure for the farms involved.

Fig. 5.7-11: Land management by means of compensation banking and a land pool



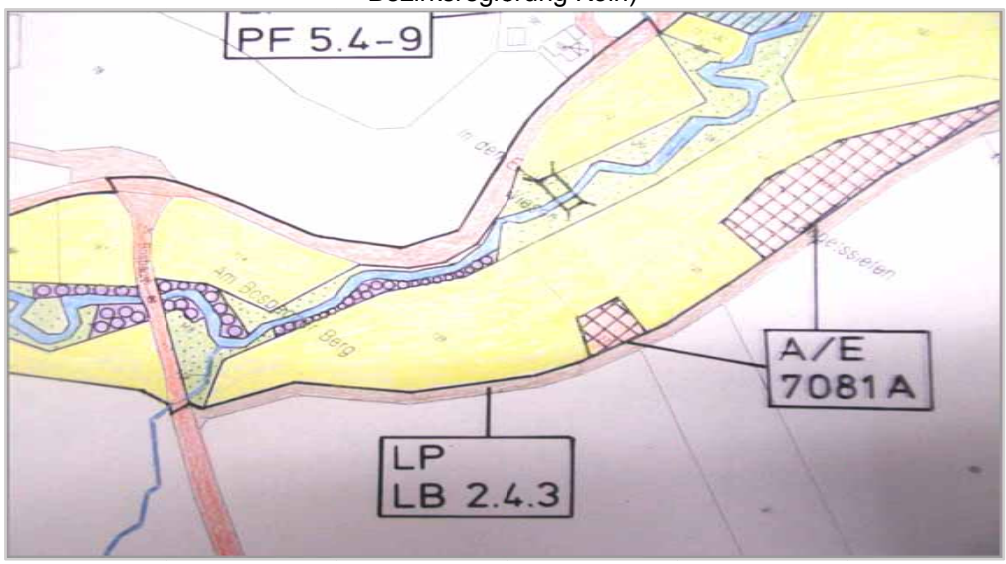
Compensation banking and land pools are strategic land management tools that make it possible for offsetting obligations under nature conservation law in connection with urban development measures to be organised in relatively large, contiguous compensation or substitution measures (Kötter; Linke 2015). The approach is made

possible under German law by the fact that, under section 16 of the Federal Nature Conservation Act (*Bundesnaturschutzgesetz*), offsetting measures for individual urban development and sectoral planning measures can be implemented separately in terms of time, location and context from the measures themselves.

In compensation banking, offsetting obligations triggered by an intervention are accounted for as debits in (for example) a points system and offsetting measures as credits, with the number of points debited or credited corresponding to the nature and scope of the ecological offsets under nature conservation law. This makes it possible, for example, to connect geographically adjacent offsetting measures step by step into an ecological network.

Fig. 5.7-12: Creation of farm track margins in open farmland (photo: Thomas)

Fig. 5.7-13: Ecological offsetting by removing spruce (A/E 7081 A) from a near-natural upland stream floodplain (Olpe land consolidation) (source: Bezirksregierung Köln)



This also enables flexible and creative implementation of regional nature conservation and environment protection measures such as restoring an entire river, ecological measures to prevent soil erosion or the rehabilitation of industrial wastelands.

Compensation banking is usually administered by the nature conservation authority, with the necessary land pool held by a municipality or sectoral planning authority. In the event that the party causing an intervention provides ecological offsets under nature conservation law in the form of monetary substitution (section 13 of the Federal Nature Conservation Act), the money paid in is used to acquire land for the land pool.

The advantage of this approach is that the required ecological offsets are not implemented where land is available at the time, but where they make sense from a landscape preservation and nature conservation viewpoint – a sort of process optimisation with regard to ecological offsets.

If administration of the land pool is assigned to the land consolidation authority, this expands the options for land management – not only because it makes far more land available to feed the land pool via ongoing land consolidation procedures in the region, but above all in that offsetting measures can additionally be tailored to the regional agrarian structure, as a result of which they are far more likely to gain acceptance among the farmers affected by them. The land consolidation authority can also provide assistance when farms are prepared to implement 'production-integrated compensation' in return for monetary compensation (see section 4.5.3).

Fig. 5.7-14: Production-integrated ecological offsetting by continuation of extensive grazing or dispensing with pesticide use on arable field margins
(photo: Thomas)

5.7.5 Conclusion

In urban areas and conurbations, municipalities and land consolidation authorities can work together to beneficial effect. Their cooperation is by no means limited to coordinating municipal land-use planning with sectoral planning within the domain of agrarian structure. It also opens up options for deploying the available land readjustment instruments to the benefit of affected landowners and the common good. Judicious use of the instruments concerned helps to minimise and reconcile land competition and land use conflicts with agriculture. Reorganisation of land ownership also provides a means of curbing the rededication of farmland. In the academic community, there is general agreement that protecting farmland from rededication should be managed primarily by direct legislative, planning and fiscal means (Op't Eynde; Kötter 2009). Nevertheless, a

creative, problem-oriented mix of formal and informal local readjustment instruments can help propel municipalities towards the objective of sustainable land use and spatial development. Fehres (2020) shows how the land readjustment instruments under the Land Consolidation Act can be used to reduce unavoidable agricultural land take due to reasons such as ordered offsetting measures.

5.8 Voluntary leased land exchange in an official procedure

Voluntary exchange of leased land is a response to ongoing structural change in agriculture.

Small farms are giving up, and larger farms want their land. Exiting farms (at least in the first successor generation) generally lease their land to larger farms with development prospects. Who gets the vacated land depends on various factors such as kinship, friendship, ground rent expectations, the location and shape of the pieces of land involved and also the general competitive situation on the agricultural land lease market. All of this results over the years in fragmentation of land tenure, because there is nothing to say that the leased land will be conveniently located for the farm taking it on. This has an impact on farm productivity. Consolidating scattered plots of leased farmland can therefore give a productivity boost for the farms involved. The possibility to do this was introduced as a policy instrument by a number of German states in 2000 and incorporated into Germany's national agricultural structure support programme in 2002.

5.8.1 Nature, objective and funding of voluntary leased land exchange

Voluntary leased land exchange (*freiwilliger Nutzungstausch*) is a simple, fast and cost-effective land readjustment procedure carried out on a voluntary and entirely civil-law basis. It helps improve farming conditions and create rational economic units for the farms involved. In individual cases, in consultation with the municipality, unpaved 'green' ways can also be included in the consolidation process. In grassland farming in marginal locations – which is where farm exodus in Germany is at its most pronounced – voluntary exchange of leased land also helps conserve the face of the cultural landscape by ensuring that the land continues to be farmed. For this reason, voluntary leased land exchange is most often sought in upland regions.

Voluntary leased land exchange is a land readjustment procedure that is carried out merely at the suggestion and with the professional guidance of the land consolidation authority. The authority does not make any decisions or issue any statutory administrative acts. An exchange of leased land only becomes legally effective with the signing of new leases. On the basis of existing leases, farmers exchange areas of farmland (which can also include land owned and managed by the farm itself). The exchange is temporary, a fact that is recorded in the lease. It does not affect the landowners' ownership of the land. Only the tenants change. An exchange of this kind

can be combined with a simplified land consolidation (section 86) or an accelerated consolidation (section 91 of the Land Consolidation Act).

The objective of the funding provided is to secure management units for the long term under leases. Lessors taking part in a voluntary leased land exchange receive a one-off premium of €200 per hectare on signing new leases with at least a ten-year term. The land consolidation authority approves the grants and pays out the premiums (once the exchange agreements have been signed).

A voluntary exchange of leased land can also be prepared and conducted by authorised exchange facilitators (*Tauschhelfer*). The services of an exchange facilitator are eligible for grant funding. For further details, see MWVLW (2000), Kram (2004) and Schäuble (2007).

5.8.2 The work process

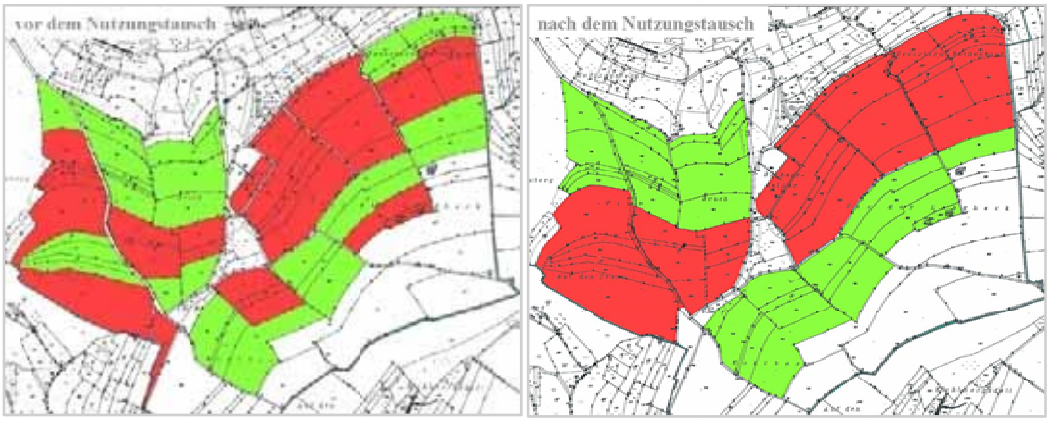
The impetus for this land readjustment measure, which is modelled on the traditional 'field exchange' (*Pflugtausch*) in which farmers till each other's fields, comes from individual farmers, agricultural business consultants or the land consolidation authorities, but it is the tenants themselves who decided whether they are willing to take part. If it considers an envisaged exchange to be practicable, the competent land consolidation authority provisionally defines the area to assess for potential exchanges, obtains the necessary documents from the land register and cadastral register and determines whether the exchange of leased land conflicts with any nature conservation or other public interests.

Following preparation of a tenure/lease map and investigation of the exchange area by the staff of the land consolidation authority, a hearing is held with the farmers and landowners who are expected to be involved to present general information on the purpose, potential and procedure of a leased land exchange. The hearing also provides the opportunity to clarify any outstanding issues and the existing tenure and lease situation. Problems, ideas, suggestions and proposals are discussed and noted for consideration. On this basis, the land consolidation authority draws up a preliminary exchange plan. The exchange plan is presented at a further hearing. Counter-proposals are discussed and are incorporated into the exchange plan if found acceptable. Finally, the completed exchange plan is presented to all involved in a communal meeting. If the parties involved agree to the exchange plan, the land consolidation authority prepares the leases with a minimum ten-year term for signing by the lessors and lessees.

In this way, the landowners (lessors) secure regular long-term lease income together with ongoing cultivation, thus maintaining the value of their land. The farmers (lessees) benefit from a significant improvement in their agricultural production conditions, while the long-term nature of the leases enables them to plan for the future.

The examples that follow show the outcomes of voluntary exchanges of leased land in the State of Rhineland-Palatinate.

Fig. 5.8-1: Land leases before and after the land lease exchange in the community of Adenbach (source: http://www.landentwicklung.rlp.de/)



Before the exchange of leased land, the two farmers involved farmed 16 areas with an average size of 3.1 ha and an average field length of 230 m. After the leased land exchange, only four areas remain with an average size of 13.3 ha and average length of 570 m.
The objective of consolidating the farmland around the farmsteads has been achieved. The outcome of the exchange will be reflected in the farms' productivity figures.

Fig. 5.8-2: Land leases before and after the land lease exchange in the community of Rodenbach (source: http://www.landentwicklung.rlp.de/)

The outcome of the voluntary exchange of leased land among seven farms in the community of Rodenbach with an exchange area of 320 ha and 140 participating landowners likewise demonstrates the effectiveness of the procedure.

Before the exchange, the farms involved managed a total of 106 areas with an average size of 3.0 ha and average length of 350 m; after the exchange, only 10 areas remain with an average size of 32.0 ha and average length of 750 m.

5.8.3 Conclusion

Voluntary leased land exchange is a land readjustment instrument applied on a civil-law basis to support ongoing structural change in agriculture. In Germany, such exchanges are primarily sought in upland regions where there is a need for quick and inexpensive solutions on a lease basis in order to keep land in cultivation and where land consolidation would take too long. They are therefore a necessary adjunct to the statutory land readjustment instruments under the Land Consolidation Act.

5.9 Woodland consolidation

Woodland consolidation (*Waldflurbereinigung*) in the strict sense of the term means all statutory land readjustment procedures carried out on forest land on the basis of the Land Consolidation Act (FlurbG 1976) in order to achieve the objectives listed in that act. In the broader sense, it encompasses all land readjustment measures to rectify or at least alleviate the fragmentation of ownership and other impediments to forestry found in many woodland areas across Germany. It can also take place under state-specific sectoral legislation or provisions of the German Civil Code (*Bürgerliches Gesetzbuch*; BGB 2002), or using a combination of such measures, to bring about improvements in production and working conditions in agriculture and forestry and to balance private and public interests in land use.

5.9.1 The socioeconomic importance of forest (source: Waldbericht Bund 2021)

Some 32% (11.4 million hectares) of the total area of Germany is covered by forest. This makes Germany one of the most densely wooded countries in Europe. Of those 11.4 million hectares, 48% is private forest and 19% is in county or municipal ownership. 33% of the country's land area is state-owned forest (29% held by the sixteen German states and 4% federal land). Private forest is owned by approximately 1.8 million landowners with an average of 2.5 hectares of production forest each. For historical reasons and as a result of equal-shares inheritance customs in many areas, ownership of private forest is severely fragmented, being divided up into very many small parcels and impractically shaped plots.

Conifers grow on over half of the forest area, with spruce accounting for 25% and pine for 23%, while deciduous species cover around 45% (including 16% beach and 10% oak).

Compared with other cultivation forms, forest management is extensive. The human impact on forest ecosystems is nevertheless pronounced in some regions, resulting in a decline in the high level of diversity of characteristic forest wild animal, plant and fungus species found in more natural regions.

Forests provide important services and products for human society. Over 40% of the area of all water protection areas is within forest areas. Unfertilised and mostly unworked forest soils are highly effective at filtering pollutants and play a key role in local water cycles and the regional hydrological regime. Forests have greater capacity than almost any other ecosystem for storing and purifying rainwater. The upper soil layer

down to a depth of one metre alone is able to accumulate up to 200 litres of rainwater per square metre of forest floor. The high rate of evapotranspiration from forests cools the surroundings and creates a significantly cooler and moister forest climate compared to open countryside.

Fig. 5.9-1: Forest land in protected areas under the Federal Nature Conservation Act (BNatSchG)

Protected area category	Federal Nature Conservation Act (BNatSchG)	Number	Total size of protected areas	Of which forest		Share of total forest land
			(1,000 ha)	(1,000 ha)	%	%
Nature conservation areas*	Section 23	8,840	1,398	713	51	6
National parks*	Section 24	16	206	128	62	1
National nature monuments*	Section 24	4	7	3	48	0
Biosphere reserves*	Section 25	18	1,344	529	39	5
Landscape protection areas*	Section 26	8,875	10,185	4,806	47	44
Nature parks*	Section 27	104	10,134	4,719	47	43
Protected forest habitats**	Section 30			593	100	5
Sites of Community Importance*	Sections 32-33	4,544	3,372	1,939	58	18
Special protection areas*	Sections 32-33	742	4,050	1,830	45	17
* source: Federal Agency for Nature Conservation ** source: National Forest Inventory 2012						

In total, Natura 2000 areas in Germany take in around 2.7 million hectares of forest. Of this total, 761,000 hectares are accounted for by forest habitat types protected under the European Habitats Directive, divided roughly half and half between state and non-state forest.

For 90% of the population, forests provide important surroundings for experiencing nature, recreation, leisure and sporting activities. Over 55 million people or 70% of the German population make active use of forests for recreational purposes at least once a year. On average, the figures add up to about 28 visits to forests per person per year. Forests thus contribute significantly to the physical and psychological health of the population.

Today, 2.6 billion tonnes of carbon are sequestered in the living biomass, deadwood and soils of German forests. Around 57 million tonnes of carbon dioxide are absorbed each year. Use of timber products binds an additional 4.2 million tonnes of carbon dioxide. This is particularly long-lasting when the carbon is stored in durable timber products, as in buildings.

As a renewable resource, timber is a major pillar of the bioeconomy. On average over the last few years, the economy has been supplied with around 73 million m³ of wood per year for use as material or energy. This provides the basis for an extensive

value chain generating revenue of around €135 billion a year and employing some 135,000 people. About 30% of raw timber used domestically in Germany was used for energy generation in 2019. About 77% of this was used in private homes to generate heat and about 23% in industrial combustion plants for heat and power.

5.9.2 The structural situation of forest regions

Forest ownership continues to suffer major structural deficits, with fragmented small to very small holdings, impractically shaped plots and average plot sizes of less than one hectare (DLKG 2008). In areas subject to equal-shares inheritance customs, each and every succession further complicates ownership. Uncertainty concerning ownership and parcel boundaries and a lack of demarkation or boundary markers are more or less the rule. In many cases there are problems of physical access to forest land. Track widths, surfaces and connections with the public road network are frequently unsuited to the vehicles used in modern forestry. State, county or municipal forest and small private holdings tend to be interspersed. Good management conditions prevail in state, county, municipal and large private forest areas except where they are interspersed with small private woodland holdings.

Fig. 5.9-2: Woodland ownership structure with small private holdings
(source: J. Mock)

The ownership structure of small private forest holdings described above has its origins in medieval land ownership and tenure systems.

Originally, territorial and manorial lords held the ownership rights to land and all appurtenant rights, such as hunting and fishing rights. Use by local farmers was subject to a complex regime of feudal rents and services. In the Prussian reforms of the early 19th century, in what is referred to as the separation of common property, farmland previously used in common was divided among the commoners in village communities and transferred to private ownership (see section 1.1). The feudal obligations were mostly bought out. Ownership of woodland, however, generally remained with the territorial or manorial lords. The rights to use forest land were likewise left untouched. In 1874, the Royal Prussian 'Revisions-Kollegium in Landeskultursachen' (review board for land improvement matters) ruled that commoners also had the right of ownership of woodland used in common. Accordingly, in the ensuing years, many woodland commoners applied for the common land to be separated out and transferred into private ownership as had already been done with farmland beginning with the legislation of 1811 and 1821. An act concerning protective woodland and woodland cooperatives (Gesetz betreffend Schutzwaldungen und Waldgenossenschaften) of 6 July 1875 did provide for the smallest holdings to be brought together in a forestry cooperative as a body corporate, but this arrangement met with little acceptance in practice. Having put the feudal yoke behind them, the new forest landowners had no appetite for a new form of dependency with new restrictions on use. As a result, matters remained as they were, with the sort of land ownership situation seen in figures 5.9-2 and 5.9-3 that still prevails in many areas of Germany to this day.

Fig. 5.9-3: ***Ownership structure with small private woodland holdings in Thuringia*** (source: Thüringer Landesamt für Bodenmanagement und Geoinformation)

To rein in the situation unleashed by the ruling of 1874, the Prussian Landtag passed an act concerning community-held production forest (Gesetz über gemeinschaftliche Holzungen) of 14 March 1881. The separation of common woodland was halted, partible inheritance was limited to certain fractions and forest management was placed under state supervision.

The introduction of the German Civil Code on 1 January 1900 (BGB 1896), which codified property law uniformly for the entire Reich, could have been taken as an opportunity to repeal the many provincial legislative stipulations on the separation of common property, on community production forest and on communal forest management practices such as 'Hauberg' (common oak and birch coppice for tanbark and charcoal), 'Markwald' (woodland common to two or more villages) and 'Niederwaldgenossenschaften' (common coppice in general). However, the Introductory Act to the German Civil Code (EGBGB 1994) expressly left such provincial legislation in force, and it remains in force to this day except where the modern-day German states have made use of their power under article 1 (2) of the Introductory Act to replace the legacy provisions on community forest use with state-level law. This has been done in the State of North Rhine-Westphalia with the Community Forest Act (Gesetz über den Gemeinschaftswald) of 8 April 1975 (GWG 1975) and in the State of Thuringia Forest Act (Thüringer Waldgesetz - ThürWaldG 2008) with regard to the former Thuringian Forest Cooperatives Act (Thüringer Waldgenossenschaftsgesetz) of 16 April 1999 (ThürWaldGenG 1999).

In Hesse, the Hessian Forest Act (HWaldG 2013) placed prior-law forest cooperatives on an equal legal footing with forestry management associations. Finally, in Lower Saxony, the Land Management Associations Act (Realverbandsgesetz; RealVerbG 1969) applies both to prior-law forest cooperatives and to newly established land management associations.

5.9.3 Land readjustment procedures under the Land Consolidation Act

Measures to reorganise forest land on the basis of the Land Consolidation Act are referred to as woodland consolidation in the strict sense of the term.

5.9.3.1 Formal and substantive legal framework of woodland consolidation

The formal and substantive legal framework for this type of land consolidation is found in its entirety in the Land Consolidation Act (FlurbG 1976). Woodland consolidation is specified as an objective of land consolidation at the very beginning, in section 1 of the Land Consolidation Act. This also provides the constitutional legitimation for this form of statutory reorganisation (see section 2.4). Reorganisation of ownership in forest land is in the private and public best interest.

- Under the provisions of [the Land Consolidation Act], rural land holdings may be rearranged with a view to improving the production and working conditions in […] forestry

- Section 84 of the Land Consolidation Act specifies that rural land holdings within the meaning of the Act include woodland.

The administrative and technical procedure to be followed in a woodland consolidation is generally based on a standard land consolidation as described in chapter 3. When forest land is included in a land consolidation procedure, however, a number of specific provisions apply under section 85 of the Act. These aim to inject forestry expertise into the standard procedure so that due account is given to the special considerations involved in dealing with woodland property.

- For example, the foresters' association is added to the list of parties and bodies representing public interests. They are informed and heard:
  - Under section 5 (2) of the Land Consolidation Act, before the land consolidation decision
  - When establishing the general principles for an appropriate reorganisation of the land consolidation under section 38 of the Land Consolidation Act
  - In the hearing on the plan covering the common and public facilities and the accompanying landscape conservation plan under section 41 (2) of the Land Consolidation Act.
- Consent from the forest supervisory authority is required before a coherent woodland area exceeding ten hectares may be included in a land consolidation
- With regard to the restrictions under section 34 of the Land Consolidation Act on the use of owned land in the period between publication of the land consolidation decision and the implementation order (see section 3.1.3), any felling in excess of the ordinary in forest management requires the land consolidation authority's consent, which it may only give in agreement with the forest supervisory authority
- In the event of any felling in contravention of this provision, the land consolidation authority may order whoever did the felling to restock the cleared or thinned area in accordance with instructions from the forest supervisory authority
- Where the value of standing timber is to be assessed, the principles of the valuation of standing timber apply (forest appraisal principles – see section 4.3.4)
- The forest supervisory authority is to be consulted for specific tasks in connection with the land valuation (section 31 (2) of the Land Consolidation Act) and preparation of the land consolidation plan (sections 19, 48 (1), 49 (1) and 50 of the Land Consolidation Act)
- Where possible, if the land consolidation plan allocates a piece of forest land to another party, compensation for standing timber should consist in timber values (section 85 no. 8 of the Land Consolidation Act).

5.9.3.2 Land consolidation to improve production and working conditions in forestry

Production and working conditions in forestry – at least as far as land use is concerned – are mainly determined by the ownership and tenure situation, the internal and external accessibility of the woodland and the topography.

In open countryside, the ownership structures resulting from 18th and 19th century land reforms were largely rectified by land consolidation in the course of the 20th century, in some cases even several times over. Rearrangements of forest ownership, by comparison, took place only in isolated cases and certainly not on such a widespread scale. Smallish areas of woodland were included where necessary in farmland consolidation procedures for the improvement of agrarian structures, but large-scale land consolidation procedures exclusively relating to forestry were the exception. The expense of valuing woodland plots and standing timber, together with the necessary time-consuming and costly surveying work, made comprehensive woodland consolidation economically unattractive. Aside from that, large-scale public and private landowners were self-sufficient in terms of forest management and timber harvesting. Up until the 1970s, small private woodland holdings were mainly exploited for personal use. Owners helped each other out with temporary permission to cross each other's land for felling and extraction.

Global growth in timber demand and improvements in large timber harvesting machinery (harvesters, forwarders and logging trucks) finally led to mounting calls for structural improvements in forestry in the last third of the 20th century. Even then, the actual impetus for woodland consolidation rarely came from owners themselves. Instead, it usually came from outside.

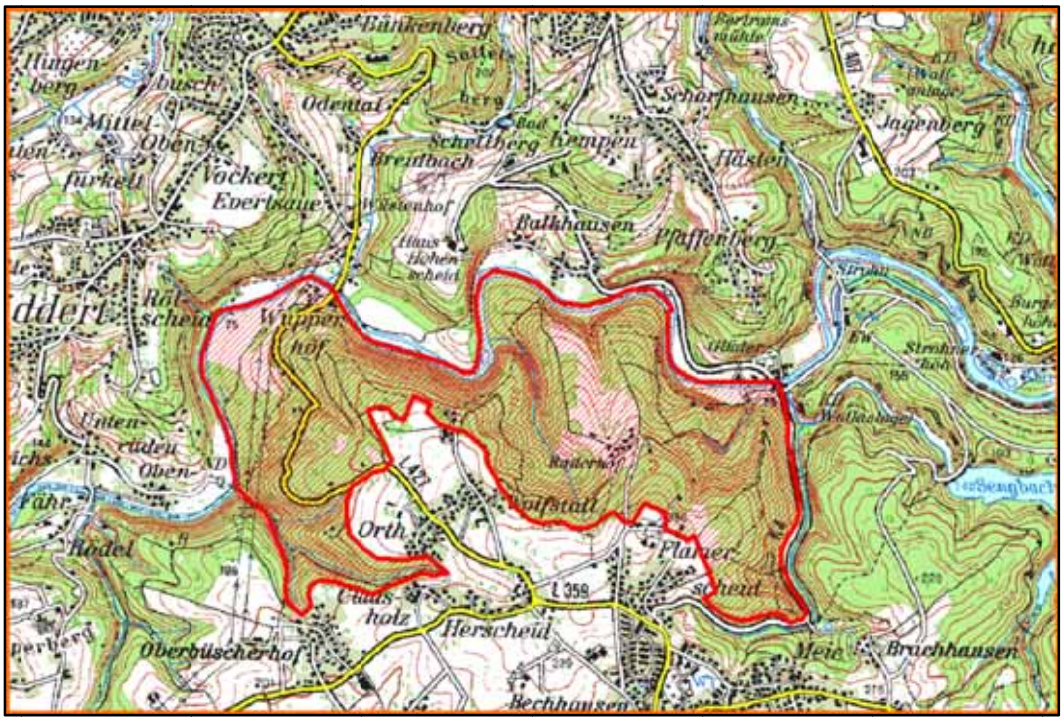
The growth in demand for timber prompted forestry management associations and foresters' associations to look into the potential of reorganising land ownership, and also to put the topic on the agenda at members' annual meetings. In tourist regions, woodland consolidation procedures were launched at the instigation of local authorities to provide consolidated and fully connected trail networks. Reorganisation procedures were also initiated at the suggestion of nature conservation authorities in order to resolve land use conflicts between recreational pressure and the desire to leave nature undisturbed, while also recognising woodland owners' economic interests in land readjustment. In the late 1990s, the need to find locations for wind turbines and the designation of areas suitable for wind power installations in territorial planning created further impetus for land readjustment procedures in forested areas. Today, however, the rationale for woodland consolidation is no longer exclusively based on forest economics, but on an analysis of potential added value for society as a whole (see, for example, Hinz 2013).

The biggest surge in demand for the consolidation of forest land was nevertheless triggered by large-scale environmental stresses, especially from the 1980s onwards. Forest dieback due to 'acid rain' in regions east of industrial zones, widespread storm devastation due to climate change and in recent years droughts and forest fires have altered the face of entire forest regions and driven their decline. It only makes sense to combine reafforestation of the devastated areas with a reorganisation of land ownership.

Depending on the aims to be achieved, all land readjustment instruments described in section 2.4 may be utilised for this purpose with their respective procedural requirements as set out in the Land Consolidation Act.

In the example below from the Ruhr metropolitan region, the impetus came from nature conservation and landscape preservation authorities. The objective was for areas in the Wupper valley of conservation importance that were subject to severe recreational pressure to be placed under lasting protection. This was to be achieved by a suitable reorganisation of public and private land ownership. A simplified land consolidation procedure under section 86 of the Land Consolidation Act was decided upon.

Fig. 5.9-4: Geographical location of and the natural landscape unit encompassed by the Wupperhänge land consolidation area
(source: R.H. Geldsetzer; Bezirksregierung Köln)



The land consolidation decision specified the following objectives for the procedure:

- Securing the protection of the areas of conservation importance on the slopes above the River Wupper
- Improving the manageability of the land holdings used for forestry by:
  - Constructing extraction tracks and tracks for timber trucks
  - Consolidating fragmented land ownership into larger and more practically shaped holdings.

The procedure area covered 351 ha, comprising 76% forest, 15% grassland and arable land and 9% other areas such as roads and water bodies. The 955 original plots were held by 220 landowners, while four farming and forestry holdings were based in the procedure area. Protected area categories within the procedure area comprised landscape protection areas, nature conservation areas, sites of Community importance, protected landscape elements and protected forest habitat types.

Fig. 5.9-5: Characteristic habitat structures in the Wupperhänge land consolidation area (source: Bezirksregierung Köln)

Among the 220 participants was the State of North Rhine-Westphalia (NRW), represented by the state forestry administration, with 102 ha of publicly owned land; NRW-Stiftung Natur, Heimat und Kultur (the state nature, heritage and culture foundation) took the opportunity to acquire around 38 ha by means of landowners electing to be bought out instead of receiving compensatory land allocations (under section 52 of the Land Consolidation Act; see section 4.2.3.2).

A plan covering the common and public facilities with accompanying landscape conservation plan (plan under section 41 of the Land Consolidation Act; see section 3.2.2) was prepared in order to modify the existing road and track network in line with the new functional requirements within the land consolidation area. For technical considerations regarding the planning and construction of common and public facilities, the reader is referred to section 4.4. A total of 8.2 km of roads and tracks had to be upgraded or newly laid, including 5.9 km of existing roads and tracks and 2.3 km across country. Of the total, 5.0 km was paved and 3.2 km left unpaved. As compensation

measures for unavoidable interventions in nature and the landscape, 4 ha of hardwood plantings were included in the plan under section 41 of the Land Consolidation Act and subsequently carried out. The land contribution under section 47 of the Land Consolidation Act was determined at 4.0%. The plan under section 41 of the Land Consolidation Act was prepared on the basis of the land improvement requirements set out in section 4.4 for the planning and construction of woodland road and track networks, although the recommendation that dead-ends should be avoided was overruled in some cases in order to prevent public disturbance of protected habitats.

For valuation of the land, the following valuation framework was established in accordance with the requirements of the Land Consolidation Act (see section 4.3):

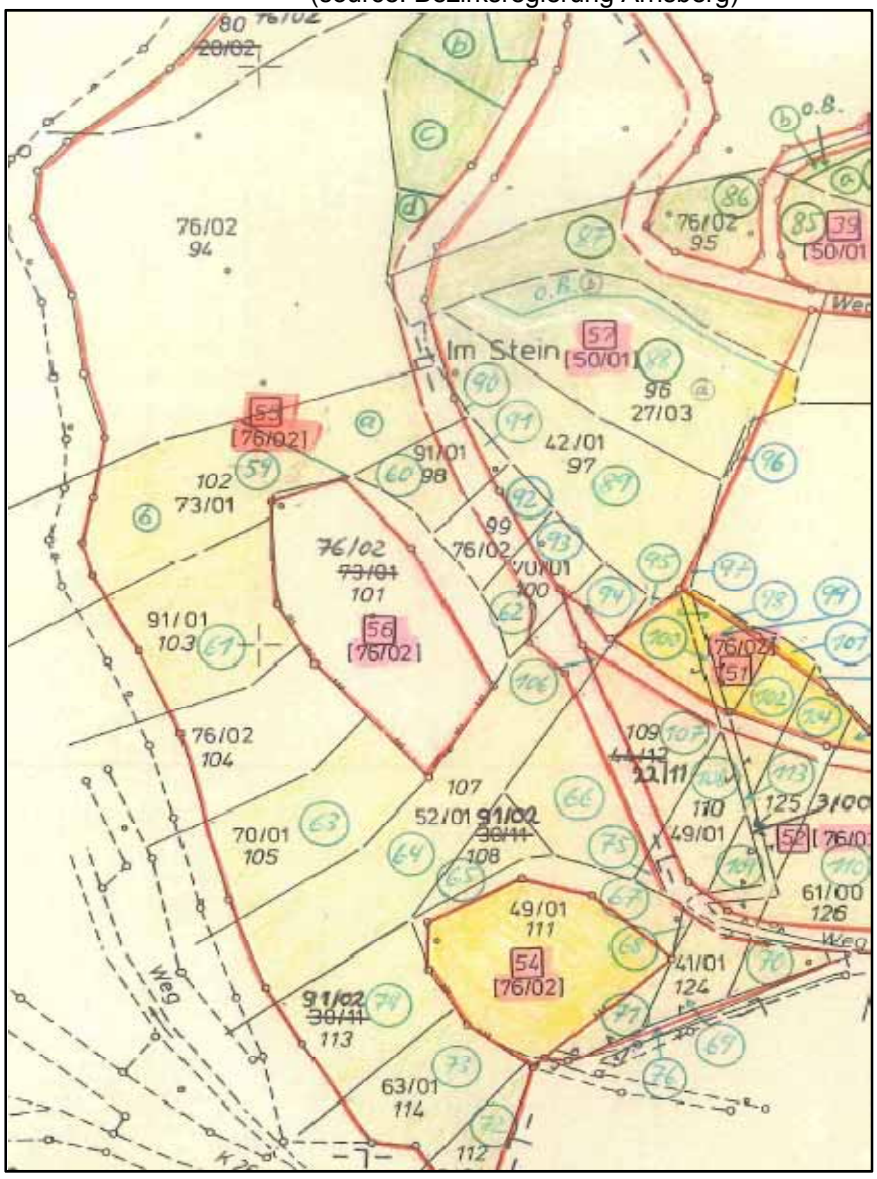
Fig. 5.9-6: Woodland valuation framework (source: R.H. Geldsetzer)

		Valuation categories						
Quality characteristic	**Class** CN	1	2	3	4	5	6	7 Paved roads, wasteland
		Value units per are						
Arable land and grassland	2	30	28	26	23	19	15	3
Convertible grassland	3	30	28	26	23	19	15	3
Woodland	4	9	8	7	6	3		
Farmyards and buildings in farmland	1	200						
	Monetisation coefficient €5/VU							
	CN: code number for coding the valuation framework in IT							

In accordance with Section 31 (2) of the Land Consolidation Act, woodland valuation is generally contracted out to forestry experts, who are needed in any case for valuation of the standing timber. As with farmland valuation, the results of the forestry land valuation have to be made available for inspection and officially confirmed in accordance with section 32 of the Land Consolidation Act. This can either be done together with the results of the farmland valuation or together with the results of the valuation of the standing timber. More on that in section 5.9.3.3.

Under section 85 no. 4 of the Land Consolidation Act, valuation of the standing timber is carried out in accordance with forest appraisal principles (see section 4.3.4). The principles applied in a specific land consolidation procedure and the valuation date are generally established by the forestry expert in consultation with the board of the body of participants, which adopts a resolution making them binding for the subsequent stages of the procedure.

Fig. 5.9-7: Valuation of the standing timber (detail)
(source: Bezirksregierung Arnsberg)



49/01 **111**	**Ref. no. of original plot** **Parcel no. of original plot**
	Old cadastral boundary
54	**New parcel number**
[76/02]	**Ref. no. of new plot**
61	**No. in valuation report**
	New parcel boundary

Valuation of the standing timber is one of the most time-consuming and cost-intensive tasks in a woodland consolidation. This is because as well as recording and valuing the standing timber as is, it is also necessary to determine the timber stock that will change hands in reorganisation of the land consolidation area. This can only be done by comparing the old and new parcel layout and assigning the timber stands to the correct old or new owner in each case. The standing timber on each of these sub-areas has to be surveyed, accurately recorded and priced. An impression of the meticulous work involved can be gained from the map detail in figure 5.9-7 and the two excerpts from forest valuation reports in figure 5.9-8.

Figure 5.9-7 shows an excerpt from the cadastral map, in which the reference numbers (ref. nos.) of the prior owners have been added in black pen. The red markings indicate the new layout provided for in the land consolidation plan, with the boundaries and parcel numbers of the new parcel numbers together with the reference numbers of their intended new owners. Numbers in green correspond to the consecutive numbering in the forest valuation report prepared by the contracted forest expert for each timber stand that will change hands in the land reorganisation.

The examples below show individual excerpts from the valuation report, translated from the German:

Fig. 5.9-8: Excerpts from forest valuation reports (source: Bezirksregierung Arnsberg)

Land consolidation X Case no: 26521

Forest valuation report no.: 61

Cadastral district: Boxberg; cadastral district subdivision: 2

Data of on-site valuation: 23 November 2021

Valuation date: 1 October 2020

Old ref. no.: 91/01 Location: Im Stein Cadastral district subdivision: 6 Parcel: 103
Owner: Friedemann Henschel, Kirchstrasse 44, 57999 Immekeppel

New ref. no.: 76/02 Location: Im Stein Cadastral district subdivision: 2 Parcel: 55
Anna Maria Schumacher, née Meier, Burgweg 4, 12345 Wippenhohn

SW lower slope 25-65/45% gradient

Timber species	Age	Yield class	Stand density	Area (ares)	Value class	Markup/ markdown	Mass	Value (€)
Norway spruce	37	IA5	1.00	15.70	3.0	0.0	0.00	3,670.41
	Slope class 3				Markdown/ha=			

Timber species	Age	Yield class	Stand density	Area (ares)	Value class	Markup/ markdown	Mass	Value (€)
Norway spruce	26	I,0	0.90	35.08	3.0	0.0	0.00	4,423.95
	Slope class 2				Markdown/ha=800			

Stand density: upper track and suppressed trees at margin taken into account

Total area: 50.78 ares
Total value: €4,908.45

Stadtburg, 9 December 2021
signed Xaver Schmidthausen
(official forest appraiser)

Land consolidation X Case no: 26521

Forest valuation report no.: 59

Cadastral district: Boxberg; cadastral district subdivision: 2

Data of on-site valuation: 23 November 2021
Valuation date: 1 October 2020

Old ref. no.: 73/01 Location: Im Stein Cadastral district subdivision: 6 Parcel: 102
Owner: Hans Müncker, Nelkenweg 7, 12345 Wippenhohn

New ref. no.: 76/02 Location: Im Stein Cadastral district subdivision: 2 Parcel: 55
Anna Maria Schumacher, née Meier, Burgweg 4, 12345 Wippenhohn

SW lower slope 25-45/38% gradient

Timber species	Age	Yield class	Stand density	Area (ares)	Value class	Markup/ markdown	Mass	Value (€)
Norway spruce	33	I,5	0.95	11.64	3.0	0.0	0.00	2,044.82
	Slope class 2				Markdown/ha=			
Area with rock outcrop, economic age of spruce only 33 years								

Timber species	Age	Yield class	Stand density	Area (ares)	Value class	Markup/ markdown	Mass	Value (€)
Norway spruce	38	IA5	1.00	24.82	3.0	0.0	0.00	6,303.85
	Slope class 2				Markdown/ha= 0			

SW slope 20-25% gradient

Timber species	Age	Yield class	Stand density	Area (ares)	Value class	Markup/ markdown	Mass	Value (€)
Beech	130	IA5	0.00	0.69	6.0	20.0	3.26	205.95
	Slope class 0				Markdown/ha= 0			

Total area: 37.15 ares
Total value: €8,554.62

Stadtburg, 9 December 2021
signed Xaver Schmidthausen
(official forest appraiser)

The above two excerpts comprise two of a total of 20 timber valuation reports used to prepare the 'compensatory timber allocations register' for ref. no. 76/02 in the parcel provided for in the land consolidation plan: cadastral district Boxberg, cadastral district subdivision 2, parcel 55. The individual valuation reports from the valuation of standing timber are documented as part of the land consolidation plan.

In preparation of the land consolidation plan (see section 3.2.6.2), the results of the standing timber valuation in accordance with forest appraisal principles are used as follows to derive the 'compensatory timber allocations register', documented as part of

the general compensatory allocations register, and published with the land consolidation plan or any subsequent modification to the land consolidation plan.

For each parcel, the compensatory timber allocations register incorporates only the final result of the standing timber valuation with totals for the stands to be given up against the stands to be taken over. The individual valuation reports are cross-referenced by the first column of the compensatory allocations register, as can be seen for ref. no. 50/01 in figure 5.9-9.

Fig. 5.9-9: Standing timber valuation in the compensatory allocations register for the land consolidation plan (excerpt)

Land consolidation: X (26521) — Arnsberg land consolidation authority

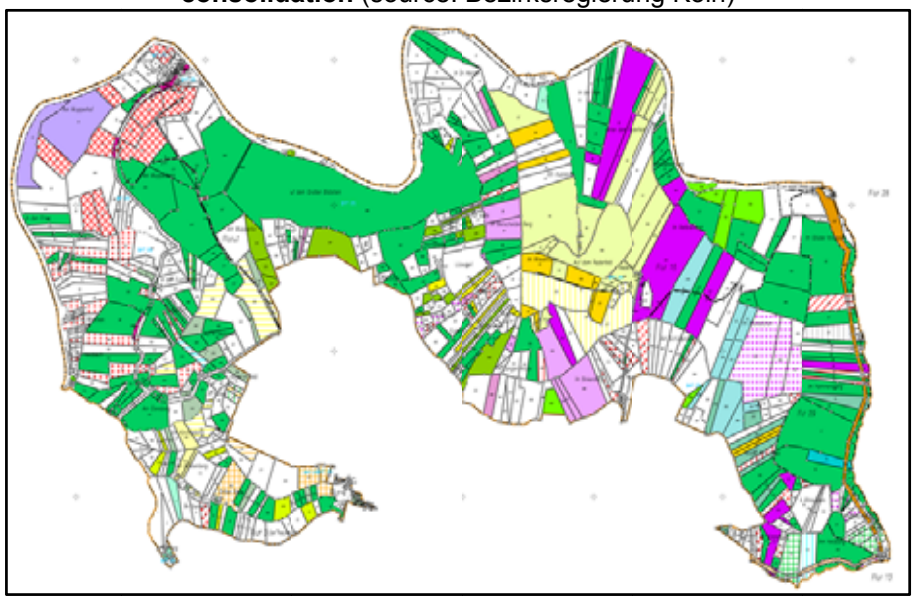
Compensatory allocations register/timber

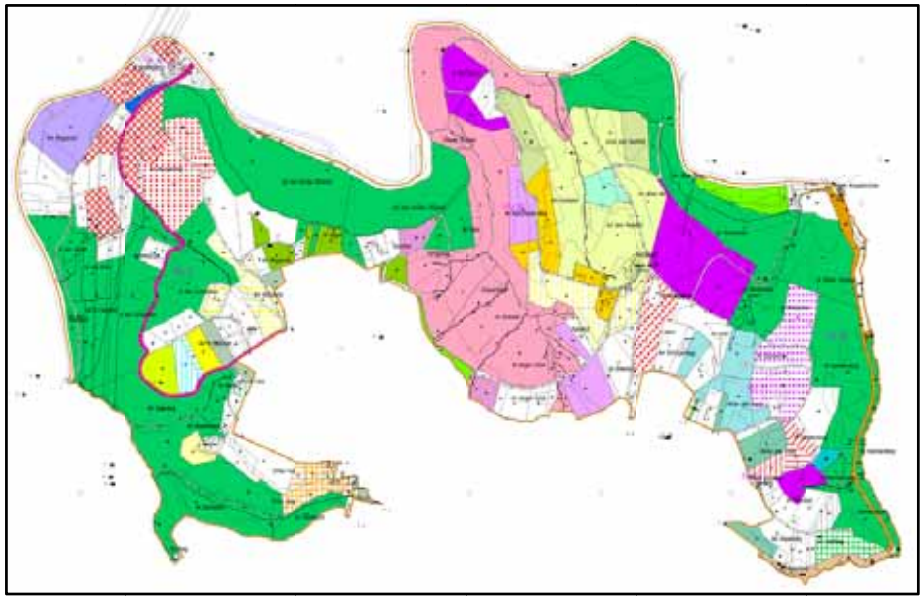
Owner: Peter Lanzerath, Tulpenfeld 53, 12345 Wippenhohn — Reference number: 50/01

Stand no.	Timber stands transferred from ref. no.	Timber stands transferred to ref. no.	Parcel: Old: District	Old: Subdivision	Old: Parcel(s)	New: Cadastral district	New: Cadastral subdivision	New: Parcel	Tree species	Area: ha	Area: a	Area: m²	Stand value €
1	2	3	4	5	6	7	8	9	10	11	12	13	14
87		614/01	Boxberg	2	21				Norway spruce		63	55	10,921
93		27/03	Boxberg	2	22 (part)				Norway spruce		7	70	18,506
94		42/01	Boxberg	2	23				Norway spruce		80	00	15,011
116		73/01	Boxberg	2	110/12 (part)				Norway spruce		55	51	8,572
									Unstocked		33	80	0
23	330/00					Boxberg	12	48	Norway spruce	1	84	46	40,968
24	330/00					Boxberg	12	48	Birch/spruce		18	99	598
25	76/02					Boxberg	12	48	Norway spruce		75	10	5,628
26	120/01					Boxberg	12	48	Beech		9	03	359
												To pay:	47,553
												To receive:	53,012
												Subtotal:	
												To receive:	5,459

It was already clear from exploratory soundings ahead of the Wupperhänge land consolidation shown in figure 5.9-4 that the envisaged woodland consolidation would be of a private benefit nature and objectively in the best interest of all participants. This made it possible to draw up a land consolidation plan that fully met the participants' expectations. The fragmented ownership of the privately held woodland was consolidated into generously sized holdings, made accessible with forest tracks for timber extraction and divided into separately manageable units with average parcel sizes of 1.9 ha.

Fig. 5.9-10: Ownership situation before and after the Wupperhänge land consolidation (source: Bezirksregierung Köln)





The land acquired by the state nature, heritage and culture foundation was allocated to sites of conservation value in the land conservation area. State-owned forest land was consolidated to create a situation where it was no longer interspersed among private woodland. The number of parcels was reduced to one-third. Discrepancies between ownership on the ground and the cadastral record were resolved. The reconfigured network of roads and tracks helped to guide tourism and take the recreational pressure away from areas of conservation value.

5.9.3.3 Individual aspects of woodland consolidation under the Land Consolidation Act

Woodland consolidation requires three specific aspects to be addressed that come up very rarely if at all in agricultural land consolidation measures.

a. Construction of forest tracks in advance to provide access

The administrative and technical procedure followed in a woodland consolidation is generally based on the sequence of steps that has been tried and tested for over a century and is also provided for in the same sequence in the Land Consolidation Act. There are situations, however, when woodland consolidation has to be thought through 'from the end backwards' and then planned and implemented accordingly. This is certainly the case when inaccessible areas of forest due to difficult terrain or areas devastated by storm or snow breakage have to be made accessible in the first place. A need also frequently arises to create access to forest areas as quickly as possible in order to combat a risk of pest infestation.

Fig. 5.9-11: Provisional access to an area devastated by hurricane Kyrill in 2007
(photo: Zerhau)

It is then necessary, after determining the boundary of the land consolidation procedure, issuing the land consolidation decision and establishing the board of the body of participants, to start work straight away on preparing the plan covering the common and public facilities and the accompanying landscape conservation plan (plan under section 41 of the Land Consolidation Act; see section 3.2.2). This lays the basis in public law for planning and constructing internal access for the land consolidation area. In some

cases, the principles for the appropriate reshaping of the land consolidation area under section 38 need to be established in a separate hearing before preparation of the plan under section 41 of the Land Consolidation Act.

As constructing forest roads and accompanying measures involve building on private land belonging to the landowners in the area, an agreement for the use of that land is needed with each landowner. In the situation described above, entering into such agreements is not usually a problem, unless ownership of the woodland area in question is highly fragmented and especially if there is uncertainty about who owns what and the run of the boundaries. Such cases hold little prospect of obtaining the full consent of all landowners. The land consolidation authority has an instrument in its toolbox for cases like these: the provisional order.

Provisional order under section 36 of the Land Consolidation Act

> Section 36 (1): Where urgent reasons make it necessary to stipulate on the possession or the use of parcels or the exercise of other rights prior to implementation of the Land Consolidation Plan or in preparation for and in implementation of modifications thereto, the land consolidation authority may issue a provisional order and repeal or amend previously issued orders. To compensate for hardships, it may set appropriate compensation. Such compensation shall be borne by the Body of Participants.
>
> Section 36 (2): Where the condition of a parcel is relevant to the valuation and to the assessment of compensation, the land consolidation authority shall ascertain the condition in due time and, if need be, by calling in experts.

A provisional order is an omnibus administrative act that must comply with the general provisions of the Administrative Procedure Act (*Verwaltungsverfahrensgesetz*; VwVfG 2003) with regard to administrative acts that impose a burden on those affected. This primarily relates to the requirements of demonstrating urgency and that the order serves the objective of the land consolidation and is therefore in the common interest. The latter criterion is indisputably met if the construction of internal access roads and tracks in advance facilitates and accelerates the progress of the land consolidation procedure and, in particular, reduces surveying and construction costs.

In this light, a provisional order does not present any administrative problems and is welcomed by participants for the reasons stated provided that they are suitably well informed beforehand. While the forest roads are being constructed, work can continue on other required stages of the procedure, such as identification of the parties concerned, valuation of the land and the standing timber, hearing the parties' preferences for compensatory land allocation and preparing and implementing the land consolidation plan.

b. Timing of the standing timber valuation relative to other stages of the procedure

Under section 28 (2) of the Land Consolidation Act, anything that is deemed an essential part of the land and has a permanent influence on its value has to be valued separately. In agricultural land consolidation procedures, the need for valuation of such assets (such as buildings or fruit trees) is usually limited to a few individual instances. They are valued once it is known from the compensatory allocation plan in what instances assets of this kind will change hands. Valuation and official confirmation of the valuation results then take place either before formal publication of the land consolidation plan or as a supplement to the plan following modifications to it (see section 4.3.7).

In woodland consolidation, on the other hand, the need to value elements deemed essential parts of the land is the rule rather than the exception. Reorganisation of the plots of land automatically means a change in ownership of the standing timber. Valuation of timber stands that will change ownership is therefore a key, time-consuming and costly part of the land consolidation that calls for careful planning and execution. The decision on when best to schedule the standing timber valuation in the course of the procedure is based on the following principles in the Land Consolidation Act:

- Every landowner who contributes forest land to a land consolidation procedure is entitled to compensation in forest land. In respect of the allocation of new lots, the management conditions of all participants must be weighed against each other and all factors that have a substantial influence on crop yield and on the use and exploitation of the plots must be duly considered (section 44 (2) of the Land Consolidation Act).
- Where possible, if a piece of forest land is allocated to another party, compensation for standing timber should be made in timber values (section 85 no. 8 of the Land Consolidation Act).

Compensation in timber of equal value makes it necessary to determine what timber value a participant will surrender in the land reorganisation and what timber value the participant will receive from others. This can only be done if the new plot layout is already known. To calculate the equalisation payments, the areas that are going to be given up and taken over need to be visualised on the ground. This is done by locating the new boundaries on site and determining how they map onto the original plot boundaries.

The compensatory land allocation made in timber values only goes part-way to complying with the compensation principles under the Land Consolidation Act. The allocation must also be made in such a way that the timber equalisation payments making up the value difference between the timber stands surrendered and received are affordable for each participant. As can be seen from figure 5.9-9, the timber equalisation payments in the compensatory allocations register can easily run to several thousand euros.

Identifying and valuing the standing timber that is going to change hands involves very time-consuming and costly fieldwork, yet this cannot be done until a stage in the land consolidation procedure (that is, following provisional transfer of possession) when participants expect imminent publication of the land consolidation plan. It is therefore necessary to determine the best way of meeting the participants' expectations in this regard. The pros and cons of various options for timing the standing timber valuation in the course of the land consolidation are outlined in the following.

Fig. 5.9-12: Suitable timing of standing timber valuation in the course of a land consolidation procedure

		A	B	C	D	E
		Farmland valuation (section 28 of the Land Consolidation Act)	In the phase up to the preferences hearing (section 57 of the Land Consolidation Act)	Following delineation and demarkation of the new parcels in connection with the provisional transfer of possession (section 65 of the Land Consolidation Act)	Publication of the land consolidation plan (section 59 of the Land Consolidation Act)	After publication of the land consolidation plan in connection with an amendment (section 60 (1) of the Land Consolidation Act)
A	**Woodland valuation**	X				
	On-site survey	X				
	Announcement	X				
	Preparation of original plots register	X				
	Results announcement and confirmation	X				
B1	**Standing timber valuation**		X			
	Survey and valuation of all forest land		X			
	Results announcement		X			
	Valuation of standing timber changing hands			X		
	Preparation of timber compensatory allocations register			X		
	Results announcement and confirmation			X		
B2	**Standing timber valuation**			X		
	Survey and valuation of standing timber changing hands			X		
	Results announcement			X		
	Preparation of timber compensatory allocations register			X		
	On results announcement and confirmation			X		
B3	**Standing timber valuation**			X		
	Survey and valuation of standing timber changing hands			X		
	Results announcement			X		
	Preparation of timber compensatory allocations register				X	
	On results announcement and confirmation				X	
B4	**Standing timber valuation**				X	
	Survey and valuation of standing timber changing hands				X	
	Results announcement				X	
	Preparation of timber compensatory allocations register					X
	On results announcement and confirmation					X

Case A-A:

It makes sense to carry out the woodland valuation together with the valuation of farmland and other land. This continues to apply if an agricultural appraisal expert is brought in for the farmland valuation alongside the forestry appraisal expert. Establishing the results of the land valuation (section 32 of the Land Consolidation Act) in the entire land consolidation area provides the basis for all remaining stages, such as preparation of the original plots register, determination of the land contribution under section 47, determining the compensation entitlements and preparation of the draft allocation plan.

Case B1-B:

In the case of the survey and valuation of all forest land in the land consolidation area with timber values assigned at plot level (irrespective of whether all stands change hands), the timber valuation follows the same logic as the land valuation. Landowners are told the value of their contributed timber stands at the earliest juncture and can formulate their preferences for compensatory allocations more specifically than they could without that knowledge. The land consolidation authority also has all the information it needs to plan the compensatory allocations in compliance with the provisions in section 85 no. 8 of the Land Consolidation Act. A drawback is that it may turn out after announcement of the new parcel layout that not all of the plots of land contributed by the landowners change hands, making some of the work done in valuing the timber stands unnecessary (see figure 5.9-7). This option is therefore only suitable if it is likely, considering the area and the ownership situation, that most of the land will change hands. Timber values are assigned to the areas changing hands after the provisional transfer of possession.

Case B2-C:

Following provisional transfer of possession, the on-site survey and valuation of the standing timber can be carried out with knowledge of the staked out and demarkated new parcels and is limited to those parts of the original plots that change hands, as shown in figures 5.9-7 and 5.9-8. The compensatory timber allocations register can be announced, but it should be borne in mind that the land consolidation plan is not yet final and incontestable, so changes may be necessary due to objections lodged against the land consolidation plan. If these are only likely to involve minor corrections, then nothing stands in the way of issuing the administrative act formally confirming the valuation under section 32 of the Land Consolidation Act. In the event that major changes are possible, especially to the new parcel boundaries, then formal official confirmation of the valuation results should be postponed, as in case B3-D.

Case B3-D:

Following provisional transfer of possession, the on-site survey and valuation of the standing timber is carried out with knowledge of the staked out and demarkated new parcels and is limited to those parts of the original parcels that change hands, as shown in figures 5.9-7 and 5.9-8. Conclusion of the standing timber valuation with announcement of the compensatory timber allocations register is postponed and takes place on publication of the land consolidation plan, which incorporates the official confirmation of the valuation results. This avoids having to separately amend a previous administrative act due to a necessary amendment to the land consolidation plan.

Case B4-E:

Work does not start on surveying and valuing the timber stands until the land consolidation plan is final and incontestable. This approach follows that of the Land

Consolidation Act: only when one procedural step has become legally final does the procedure move on to the next. Because surveying the standing timber is such a time-consuming process (usually lasting several months depending on the area involved), this can significantly delay the implementation order. Participants then have to wait until formal completion of the valuation process before they can reap the benefits of the land reorganisation, as the implementation order establishing the new legal status cannot be issued until the results of the standing timber valuation have been formally confirmed. This approach is also legally vulnerable, because a lack of objections to a land consolidation plan published without knowledge of the compensatory timber allocation does not mean that participants will not lodge objections afterwards once the compensatory timber allocations register is announced. Relying on sections 44 (2) and 85 no. 8 of the Land Consolidation Act, a participant could well assert with due reasoning that compensation under the land consolidation plan is not of equal value.

As shown by the above analysis of options for practical implementation of the standing timber valuation in woodland consolidation, the choice of timing has to be made on the basis of legal, cost and structural considerations.

c. Hunting rights and the reorganisation of a land consolidation area

Hunting rights are among the most important rights *in rem* deriving from woodland ownership, especially in large, contiguous areas of forest. They are protected by property law but (unlike a land lease) are not recorded in the land register.

Under German law, hunting rights can be exercised in a private hunting district or a collective hunting territory.

A private hunt (*Eigenjagd*) or private hunting district (*Eigenjagdbezirk*) comprises all contiguous agricultural, forestry or fisheries real property belonging to a person or group of persons and encompassing a contiguous area of at least 75 ha.

A collective hunting district (*gemeinschaftlicher Jagdbezirk*) comprises contiguous areas of land encompassing together at least 150 ha and not belonging to a private hunting district. The area of a hunting district includes roads, sports facilities and also areas where hunting is suspended (*befriedete Bezirke*). Larger minimum sizes may be stipulated for private and collective hunting districts in hunting legislation enacted by the individual German states.

In a private hunting district, hunting rights are exercised by the landowner, but may also be leased to another person or persons who are authorised to hunt. A collective hunting district is used as a hunting cooperative (*Jagdgenossenschaft*) or leased to individuals (*Jagdpächter* or hunting tenants).

The fact that, by law, hunting rights are tied to the land brings them within the remit of rural land readjustment and land consolidation. For this reason, holders of hunting rights are second-order participants within the meaning of section 10 no. 2d of the Land Consolidation Act. A land readjustment procedure reshapes land ownership but, with certain exceptions provided for in the Act, leaves rights attached to the plots of land untouched. Under section 68 (1) of the Land Consolidation Act, in respect of such rights attached to the original plots and such legal relationships concerning the original plots as are not abolished, the compensatory land allocation takes the place of the original plots. This *in rem* subrogation applies both to the right of ownership and to all other rights *in rem* to the plots of land. Hunting rights therefore also remain untouched.

Although hunting districts generally need to be reorganised or adjusted in line with the new farmland or forest layout following entry into force of the new legal status, this is not the responsibility of the land consolidation authority. According to supreme court rulings, the land consolidation authority does not have the power to reorganise hunting districts or even to intercede in arrangements under hunting law between landowners (Seehusen; Schwede 1997). The adjustment of hunting districts following entry into force of the new legal status is a matter for the hunting authorities and is not generally carried out until the land register and cadastral register have been corrected (see section 3.3.5).

If the objective of the land consolidation nevertheless requires hunting rights to be rescinded under section 49 (2) of the Land Consolidation Act, compensation has to be provided under section 44 (2) of the Act in the compensatory land allocation or as a compulsory purchase measure. An example is when it is not possible to allocate the owner of a private hunt at least 75 ha of contiguous land in compensation. This can result in large compensation payments that have to be borne by the body of participants. The capitalised value of a hunting lease is significantly higher for a private hunting district than for a collective hunting district.

The opposite case can and does also arise, however – where a landowner with more than 75 ha of farmland and/or forest land that did not constitute contiguous property for the purposes of hunting law is allocated a consolidated, compensatory land allocation in the land consolidation that does meet the requirements for a private hunt. This puts the benefiting landowner at such a great economic advantage over the others that it is necessary to ask whether the management conditions of all participants have indeed been weighed against each other (section 44 (2) of the Land Consolidation Act) in appropriate use of the consolidation authority's discretionary power. A compensatory land allocation of this kind is legally tenable only if the beneficiary has to accept certain other disadvantages relative to the other participants in return.

5.9.4 Land readjustment procedures in cases of collective forest management

Various forms of collective forest management developed for joint cultivation of forest land over the centuries. Changes during the 19th century caused an increasing focus to be placed here on legal and economic aspects of forest management. That focus continues to apply in the present day, because the fact of private landowners joining forces for collective management does nothing to remedy the structural disadvantages of small forest holdings that lead them to work together in the first place. To this day, therefore, there is considerable incentive to achieve better administration and management of small private forest holdings by organising in larger units.

Under German law, collective forest management can generally take two forms: either as a forest cooperative (*Waldgenossenschaft*) or in the form of combined forest management undertakings (*forstwirtschaftliche Zusammenschlüsse*); details are provided in Thiemann; Mock; Schumann (2016).

5.9.4.1 Forest cooperatives under article 83 of the Introductory Act to the German Civil Code

A forest cooperative is the joint owner of the land belonging to it. The individual landowners (forest cooperative members) hold co-ownership of undivided shares in the forest cooperative. These are ownership interests that constitute a land right. They can

be sold and inherited, in which case membership merely changes hands. However, the individual cooperative shares cannot be subdivided.

The joint property of the forest cooperative and the forest cooperative members' shares in it are not stipulated on in the German Civil Code (*Bürgerliches Gesetzbuch*) or the Land Register Code (*Grundbuchordnung*; GBO 1994). Instead, as outlined in section 5.9.2, this form of property continues to exist under prior law. Making use of powers under article 1 (2) of the Introductory Act to the German Civil Code (EGBGB 1994), the State of North Rhine-Westphalia in 1975 and the State of Thuringia in 1999 placed the historical forms of collective management under prior law on a new legal basis. This enables cooperative shares to be recorded under a consecutive number in the inventory section of the land register folio for the owner.

North Rhine-Westphalia still has around 270 forest cooperatives with some 18,000 landowners holding cooperative shares to around 41,000 ha of land, mainly in the southern part of the state. Thuringia has about 340 historical collective management arrangements, again with around 18,000 member-landowners covering some 17,500 ha. While no more new forest cooperatives are established in North Rhine-Westphalia, new cooperatives do still come into being in Thuringia.

In all other German states, which have not enacted state-level legislation for the purpose, it is no longer possible for forest cooperatives to be established within the meaning of article 83 of the Introductory Act to the German Civil Code. It is, however, possible to establish joint management arrangements by contractual agreement in the form of co-ownership by fractional shares (*Miteigentum nach Bruchteilen*) under on the section 1008 of the German Civil Code (further details are provided in Thiemann; Mock; Schumann 2016).

5.9.4.2 Merger of forest cooperatives under the NRW Common Forest Land Act in conjunction with the Land Consolidation Act

(source: A. Peter; Bezirksregierung Arnsberg)

The objective of a merger procedure under sections 26 *et seq.* of the North Rhine-Westphalia (NRW) Common Forest Land Act (*Gemeinschaftswaldgesetz NRW*; GWG 1975) is to improve forest management, facilitate administration and create a uniform forest management plan for sustainable forest management. In most cases, several forest cooperatives are merged into a new forest cooperative. Under section 27 of the NRW Common Forest Land Act, the provisions of the Land Consolidation Act (FlurbG 1976) apply analogously to such merger procedures. Initiation of a merger under the NRW Common Forest Land Act has to be approved by the higher forest authority.

The merger decision establishes the body of participants for the merger procedure (section 16 of the Land Consolidation Act). Land valuation in accordance with sections 27 *et seq.* of the Land Consolidation Act is generally carried out in a straightforward manner. Valuation of the standing timber is far more involved. If available, valuations from the forest management plan are used as an alternative. The results of the valuation are announced and officially confirmed together with the merger plan.

The merger plan (section 100 of the Land Consolidation Act) sets out the outcomes of the procedure. Following entry into force of the new legal status, it serves as the official register of plots of land (section 2 (2) of the Land Register Code).

Appeals against administrative acts of the land consolidation authority under the NRW Common Forest Land Act can be brought directly before the administrative court, without preliminary proceedings.

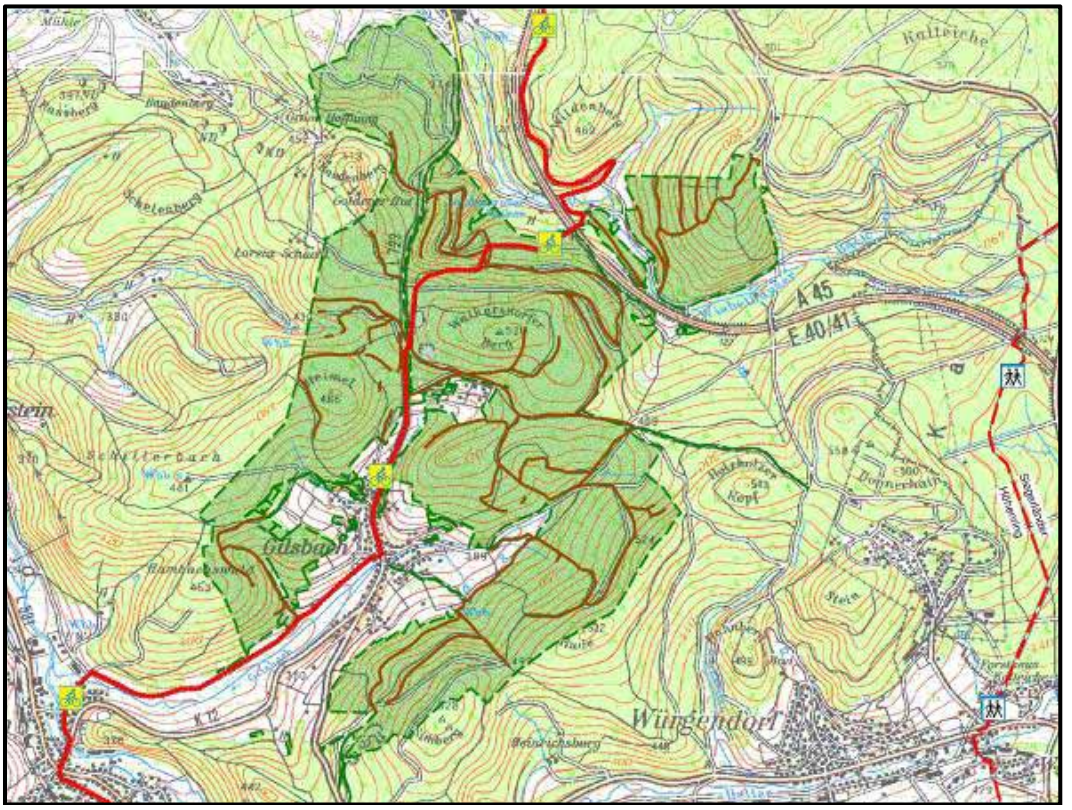
In the following, the main stages of the procedure are illustrated with the example of the Gilsbach area merger procedure under section 26 of the NRW Common Forest Land Act in conjunction with the Land Consolidation Act.

Objective of merger

The legal merger of five forest cooperatives was directed at improving forest management and facilitating their administration. Their land was to be consolidated by exchanging out enclaves of other parties' land. In addition, the forestry infrastructure was to be improved in a nature-sensitive and environment-friendly upgrade to the track network for better forest access and to mobilise timber as a material and energy resource. Future lease income from wind turbines was taken into account in the merger procedure.

The procedure area took in 710 ha with 420 participants, with additional neighbouring forest cooperatives and private landowners involved in the procedure.

Fig. 5.9-13: Reshaping of the infrastructure in the merger area (source: A. Peter; Bezirksregierung Arnsberg)



The planning of the forest road network demands an explanation as parts of it clearly contradict the principles set out in section 4.4.3.2: The reason for the numerous dead-ends in the road network is that the consolidated forest cooperative is managed as a whole and the tracks are only for accessing the forest areas and extracting the harvested timber.

Stages of the merger procedure

- Information of the forest cooperative members likely to be affected
- Membership resolutions of the five forest cooperatives to seek merger
- Joint application by the five boards for the merger
- Merger decision under section 91 of the Land Consolidation Act
- Implementation of the merger by the land consolidation authority:
  - Valuation of land and standing timber
  - Preparation of the plan covering the common and public facilities with accompanying landscape conservation plan
  - Preparation of the merger plan
- Implementation order following entry into force of the merger plan.

Valuation in the merger procedure

Land valuation is carried out by the land consolidation authority in consultation with the board of the body of participants, with the standing timber being valued by a forestry expert.

Fig. 5.9-14: Results of land and standing timber valuation

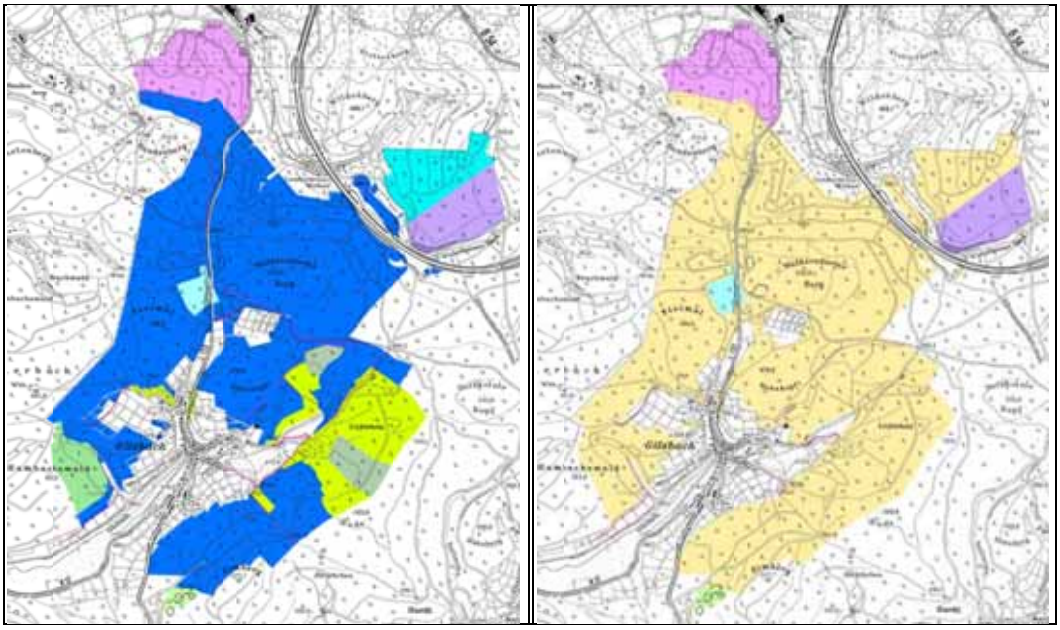
Forest cooperative (ref. no.)	Shares	Area	Land value	Timber value	Present value	Total value
		ha	€	€	€	€
9/00	3,912	481.0675	962,135	1,873,166	150,000	2,985,301
7/00	3,572	67.3221	134,644	479,619	30,000	644,263
6/00	1,987	17.3924	34,785	115,322	20,000	170,107
5/00	1,760	19.2230	38,446	97,428	10,000	145,874
8/00	620	33.9671	67,934	204,024	5,000	276,958
Total	**11,851**	**618.9721**	**1,237,944**	**2,769,559**	**215,000**	**4,222,503**

(source: after A. Peter)

On this basis, the merger plan was prepared and equalisation payments for over-allocations and under-allocations were set at €634 per share. Under the merger plan, the forest cooperatives that contributed two approved wind turbines to the merger procedure were awarded the lease income (€40,000 p.a.) for 25 years.

At the point in time specified in the implementation order, the new legal status provided for in the merger plan entered into effect, with one single forest cooperative taking the place of the five previous forest cooperatives. The merger procedure was concluded with correction of the public records and appointment of the governing bodies of the new forest cooperative.

Fig. 5.9-15: The forest cooperatives involved in the merger and their boundaries after merger (source: A. Peter; Bezirksregierung Arnsberg)



Outcome of the merger

The five previous forest cooperatives were merged into the new Gilsbach forest cooperative. This manages 11,851 cooperative shares of some 420 forest cooperative members and an area of 619.9721 ha. All uncertainties regarding boundaries were eliminated. The area was freed of privately held land enclaves.

To improve forest access, some 24.7 km of roads and tracks were upgraded and 2.3 km newly constructed with formation widths of 4.5 to 5.0 m and a carriageway width of 3.5 m. Measures were implemented to foster the development of nature and the environment, including the removal of spruce stands from wetlands and stream valleys and the conversion of areas under spruce to mixed woodland. Merger of the cooperatives created a unit of an economically viable size for sustainable forest management. Forest management, timber marketing and the deployment of operating resources were made more efficient and economic. Administration costs fell because expenses and revenues no longer have to be split across the various cooperatives. The merger reduced the business risk facing small forest cooperatives. Finally, a new ownership register was established.

5.9.4.3 Establishment of a forest cooperative under sections 1008 *et seq.* of the German Civil Code

The establishment of new forest cooperative in the form of co-ownership by fractional shares is covered in Thiemann; Mock; Schumann (2016) and the references listed therein and in Harnischfeger; Peuke (2021). Amalgamation with other forest cooperatives for economic reasons is able to take place as outlined in section 5.9.4.2.

5.9.5 Combined forest management undertakings under section 15 of the Federal Forest Act

Peasant-cultivated forest is a thing of the past, and the German term *Bauernwald* mostly serves today as an ecological descriptor for woodland shaped by historical management practices. Very few forest landowners today are willing and able to manage the woodland themselves. Efforts to encourage contractual arrangements for the joint management of forest holdings have been underway since the early 20th century. Theoretically, these can be implemented in Germany using any form of establishment, including partnerships under the German Civil Code, cooperatives under the Cooperatives Act and the various forms of establishment under the German Commercial Code. All joint entities are established by contract.

In practice, however, most such arrangements take the form of a forestry management association (*Forstbetriebsgemeinschaft*, also known as a *Waldbesitzervereinigung*) under sections 16 to 20 of the Federal Forest Act (*Bundeswaldgesetz*; BWaldG 1975) or as a registered association (*eingetragener Verein*) under section 21 or commercial association (*wirtschaftlicher Verein*) under section 22 of the German Civil Code. A forestry management association is a private-law association of forest landowners with the purpose of joint management of its members' forest holdings and in particular of surmounting disadvantages due to structural deficiencies of forest land ownership, such as small units, impractically shaped units, fragmented ownership, interspersed plots, inadequate road or track access and unproductive or low-yield timber stands. The Act Concerning Combined Forest Management Undertakings (*Gesetz über forstwirtschaftliche Zusammenschlüsse*; FZusG 1961) gave a significant boost to such initiatives from the early 1960s onwards. In 2003, there were a total of 1,723 recognised forestry management associations in Germany, with some 311,000 members and a forest area of around 3.150 million ha. Forestry management association rarely undertake 'all-round' management of forest land. Instead, they tend to concentrate on timber harvesting, joint marketing, coordinated procurement and deployment of machinery and equipment, and forest road construction and maintenance.

Unlike in forest cooperatives, expenses and revenues relating to the services provided by forestry management associations have to be allocated to members' individual units. This incurs a significant administrative burden. Inheritances or sales of forest land further add to the administrative expense. In some regions, this has led to adoption of a new instrument for the reduction of harvesting and marketing expenses: **temporary consolidation into management blocks** (Wippel 2012). Forest land ready for timber harvest and sale is combined into management blocks with the aid of orthophoto maps, excerpts from the cadastral register and, where necessary, digital elevation models. Such arrangements only work if forest landowners are approached in advance by forestry authority experts or freelance forestry engineers to explain the benefits of the measures in question. In many cases, the experts need to intermediate between the various landowners.

5.9.6 Conclusion

In addition to traditional land consolidation under the Land Consolidation Act, as is the case for agricultural land, various options are available by law and at sub-legislative level for land readjustment in the interests of sustainable forest management. This links back to the sub-legislative voluntary instruments for the improvement of production and

working conditions in agriculture and forestry outlined in section 5.8. All approaches share the objective of serving the economic interests of landowners in and societal expectations with regard to sustainable use of the land.

5.10 The present-day and future role of rural land readjustment and land consolidation in Germany

The implementation aspects of land consolidation and land reorganisation presented in this chapter show, using selected examples, how governments and implementing authorities use instruments of land readjustment to meet present-day land use challenges. These challenges vary greatly in Germany from region to region. They materialise in the specific everyday challenges faced by a land consolidation authority in its various work areas, as can be seen, for example, in a paper recently published in the portfolio of the rural land readjustment administration for the State of North Rhine-Westphalia, Verwaltung für Agrarordnung NRW (umwelt-nrw 2021).

> *With a population of 18 million, the State of North Rhine-Westphalia is Germany's most populous state. The Ruhr metropolitan region is a European industrial region, a science and technology cluster and a culture and media region. Nevertheless, about 50% of state territory is dominated by a dynamic and globally competitive agricultural sector and about 25% by a forestry sector undergoing forest transformation and with a large export share. The current business areas of the five land consolidation authorities serving the various regions of the state are Agricultural Structure and Food Security, Nature Conservation and Landscape Management, Forestry, Water Resources Management, Infrastructure, Post-Mining Rehabilitation, and Improvement of Living Conditions. Verwaltung für Agrarordnung NRW has carried out its work as a land consolidation authority without interruption for 200 years – needless to say with ever-changing objectives, a changing legal framework and changing organisational forms and titles.*

This 'snapshot' of the portfolio of a modern land consolidation administration in 2021 is illustrative of the role and importance of rural land readjustment throughout Germany. It shows how rural land readjustment can make an effective and lasting contribution to a country's social and economic development. In their present-day form – based on the guarantee of personal property, with checks and balances in administrative procedures to safeguard the rule of law and ensure orientation towards sustainability principles, and deployed in a pluralistic society with a free democratic social order – the rural land readjustment instruments used in Germany today are manifestly capable of meeting today's challenges while balancing individual freedom with the public interest.

This also applies to all land use challenges arising from climate change. While it is impossible to predict how climate change will ultimately alter agriculture and forestry, how we will adapt to inevitable impacts of climate change, live with climate change and cope with extreme climate events, or how global climate zones will shift over time, it is clear that climate and climate change will define the conditions for future land use. This ties in directly with land reorganisation as practised by public authorities in a system based on the rule of law. The entire land readjustment portfolio as described in the preceding chapters can be harnessed for the necessary adjustments that lie ahead (DVW 2010; UBA 2011). New forms of land readjustment may also have to be developed in the process.

6 The importance of land consolidation and land development in the international context

Rural development is by no means an issue limited to any specific country such as Germany. It is a continental and a global challenge. The specific challenges vary considerably from place to place.

On the global level, 'rural' is synonymous with 'poverty'. Accordingly, the United Nations Millennium Development Goals adopted in 2000 are primarily directed at fighting hunger and poverty, with a strong focus on rural development. Two-thirds of the world's hungry people live in a rural setting. In large parts of the world, efforts are concentrated on meeting people's basic needs: healthy drinking water, adequate nutrition and a decent place to live. These things that are taken for granted in the developed world are still the main priority in many countries – far ahead of people's aspirations for a self-determined life with work, health care and education. At the same time, there are landowners in many countries of the Third World who own and exploit unimaginably large areas of farmland or forest where the value generated does not remain in the countries concerned but is invested for profit maximisation in international capital markets.

Internationally, rural development in the Third World is regarded as a long-term process of change involving a multitude of sectoral and regional strategies. According to Brüntrup (2016), rural development will have to become the backbone of poverty reduction, food security and prosperity. At the heart of this approach is the 'land question', meaning people's access to land as the basis for growing subsistence crops to meet at least basic needs (FAO 2005). In world regions ravaged by civil war, land ownership and property rights are key factors in achieving reconciliation between ethnic groups and for the first steps toward the economic recovery of a functioning state. Guaranteeing ownership and property rights to land is also a matter of the rule of law in the governance of land tenure and in participation-based grassroots development activity (FAO 2007). In light of the very different points of departure for development measures in countries of the Third World, the Organisation for Economic Co-operation and Development (OECD) presented a framework for rural development strategies with a typology of 'Five Rural Worlds' (OECD 2006).

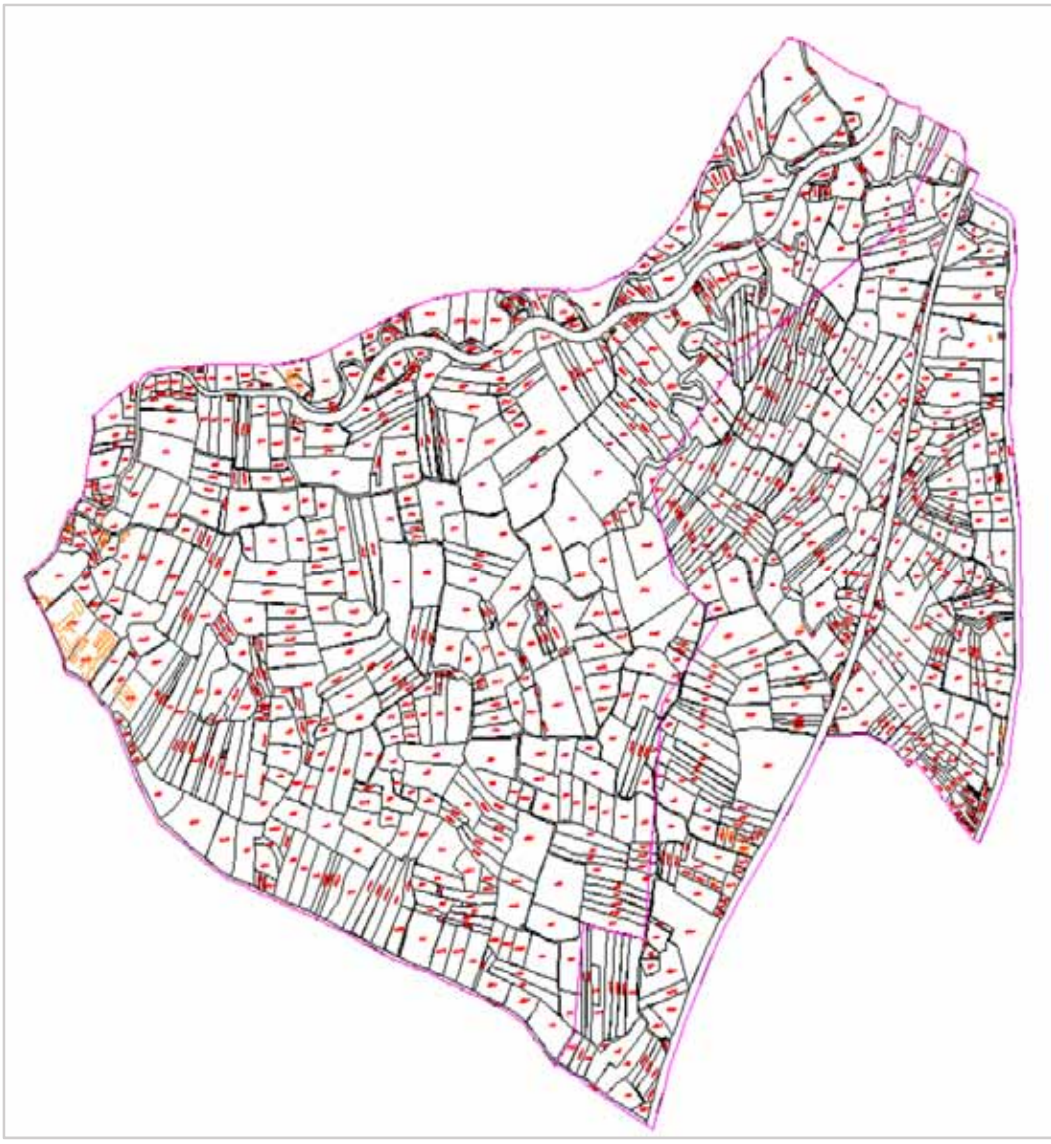
Fig. 6-1: The OECD 'Five Rural Worlds' model

Rural World 1 (RW 1) Large-scale commercial agricultural households and enterprises	• Make up a very small minority of rural households and firms in the developing world • Engaged in high-value, export-oriented agriculture • Have direct access to finance, risk management instruments, information and infrastructure • Have an influential voice in national policies and institutions affecting their enterprise • Have close ties to buyer-driven value chains.

Rural World 2 (RW 2) Traditional agricultural households and enterprises, not internationally competitive	• Account for a substantial number of rural households and agricultural firms in the developing world • Families frequently part of the local elite but have little influence at the national level • Have sizable landholdings often devoted to both commercial and subsistence agriculture • Previously had access to basic services, such as finance, but no longer do so following structural changes.
Rural World 3 (RW 3) Subsistence agricultural households and micro-enterprises	• Comprise the very large share of fishermen, pastoralists, smallholders and associated micro-enterprises • Food security is their main concern • Their assets are poorly developed • Have very limited access to services (credit) • Very limited ability to manage risk • Many live in fragile ecosystems or less favoured regions.
Rural World 4 (RW 4) Landless rural households and micro-enterprises	• Micro-enterprises frequently headed by women • Sharecropping or working as agricultural labourers for better-off households in their communities is the most secure livelihood option for many • Migration to economic centres on a daily, seasonal or even permanent basis • Low education levels a major barrier to migrating out of poverty.
Rural World 5 (RW 5) Chronically poor rural households, many no longer economically active	• Chronic poverty having sold off or been stripped of asset holdings during periods of crisis. • Remittances from relatives, community (international) safety nets and government transfers are vital to their sustenance • Poverty often results in social exclusion from the local community.
	(after OECD 2006)

Rural development is also a challenge for the Central and Eastern European countries (CEECs) and the countries of the Commonwealth of Independent States (CIS) that emerged from the former Soviet Union. Many of these are still undergoing transformation from the former socialist planned economy to a free market economy. This has a major impact on rural regions (see, for example, Dijk 2003, Thomas 2006c). It is a process that (with few exceptions) has still not been completed even after nearly 30 years of national independence (Thomas 2011b). If rural areas are not to be left behind in general economic recovery, it is essential in these countries for the agricultural structures resulting from land reforms of the 1990s to be geared towards present-day requirements of sustainable agriculture while improving living and working conditions. Land consolidation restricted to a (voluntary) consolidation of land parcels is insufficient to this end. Only a few such countries are making visible efforts to make the transition from sectoral land consolidation to integrated rural development.

Fig. 6.1-1: The land readjustment challenges that still lie ahead in Central and Eastern European countries are clearly illustrated by this example from Serbia (source: GIZ Serbien 2014).



Even in developed economies, the work of rural development is never complete. As the degree of social organisation increases, competing land use claims become increasingly differentiated, and this necessitates clear spatial allocation (Thomas 2006a).

6.1 Land consolidation and land development in the present-day European context

6.1.1 Land development approaches and instruments in Europe

Rural development has been a vital sociopolitical and government policy challenge in Western Europe ever since the upheaval of the social and state systems triggered by the French Revolution. However, developments predominantly took place within the bounds of the respective national context, whether in France, the Netherlands, Sweden, Denmark, Belgium, Austria, Luxembourg, Spain, Italy, Finland, Switzerland or Germany. Systematic or even comparative studies of rural development in Europe are rare. In the German-language literature, for example, initial discussion of the problem of land consolidation in Europe is found in Tcherkinsky (1942), followed by Korte (1952) and Welling (1955). Gamperl (1955) provided the first synoptic presentation of the objectives and legal basis of land consolidation in Western Europe. This publication also addressed the substantive and technical implementation of land readjustment together with the structure and working methods of the implementing bodies. In the early days of the European Communities, there followed a first comparative description of "Land Consolidation in Europe" (Jacoby 1961), published by the Sub-Commission on Land and Water Use of the European Commission on Agriculture of the Food and Agriculture Organization of the United Nations (FAO).

Whereas the approaches described in the above publications are still entirely directed at rectifying 'land fragmentation' and at traditional agrarian structure improvement, BMELF (1992), in a European comparison, placed land consolidation in a spatial policy context for the first time "as an instrument of economically and environmentally effective rural development".

Methodological and instrumental approaches of six European countries in rural development were systematically investigated and subjected to comparative analysis in the INTERREG III C FARLAND (Future Approaches to Land Development) project carried out between 2005 and 2007. The aim of this project was to make use of the analysis to refine the various instruments in line with current needs and provide the basis for further innovation in rural development (Thomas 2006b). The project outcomes are published in FARLAND (2007).

6.1.2 Programmatic aspects of land consolidation and rural development in Europe

The current EU 2030 Strategy on rural development in Europe ties in with the United Nations Sustainable Development Goals. In this connection, the European Commission publishes an annual reflection paper (European Commission 2019). Nine objectives have been set for the Common Agricultural Policy (CAP) for the 2021 to 2027 funding period (see fig. 6.1-2). The instruments of land consolidation and rural development described in this book can make a significant direct or indirect contribution towards achieving many of these objectives.

Fig. 6.1-2: CAP objectives for the 2021 to 2027 funding period
(www.ec.europa.eu/info/ food-farming-fisheries/key-policies/)

Support for rural development in member states of the European Union is largely provided through the European Agricultural Fund for Rural Development (EAFRD) (European Commission 2019). The EAFRD is also used to implement European strategies such as the Green Deal, the Farm to Fork Strategy and the Biodiversity Strategy for the conservation of natural resources. EAFRD is implemented by way of a national strategy plan in each member state. For Germany, further information is provided on the website of the Federal Ministry of Food and Agriculture (BMEL), www.bmel.de.

The European Commission is not itself involved in operational implementation of the programme objectives, which it leaves to the member states. At the end of each funding period, however, the Commission has the measures that have been funded and implemented evaluated by external experts to determine the extent to which planned measures have been implemented and the programme objectives achieved.

6.1.3 Operational aspects of land consolidation and rural development in Europe and beyond

Two terms that are used to an equal extent in this context and above all with the same intended meaning internationally are ‘land consolidation’ and ‘rural development’. Internationally, ‘land consolidation’ takes in all forms of reorganising land ownership or (in some cases solely, as in the People’s Republic of China) land tenure and is always closely associated with land use planning. Moreover, it is by no means restricted to the rural setting. Land consolidation is synonymous with:

- Voluntary or sovereign exchange of privately or publicly owned land parcels

- Standard land consolidation, in the German sense (*Regelflurbereinigung*), with the redevelopment or reshaping of rural infrastructure and obligatory participation by landowners in the land consolidation area
- Integrated land consolidation taking into account sectoral planning requirements in state spatial planning
- In (former) socialist countries, where ownership rights were generally expropriated in favour of a full and perpetual right of use for collective farms, the reorganisation of rights of use in the course of large-scale land improvement or infrastructure measures.

The different shades of meaning attached to land consolidation are also reflected in the legal and institutional basis for implementing land consolidation measures: In some countries, land readjustment is governed as a public responsibility in legislation covering the entire national territory, meets the standards of the rule of law and provides for full involvement of the affected population. Elsewhere, however, land consolidation is considered a matter of the municipality or even the collective and is carried out according to rules of self-governing autonomy, in some cases on the basis of local council decisions with no right of appeal and consequently no judicial review (Thomas 2011b).

Horizontal and vertical coordination of reorganisation measures with sectoral and spatial planning is likewise by no means common in the countries of Europe.

A tentative thematic classification of the many pressing rural development issues in Europe brings out three characteristic distinguishing features:

- First, there are the countries of Western Europe with well-developed rural development strategies, comprehensive legislation on rural development instruments and established public institutions to implement them. They make successful use of national and European support for rural development and, in particular, deploy proven land readjustment instruments effectively to resolve a wide range of competing land use claims. Among these countries, sectoral administrations in Germany have at their disposal what is indisputably the most significant and comprehensive framework for the performance of these responsibilities, in the form of the Guidelines for Land Development (*Leitlinien Landentwicklung*, www.landentwicklung.de/ziele-und-strategien/leitlinien; Thomas 2011b). Rural development tasks are nevertheless successfully carried out in other countries in the absence of a framework of this kind (see, for example, Pauwels 2014; Leenen 2014; Seher, Mansberger 2014).
- Secondly, there are the former socialist countries of Central and Eastern Europe whose socialist or even pre-socialist land consolidation legislation survived the transformation processes of the 1990s and which are now in the course of adapting that legislation and their implementation practices to contemporary standards with regard to the rule of law, participation and administrative efficiency. Their aim here is to harness the traditional instrument of land consolidation with its (sectoral) agrarian structure approach as an instrument of integrated rural development (see, for example, Kaulich 2013; Korta, Kozlowski et al. 2014; Serbien 2014; Lisec et al. 2015; Kuhn et al. 2016).
- The third category comprises former socialist countries that do not (or no longer) have specific land consolidation legislation (such as the Baltic states, Hungary, Bulgaria, Romania and Moldavia). In light of disastrous results of land reforms after the collapse of the socialist system, efforts are now underway in

these countries to create awareness of the need for land consolidation to rectify the incredible fragmentation of ownership created by those reforms.

Fig. 6.1-3: Outcome of land reform in Albania (source: Hartvigsen 2014)

Excessive fragmentation of land ownership and land use in Terbuf Municipality, Albania. The illustration shows an excerpt of the ortophoto from one of the villages in the municipality with overlay of the cadaster map. In average each family owns 1.72 ha distributed in 5.33 physical parcels. The parcels are often distributed in a distance of 3-4 km from the homestead.

At the recommendation of the FAO and with particular support from Scandinavian and Dutch experts, 'voluntary land consolidation' – without a legal basis but with the involvement of notaries – was trialled here in pilot projects in an attempt to persuade farmers of the benefits of land consolidation. Although most participating landowners were disappointed with the results of the pilot projects, which fell far short of their expectations, none of these countries has since gone on to develop practical and effective land consolidation legislation. The dedicated initiative of national experts has largely gone no further than the development of land consolidation 'strategies' or 'programmes'.

Today, rural development in these countries mainly takes the form of funding for agriculture-related investment via LEADER projects and for agri-environmental measures as a welcome complement to direct farm payments. While national politicians court the 'family farm' as deserving of support, agricultural policy effectively serves to favour and consolidate the position of large, former socialist agricultural enterprises. This sectoral policy environment is not conducive to the emergence of instruments of integrated rural development.

Looking at this classification, the countries of Central and Eastern Europe would appear predestined to pass through all of the same development phases as Western European countries have undergone over the last 200 years on the way from traditional consolidation to integrated land development (see section 1.1). This defers any hopes of

livable and sustainable rural regions for future generations. Although the Western Europe experience may suggest otherwise, it does not appear possible for land consolidation to make a sudden leap from a narrow consolidation instrument to a versatile land development instrument for broader rural development.

However, the experience of two countries beyond the European sphere does not square with this conclusion. This relates to land consolidation in the Republic of Turkey and in the People's Republic of China.

Without significant guidance from, for example, German land consolidation administrations or international organisations, but on national initiative with systematic exploration and analysis of methodological alternatives in Europe, the last 30 years have brought major changes in the **Republic of Turkey**:

- Solid legislation on land reform and land consolidation (Demirel; Gülsever 2007)
- Efficient organisational structures for the implementation of land consolidation in the shape of the General Directorate of Agricultural Reform and nine regional directorates
- A World Bank loan providing the financial resources for comprehensive rural development, with some 10 million ha of agricultural land under reorganisation and development between 2013 and 2022 (Türker; Gülsever 2013 and Küsek 2015).

Fig. 6.1-4: Integral land consolidation for land development in Turkey
(source: Gülsever)

*In the **People's Republic of China**, too, rapid changes are underway in terms of land policy and social policy for rural development. Although the Chinese legal system does not recognise private land ownership – it only recognises private rights of land tenure – great interest has arisen over the last ten years or so in European approaches for land consolidation. This is because tenure rights in China now constitute a legal title that is market-negotiable (by subletting, inheritance or sale) and require readjustment or even reorganisation when actual*

land use conflicts with public or private objectives. The main interest of Chinese experts here is in the German approach of integrated land consolidation and integrated rural development.

Fig. 6.1-5: Integrated land consolidation master plan for rural development in Ranyi (source: MoLR Beijing, China)

Land consolidation has been on the central government agenda in China as an effective rural development tool since 2008. The National Congress of the Chinese Communist Party resolved to carry out land consolidation on a large scale. According to government decrees, land consolidation is considered a state-directed responsibility and is intended to promote China's socioeconomic development, improve living conditions for the rural population and deployed strategically as a measure against the rededication of agricultural land as building and industrial land and against rural-urban migration.

- Over the intervening years, land consolidation legislation has been enshrined in several national laws with provisions on comprehensive land management supplemented by implementing regulations at provincial level. The legislation is based on the principles of the rule of law, transparency and participation in administrative decisions.
- An efficient sectoral administration was created in the form of the Ministry of Land and Resources (MLR) and subsequently the Ministry of Natural Resources (MNR) with its subordinate administrative levels. The role of lower land consolidation authority is assigned to county administrations. This sectoral administration has an annual rural development budget of around US$14 billion.
- Thematic issues currently addressed by the Chinese experts include integrating rural development into national spatial planning, village

development, participation and dialogue-based involvement of local populations in land development measures, and environment-friendly land consolidation, as the proceedings of the 5th Sino-German Agricultural Week in 2019 confirm (Thomas 2020b).

This all makes it all the more pertinent to ask why the deployment of land readjustment and land development instruments in Central and Eastern European countries has been so unsatisfactory from a professional point of view. Is it due to a lack of subject-matter knowledge among national experts in government and parliament? Are the financial resources not there to sustain the necessary development process over a period of years? Is it because society in general, and rural populations in particular, are not yet ready to tackle the reshaping of rural areas with the instruments of land readjustment and land development? Does the resistance come from local authorities for fear of interference in their self-governing autonomy? Or is it because of the agricultural and land market sectors lobbying politicians to prevent or at least postpone this kind of development?

Whatever the answer, it cannot be a lack of general subject-matter expertise and experience after the 200-year 'field trial' of rural land readjustment in Europe.

6.2 Land consolidation and land development in supranational organisations

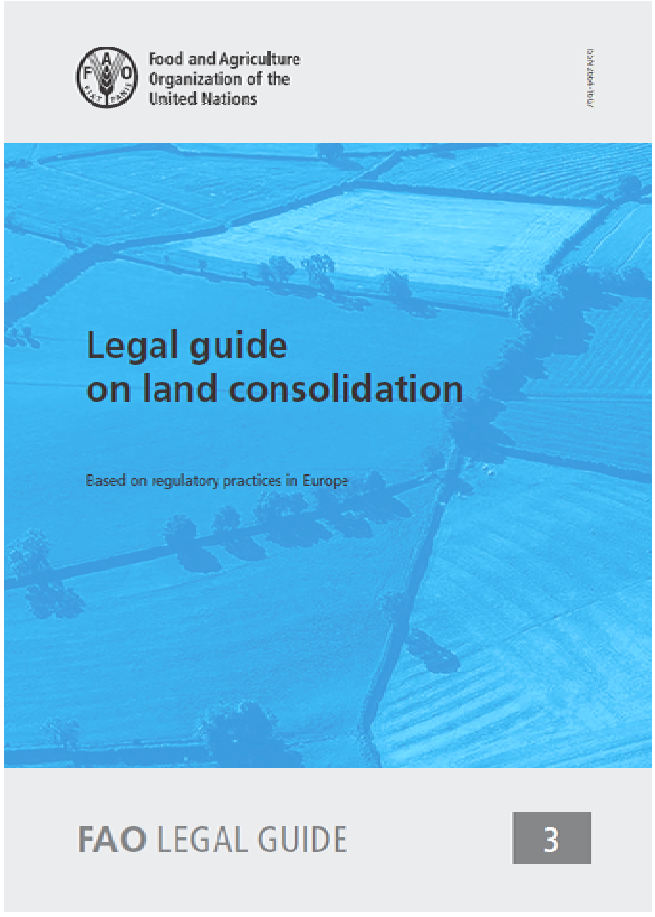
The **United Nations Economic Commission for Europe Working Party on Land Administration (UNECE-WPLA)** was originally set up to provide transition states with professional support in establishing land registry and cadastral registry systems. Land management has since been added to the agenda and was also incorporated into the name of the Sectoral Committee on Housing and Land Management (Creuzer 2006). ARGE Landentwicklung – the German Working Group on Land Development – is represented here by its international development officer for the areas of rural development, land consolidation and land readjustment. UNECE-WPLA publishes papers and guidelines on land administration, holds two workshops a year on current land administration and land management issues and prepares Land Administration Reviews (status reports) at the request of governments of Central and Eastern European countries. More at www.unece.org/programs/.

The **Food and Agriculture Organization** of the United Nations (FAO) has traditionally been concerned with agriculture and rural areas and world food situation since its establishment in 1945. Land tenure, land use, land reform and land readjustment are addressed by the FAO **Land Tenure Office**. This provides guiding impetus for rural sustainable development with workshops, conferences, feasibility studies and specialist publications. Special importance is attached to sustainable development in the transition states of Central and Eastern Europe, as reflected in a separate publication series, Land Tenure Studies. Technical papers contributed by ARGE Landentwicklung in support of FAO activities in relation to land consolidation and rural development are available at www.landentwicklung.de/international. Papers on rural development are also published in the FAO Land Tenure Journal at https://www.fao.org/tenure/resources/collections/land-tenure-journal/en/.

The **Legal Guide on Land Consolidation**, published by the FAO in a webinar held in Paris on 18 June 2020, comprises a substantial guide to land consolidation and

its international relevance in rural development (Veršinskas et al. 2020). This publication aims to provide guidance for countries that so far lack experience in land consolidation matters or are in the early stages of introducing modern-day land consolidation legislation. It is in the nature of the elected Europe-wide approach that the Legal Guide makes recommendations on a more general level without proposing specific legislative or procedural solutions. Nevertheless, it is necessary to note the dogmatic emphasis placed by the author team on 'voluntary' land consolidation while relegating 'mandatory' land consolidation to a secondary role. An impression is created that the two forms of land consolidation are interchangeable according to the prevailing policy environment. The FAO's preference for voluntary land consolidation is justified neither in legal terms nor by the experience gained in numerous pilot projects (Thomas 2020c). Voluntary land consolidation procedures are not capable of lastingly rectifying structural problems in post-socialist agriculture to the benefit of private landowners or rural economic development. In addition, with a view to the situation in former socialist states, this recommendation neglects the fact that land consolidation procedures continue to be carried out on a statutory basis in countries such as Poland, Slovenia, the Czech Republic and Serbia (Drlicek 2021). More detailed consideration of the balance between the constitutional guarantee of property and permissible statutory limits to that guarantee for reasons of public interest, as given in section 2.3, ought to have led to a more nuanced view.

Fig. 6.2-1: Legal Guide on Land Consolidation



LANDNET, an international platform established in 2012 under the umbrella of the FAO Regional Office for Europe and Central Asia (REU) in Budapest, hosts international exchange of experience and opinions between national experts working in land management and land consolidation. A major focus is placed on current developments and, in particular, challenges in rural development (van Holst et al. 2014). The aim of LANDNET is to provide suitable and timely responses to changing societal needs with regard to land use and land tenure in rural and peri-urban regions. Representatives from some 40 European countries now meet regularly for workshops in this initiative, which originally emerged from the FARLAND project (FARLAND 2007).

The **World Bank** and its institutions promote economic development in less developed member countries with financial aid, advice and technical assistance. Its goals are to support international development goals and in particular the fight against poverty. This is done through long-term loans for investment projects and reform programmes from the International Bank for Reconstruction and Development (IBRD) and through technical assistance from the International Development Association (IDA). These organisations also draw upon German expertise and experience in rural development and land management in their international cooperation activities.

(See, for example, https://landgov.donorplatform.org/)

The **Organisation for Economic Co-operation and Development (OECD)** also addresses rural development. Governments of 30 democratic countries work together in this unique forum to meet the economic, social and environmental challenges of globalisation. Challenges to be met by policymakers and administrations in promoting integrated rural development (see section 6.1) are formulated in a report, The New Rural Paradigm (OECD 2006). The OECD regularly monitors and analyses economic development in the constituent regions of Europe and evaluates government interventions to this end. Its findings are broken down to country level in country reviews. A rural policy review on Germany was published in OECD (2007).

7 Sources

7.1 Literature

ADAM; NOHL; VALENTIN (1986): Bewertungsgrundlagen für Kompensationsmaßnahmen bei Eingriffen in die Landschaft. Ministerium für Umwelt, Naturschutz, Landwirtschaft und Verbraucherschutz NRW (Hrsg.), Düsseldorf mit praxisnahen und aussagekräftigen Beispielen.

Ahlborn H. (2008): Technik für den Wald. Eberswalder Forstliche Schriftenreihe, Band 48. Landesbetrieb Forst Brandenburg.

ALR-SH (2011): „Wege mit Aussichten" – Studie zur Zukunftsfähigkeit des ländlichen Wegenetzes in Schleswig-Holstein; ALR-Themen, Heft 41. Akademie für die Ländlichen Räume Schleswig-Holstein e. V.
www.alr-sh.de

ARL (2020): Akademie für Raumentwicklung in der Leibnitz Gemeinschaft.
www.arl-net.de/de/commin/deutschland-germany

ARGE Eingriff/ Ausgleich (1994): Entwicklung eines einheitlichen Bewertungsrahmens für straßenbedingte Eingriffe in Natur und Landschaft und deren Kompensation. Ministerium für Wirtschaft, Mittelstand und Verkehr NRW/ Ministerium für Umwelt, Naturschutz, Landwirtschaft und Verbraucherschutz NRW (Hrsg.), Düsseldorf.

ARGE Landentwicklung (2002): Flurbereinigung und Steuern. Schriftenreihe der Bund-Länder-Arbeitsgemeinschaft Nachhaltige Landentwicklung, Heft 19.
www.argelandentwicklung.de

ARGE Landentwicklung (2013a): Leitlinien Landentwicklung – Zukunft im ländlichen Raum gemeinsam gestalten. Orientierungsrahmen zur nachhaltigen Entwicklung der ländlichen Räume; Heft 20. Ministerium für Landwirtschaft, Umwelt und Verbraucherschutz, Schwerin.

ARGE Landentwicklung (2013b): Empfehlungen zum Umgang mit Windenergieanlagen in der Bodenordnung nach dem Flurbereinigungsgesetz. Schriftenreihe der Bund-Länder-Arbeitsgemeinschaft Nachhaltige Landentwicklung, Heft 21.

ARGE Landentwicklung (2020): Bund-Länder-Arbeitsgemeinschaft nachhaltige Landentwicklung: Statistik zur Integrierten ländlichen Entwicklung.
www.landentwicklung.de/publikationen/statistik

Baldenhofer K. (1999): Lexikon des Agrarraums, Verlag Klett-Perthes Gotha/Stuttgart 1999, ISBN 978-3-623-00850-9.

Batz, E. (1990): Neuordnung des ländlichen Raumes. Wittwer Verlag Stuttgart.

BayLA (2009): Merkblatt über den Aufbau der Bodenschätzung 02/2009. Bayerisches Landesamt für Steuern.

BAYSTMELF (1982): Waldflurbereinigung. Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten, München.

BBSR (2017): Laufende Raumbeobachtung – Raumabgrenzungen, Siedlungsstrukturelle Kreistypen. Bundesinstitut für Bau-, Stadt- und Raumforschung 2017. www.bbsr.bund.de

Benjes, H. (1997): Die Vernetzung von Lebensräumen mit Benjes-Hecken. Verlag Natur & Umwelt, ISBN 978-3-924-74915-6.

Berkner, Andreas (1998): Naturraum und ausgewählte Geofaktoren im Mitteldeutschen Förderraum – Ausgangszustand, bergbaubedingte Veränderungen, Zielvorstellungen. In: Pflug, W. (1998) (Hrsg.): Braunkohlentagebau und Rekultivierung, S. 767 ff. Springer-Verlag Berlin/Heidelberg.
ISBN 378-3-540-60092-2.

Bertling, H.; Kriese, H.; Lütkemeier, H. (2015): Neue Planungsansätze im ländlichen Wegebau, Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 140, S. 320-326.

BMELF (1979): Flurbereinigung und Wiederaufbau in den Weinbergen. Bundesministerium für Ernährung, Landwirtschaft und Forsten, Schriftenreihe/ Sonderheft.

BMELF (1982): Wertermittlung in der Flurbereinigung. Bundesministerium für Ernährung, Landwirtschaft und Forsten, Schriftenreihe B (Flurbereinigung), Sonderheft 19, Bonn.

BMELF (1985): Waldflurbereinigung. Bundesministerium für Ernährung, Landwirtschaft und Forsten, Schriftenreihe B (Flurbereinigung), Sonderheft 21, Bonn.

BMELF (1988): Effizienz der Flurbereinigung; Optimierungsberechnungen. Bundesministerium für Ernährung, Landwirtschaft und Forsten (Hrsg.). Schriftenreihe Flurbereinigung, Heft 73. Landwirtschaftsverlag GmbH, Münster. ISBN 3-7843-1141-5.

BMELF (1992): Flurbereinigung in Europa. Schriftenreihe des Bundesministers für Ernährung, Landwirtschaft und Forsten, Schriftenreihe B (Flurbereinigung), Heft 78. Landwirtschaftsverlag GmbH Münster-Hiltrup.

BMEL (2002/2018): Jahresbericht Integrierte Ländliche Entwicklung. BMEL – Statistik 2002 und 2018. www.landentwicklung.de/publikationen

BMEL (2021): Ackerbaustrategie 2035. Perspektiven für einen produktiven und vielfältigen Pflanzenbau. Bundesministerium für Ernährung und Landwirtschaft. Berlin.

BMS Consulting (2005): Wirkungsorientiertes Controlling: Gesamtwirtschaftliche Wertschöpfungsanalyse von Bodenordnungsverfahren der Verwaltung für Agrarordnung NRW am Beispiel der Bodenordnung nach § 87 FlurbG (Unternehmensflurbereinigung). Düsseldorf.

BMS Consulting (2006): Wirkungsorientiertes Controlling: Entwicklung und Einführung eines Konzepts zur Wirkungsanalyse und – Wirkungsprognose für Bodenordnungsverfahren in Rheinland-Pfalz. Nachrichten aus der Landeskulturverwaltung Rheinland-Pfalz, Sonderheft 17/2006. Mainz.

BMU (2016): Klimaschutzplan 2050 – Klimaschutzpolitische Grundsätze und Ziele der Bundesregierung. Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit, 1. Auflage November 2016, Broschüre Nr. 10029.

BMVEL (2005): Ländliche Entwicklung aktiv gestalten: Leitfaden zur integrierten ländlichen Entwicklung. Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft (Hrsg.), Bonn.

BMVI (2016): Leitbilder und Handlungsstrategien für die Raumentwicklung in Deutschland, verabschiedet von der Ministerkonferenz für Raumordnung am 9. März 2016. www.bbsr.bund.de/BBSR/DE/Themen.

Bröckling, F. (2004): Integrierte Ländliche Regionalentwicklung und Kulturlandschaftspflege. Dissertation an der Mathematisch-naturwissenschaftlichen Fakultät der Westfälischen Wilhelms-Universität Münster.

Brüntrup, M. (2016): Erweiterung des QECD-Modells der fünf ländlichen Welten für die Sektor übergreifende armutsorientierte Analyse, Kommunikation und Planung. Deutsches Institut für Entwicklungspolitik (DIE). Analysen und Stellungnahmen 12/2016. ISSN 1434-8934.

BTG (2018): Bundesverband der Teilnehmergemeinschaften e.V., 2018.
www.btg-bund.de/

Bundesregierung (2020): Mehr Fortschritt wagen – Bündnis für Freiheit, Gerechtigkeit und Nachhaltigkeit. Koalitionsvertrag zwischen der Sozialdemokratischen Partei Deutschlands (SPD), BÜNDNIS 90/ DIE GRÜNEN und den Freien Demokraten (FDP).
www.spd.de/fileadmin/Dokumente/Koalitionsvertrag/koalitionsvertrag_2021-2025.pdf

BVerfGE (1968): Entscheidungen des Bundesverfassungsgerichts, Bd. 24, S. 367.

Creuzer, P. (2006): Internationale Entwicklungszusammenarbeit – der Beitrag der Working Party on Land Administration der United Nations – Economic Commission for Europe (UNECE WPLA). Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 131, S. 274-280.

Czybulka, D.; Hampicke, U.; Litterski, B. (2012): Produktionsintegrierte Kompensation. Rechtliche Möglichkeiten, Akzeptanz, Effizienz und naturschutzgerechte Nutzung. Erwin Schmidt Verlag, Berlin.

Demirel, Zerrin; Gülsever, Fatma Zehra (2007): Land Reform and Practices in Turkey. UNECE WPLA Workshop “Effective and sustainable Land Management”; Munich, May 2007.

Demetriou, D.; Stillwell, J.; See, L. (2012): Land Consolidation in Cyprus: Why is an Integrated Planning Support System required? Land Use Policy, 29, 131-142.

Dieterich, Hartmut (2006): Baulandumlegung – Recht und Praxis, 5. Auflage. 2006. Verlag C.H.BECK. ISBN 978-3-406-54225-1.

Dijk, T.v. (2003): Dealing with Central European land fragmentation. A critical assessment on the use of Western European instruments. Uitgevereij Eburon, Delft.

DLKG (2008): Landeskultur – Motor der Waldentwicklung. Tagungsband der 29. Bundestagung der DLKG vom 15. Bis 17. Oktober 2008 in Gummersbach. Schriftenreihe der DLKG, Heft 6.

DLKG (2010): Wege in die Zukunft?! Neue Anforderungen an ländliche Infrastrukturen. Deutsche Landeskulturgesellschaft, Schriftenreihe Sonderheft 3.

DLKG (2016): Flächenkonkurrenz entschärfen: gemeinsam-maßvoll-zukunftsfähig. Deutsche Landeskulturgesellschaft, Schriftenreihe Heft 14, 2016. ISSN 1614-5240.

DLKG (2017): Idylle Ländlicher Raum? – Der Kampf um die Fläche. Deutsche Landeskulturgesellschaft, Schriftenreihe Heft 15, 2017. ISSN 1614-5240.

DLKG (2021): Neue Wege digital und analog! Den Wandel im ländlichen Raum gestalten. Deutsche Landeskulturgesellschaft, Schriftenreihe Heft 18. Eigenverlag Müncheberg, Open Access. ISSN 1614-5240

DLKG-RLP (2017): Rebflurbereinigung Neustadt-Duttweiler.
www.dlr-rheinlandpfalz.rlp.de/aufbauplan/

Drlicek, M. (2021): Der FAO Legal Guide on Land Consolidation – Theorie und Praxis eines Flurbereinigungsgesetzes. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 146, S. 393.

DVW (1997): Verkehrswertermittlung von Grundstücken in ländlichen Bereichen. Deutscher Verein für Vermessungswesen e.V., Schriftenreihe 26/1997. Verlag Konrad Witwer, Stuttgart.

DVW (2010): Klimawandel und Landnutzung in Deutschland – Anforderungen an die Landentwicklung. Gesellschaft für Geodäsie, Geoinformation und Landmanagement (DVW), Schriftenreihe, Band 65. ISBN: 978-3-89639-803-1.

Eberl, Ch. (1955): Die durch das Volkseigentum an Mineralien und Bergbaubetrieben in der DDR hervorgerufenen Änderungen des Bergrechts, Freiberg 1955.

Eichenauer, M.; Joeris, D. (1993): Naturschutz und Landschaftspflege in der Flurbereinigung: Umsetzung aufgezeigt an Fallbeispielen aus Nordrhein-Westfalen, Schleswig-Holstein und Bayern. Schriftenreihe des Bundesministeriums für Ernährung, Landwirtschaft und Forsten, Heft 80. Landwirtschaftsverlag 1993, ISBN 978-3-784-32631-3.

Eilfort (1985): Neuordnung des ländlichen Raumes seit 1680. Beiwort zu Karte IV/21 des Historischen Atlas von Baden-Württemberg.

European Commission (2019): Reflection paper: Towards a sustainable Europe by 2030. Brussels.

Eyter (2013): Die Eyter-Renaturierung im Bundesland Niedersachsen. www.mittelweserverband.de/gewaesser/modellprojekt-eyterniederung/

FAO (2005): Access to land and land administration after violent conflicts. FAO Land Tenure Studies no. 8, Rome.

FAO (2007): Good Governance in Land Tenure and Administration. FAO Land Tenure Studies no. 9, Rome.

FARLAND (2007): FARLAND – Near Future. Budapest 2007, ISBN 978-963-06-3423-6.

Fehres, J. (2014): Besonderheiten der Unternehmensflurbereinigung. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 139, S. 15.

Fehres, J. (2015): Zukünftiger Datenaustausch mit dem Programmsystem LEFID. In: Kummer, K. & Frankenberger, J. (Hrsg.): Das deutsche Vermessungs- und Geoinformationswesen 2015. Wichmann, Berlin/Offenbach, S. 554.

Fehres, J. (2020): Kann die Landentwicklung einen Beitrag zur Reduzierung des Flächenverbrauchs von landwirtschaftlichen Flächen leisten? Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 145, S. 340-348.

FGSV (2003): Hinweise für die Zusammenarbeit von Straßenbau und Flurbereinigung bei der Vorbereitung und Durchführung von Verfahren nach dem Flurbereinigungsgesetz – Hinweise zur Unternehmensflurbereinigung. Verlag der Forschungsgesellschaft für Straßen- und Verkehrswesen e.V., Köln.

Fischer, R.; Biederbeck, M. (2019): Bewertung im ländlichen Raum. HLBS Verlag GmbH Berlin. ISBN 978-3-89187-088-4.

Frede, H.-G.; Lecher, K.; Magel, H.; Scheffer, B. (2001): Landnutzung und Landentwicklung. Zeitschrift Landnutzung und Landentwicklung, 42, S. 1-3.

FROEHLICH; SPORBECK; SMEETS; DAMASCHKE; REINISCH (2002): Leitfaden zur Erstellung und Prüfung Landschaftspflegerischer Begleitpläne zu Straßenbauvorhaben in Mecklenburg-Vorpommern. Bochum/ Schwerin, September 2002, erstellt im Auftrag des Landesamtes für Straßenbau und Verkehr Mecklenburg- Vorpommern.

Fromm, E. (1993): Haben oder Sein. Die seelischen Grundlagen einer neuen Gesellschaft. Deutscher Taschenbuchverlag GmbH, München.

Gamperl, H. (1955): Die Flurbereinigung im westlichen Europa. Bayerischer Landwirtschaftsverlag München.

Gamperl, H. (1967): Ländliche Neuordnung (Flurbereinigung) in: Handbuch der Vermessungskunde, Band 4b, 10. Auflage, J.B. Metzlersche Verlagsbuchhandlung Stuttgart.

GIZ Serbien (2014):
http://www.fao.org/fileadmin/user_upload/Europe/documents/Events_2014/4LandNet/2_5_6e_GIZ_EU_best_practices

Gödeke, K.; Schwabe, M.; Bärwolff, M.; Marschall, K. et al. (2014): Produktionsintegrierte Kompensation – Maßnahmenvorschläge. Thüringer Landesanstalt für Landwirtschaft. Thüringer Landgesellschaft m.b.H. (Hrsg.).
www.thueringen.de/tll

Hahn (1960): Bewertungsgrundsätze und Schätzungsmethoden in der Flurbereinigung und deren Folgemaßnahmen. Bundesminister für Ernährung, Landwirtschaft und Forsten, Schriftenreihe für Flurbereinigung, Stuttgart.

Hammer, R.; Diemann, R.; Petschick, D.; Burslan, M. (2001): Möglichkeiten einer konfliktarmen Umsetzung von Ausgleichs- und Ersatzmaßnahmen für die Landwirtschaft. Landnutzung und Landentwicklung, 42, S. 120-125.

Harder G. (1998): Das verliehene Nutzungsrecht – Herausbildung und Entwicklung eines Rechtsinstituts des DDR-Bodenrechts, Berlin 1998. Reihe Berliner Juristische Universitätsschriften: Grundlagen des Rechts, Band 10, Berliner Verlag Arno Spitz GmbH, Nomos Verlagsgesellschaft. ISBN 978-3-87061-738-7.

Harnischfeger, A.; Peuke, J. (2021): Erste Neugründung einer Waldgenossenschaft in Kombination mit einem Bodenordnungsverfahren nach dem FlurbG. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 146, S. 24-29.

Hartvigsen, Morten (2014): Land Reform and Land Fragmentation in Central and Eastern Europe. Land Use Policy, 36, 330-341.

Heissenhuber, A.; Kapfer, M.; Kantelhardt, J.; Bluhm, R. (2006): Untersuchung der Auswirkungen der Flurneuordnung – betriebswirtschaftliche Auswirkungen auf Einzelbetrieblicher Ebene. Technische Universität München, Lehrstuhl für Wirtschaftslehre des Landbaus.

Helmstädter, S.; Lorenzl, H. (2018): Die neuen Richtlinien für den Ländlichen Wegebau (RLW). Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 143, S. 349-353.

Henkel, Gerhard (2011): Das Dorf, Landleben in Deutschland- gestern und heute. Verlag K. Theiss, Stuttgart. ISBN 978-3-8062-2541-9.

Hesse, Franziska (2021): Evaluation der Kommunikation in Flurneuordnungsverfahren an Beispielen in Bayern. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 146, S. 354-362.

Hildemann, Eckart (1998): technische und historische Aspekte der Wiedernutzbarmachung. In: Pflug, W. (1998) (Hrsg.): Braunkohlentagebau und Rekultivierung, S. 797 ff. Springer-Verlag Berlin/ Heidelberg.
ISBN 378-3-540-60092-2.

Hinz, S.A. (2012): Ganzheitliches Wertschöpfungsmodell der Waldflurbereinigung und deren Effizienzsteigerung. Dissertation. Schriftenreihe des Instituts für Geodäsie der Universität der Bundeswehr München, Heft 89/2012.

Hoisl, R.; Nohl, W.; Engelhardt, P. (2000): Naturbezogene Erholung und Landschaftsbild. Kuratorium für Technik und Bauwesen in der Landwirtschaft. KTBL-Schrift, 389, Darmstadt.

Hübner, T.; Tara, K. (1995): ökologische Zielsetzung für den Auenschutz in Nordrhein-Westfalen, Seminarberichte. Naturschutzzentrum Nordrhein-Westfalen. Recklinghausen 1995.

Hunke-Klein, M. (2022): Beiträge der ländlichen Bodenordnung zur ländlichen Entwicklung im Rheinischen Braunkohlerevier. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 147, S. 202-207.

Jacoby, Erich H. (1961): Land Consolidation in Europe. International Institute for Land Reclamation and Improvement, Wageningen, Netherlands.

Jessel, T. (2008): Kulturlandschaftsentwicklung und regionale Flächenpools. Über das Zusammenwirken von Landschaftsplanung, Eingriffsregelung und Raumordnung. In: Informationen zur Raumentwicklung, 5/2008 S.329-340.

Kammer, H. R.; Tinz, W. (1998): Rekultivierungsmaßnahmen und Folgelandschaft. In: Pflug, W. (1998) (Hrsg.): Braunkohlentagebau und Rekultivierung, S. 992 ff. Springer-Verlag Berlin/Heidelberg. ISBN 378-3-540-60092-2.

Kasimir, Wilfried (2001): Die Flurneuordnung und das ICE-Neubauprojekt Köln-Rhein/Main. Zeitschrift für Vermessungswesen (ZfV), 126, S. 195-200.

Kaulich, K. (2013): Importance and prospect of land consolidation in the Czech Republic. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 138, S.193-200.

Klaus, M. (2001): Ausgleichs- und Ersatzmaßnahmen: Konfliktlösung durch Bodenordnung. Landnutzung und Landentwicklung, 42, S. 100-105.

Kötter, Th. (2016): Gleichwertigkeit der Lebensbedingungen- Herausforderungen und Ansätze für eine wichtige Aufgabe der Raumordnung. Flächenmanagement und Bodenordnung, 78, S. 160-171.

Kötter, Th.; Fehres, J.; Thomas, J.; Voss, W. (2020): Entwicklung ländlicher Räume. In: Kummer; Kötter; Kutterer; Ostrau (Hrsg.): Das deutsche Vermessungs- und Geoinformationswesen. Wichmann Berlin/ Offenbach. ISBN 978-3-87907-676-5.

Kötter, Th.; Linke, J. (2015): Städtebau und Bodenordnung. In: Kummer/ Kötter/ Eichhorn (Hrsg.): Das deutsche Vermessungs- und Geoinformationswesen 2015, S. 675 ff.. Wichmann Verlag. ISBN 978-3-87907-547-8.

Korta, G.; Kozlowski, J. et al. (2014): Stand der Grundstückszusammenlegung und Perspektiven für eine Landentwicklung in der Republik Polen. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 139, S. 151-158.

Korte, H.C.P. (1952): Die Flurbereinigung in Westeuropa. In: Agrarpolitische Revue, 9, 37-64, Zürich.

Kram, S. (2004): Zum freiwilligen Nutzungstausch. Flächenmanagement und Bodenordnung, 66, S. 32.

KTBL (2005): Landwirtschaftliche Wege. Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V.; KTBL-Schrift 443. Darmstadt.

Küsek, G. (2015): Land Consolidation Experiences of Turkey. LANDNET Conference Ankara. http://www.fao.org/europe/events/detail-events/en/

Kuhn, M.; Richter, R. et al. (2016): Integrierte Ländliche Entwicklung – Eine neue Perspektive für ländliche Räume in Kleinpolen. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 141, Heft 2.

Kurbjuhn, J. (2002): Rebflurbereinigungen im Ahrtal-eine bodenordnerische und bodenwirtschaftliche Dokumentation mit besonderen Aspekten zur Effizienz und Nachhaltigkeit. Schriftenreihe des Instituts für Städtebau, Bodenordnung und Kulturtechnik der Universität Bonn, Band 25.

Läpple, E.C. (1981): Untersuchungen zur Effizienz der Flurbereinigung. Zeitschrift für Kulturtechnik und Flurbereinigung 1981, S. 323 ff. Verlag Parey, Berlin/ Hamburg.

LandR (1978): Entschädigungsrichtlinien Landwirtschaft ; Richtlinien für die Ermittlung des Verkehrswertes landwirtschaftlicher Grundstücke und Betriebe, anderer Substanzverluste (Wertminderung) und sonstiger Vermögensnachteile ; mit Anlage 1, vom 28. Juli 1978 u. Anlagen 2 u. 3 zu den Entschädigungsrichtlinien Landwirtschaft 1978 vom 7. Februar 1980.

LANUV (2008); Numerische Bewertung von Biotoptypen für die Eingriffsregelung in NRW. Landesamt für Natur, Umwelt und Verbraucherschutz NRW (LANUV), Recklinghausen.

Leenen, H. (2014): Land Development in the Netherlands. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 139, S. 166-172.

LFV-NRW (1995): Bilder aus dem Hauberg. Landesforstverwaltung Nordrhein-Westfalen, Düsseldorf.

LGL-BW (2009): Anweisung zur Ökologischen Ressourcenanalyse und Bewertung in der Flurneuordnung. Landesamt für Geoinformation und Landentwicklung Baden-Württemberg. Kornwestheim.

Lisec, Anka; Primožić, Tomaž (2015): Slovenian land consolidation – experiences and land consolidation programme. LANDNET Conference Ankara. http://www.fao.org/europe/events/detail-events/en/c/334892/

LLG (2018): Beratungsleitfaden Bodenerosion und Sturzfluten-Lokale Kooperation zwischen Landwirten und Gemeinden sowie weiteren Akteuren zur Vermeidung von Bodenerosion, Schriftenreihe der LLG, Heft 1/2018.
www.llg.sachsen-anhalt.de/themen/

Lorig, A. (2022): 25 Jahre Verband der Teilnehmergemeinschaften (VTG) Rheinland-Pfalz. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 147, S. 208-217

LUDWIG; MEINIG (1991): Methode zur ökologischen Bewertung der Biotopfunktion von Biotoptypen, vornehmlich auf städtebauliche Maßnahmen fokussiert.

Meitzen, August (1868): Der Boden und die landwirtschaftlichen Verhältnisse des Preußischen Staates nach dem Gebietsumfange vor 1866. Königliche Staatsdruckerei Berlin.

MKULNV (2013): Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen: EU-Verordnung Ökologischer Landbau. 4. Auflage Eigenverlag, Düsseldorf, Januar 2013.

Mosiek, T.; Pieper, T.; Kasten, T. (2006): Wirkungsorientiertes Controlling: Entwicklung und Einführung eines Konzeptes zur Wirkungsanalyse und Wirkungsprognose für

Bodenordnungsverfahren im Lande Rheinland-Pfalz. Ministerium für Wirtschaft, Verkehr, Landwirtschaft und Weinbau des Landes Rheinland-Pfalz (Hrsg.). Nachrichtenblatt 17/ 2019.

MWIDE NRW (2021): Neue Perspektiven für das Rheinische Braunkohlerevier – Kohleausstieg entschlossen vorantreiben, Tagebaue verkleinern, CO_2 noch stärker reduzieren. Leitentscheidung 2021; Beschluss der Landesregierung vom 23. März 2021. Ministerium für Wirtschaft, Innovation, Digitalisierung und Energie NRW.

MWVLW (2000): Freiwilliger Nutzungstausch – eine neue Initiative zur Schaffung wettbewerbsfähiger Schlaggrößen auf Pachtbasis. Ministerium für Wirtschaft, Verkehr, Landwirtschaft und Weinbau. Nachrichten aus der Landeskulturverwaltung des Landes Rheinland-Pfalz, Sonderheft 13.

MWVLW (2006): Leitlinien Landentwicklung und ländliche Bodenordnung. Ministerium für Wirtschaft, Verkehr, Landwirtschaft und Weinbau des Landes Rheinland-Pfalz, Mainz.

NABU (2003): Flurbereinigung und Naturschutz-Situation und Handlungsempfehlungen. Naturschutzbund Deutschland e.V.; Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft Berlin (Hrsg.)

Nobis, K.; Schumann, M.; Lehmann, B.; Linke, H.-J. (2020): Die Anwendung der ländlichen Bodenordnung bei der Renaturierung und naturnahen Entwicklung von Fließgewässern. Springer Fachmedien GmbH. Wiesbaden, ISBN 978-3-658-30252-8; ISSN 2197-6708.

OECD (2006): The New Rural Paradigm: Policies and Governance. OECD Rural Policy Reviews. Organisation for Economic Co-operation and Development, OECD Publications, Paris.

OECD (2007): Germany. OECD Rural Policy Reviews. Organisation for Economic Co-operation and Development, OECD Publications, Paris. ISBN 978-92-64-01315-5. https://www.oecd.org/doc/povertyreduction/

Op't Eynde, B.; Kötter, Th. (2009): Bedeutung von Raumplanung und Bodenordnung in Ballungsrandgebieten als Element zur Steuerung und Verringerung der Umwidmung von landwirtschaftlichen Flächen. Lehr- und Forschungsschwerpunkt „Umweltverträgliche und Standortgerechte Landwirtschaft", Institut für Geodäsie und Geoinformation der Friedrich-Wilhelms-Universität Bonn, im Auftrag des Ministeriums für Umwelt, Naturschutz, Landwirtschaft und Verbraucherschutz des Landes Nordrhein-Westfalen, Düsseldorf 2009. ISSN 1610-2460.

Ostermann, D.; Schumann, M.; Thiemann; K.-H. (2022): Die Vertreterbestellung nach § 119 FlurbG – Anforderungen an Ermittlungsmaßnahmen der Flurbereinigungsbehörde. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 147, S. 193-201.

Pauwels, F. (2014): Land Development in Flanders in a changing perspective. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 139, S. 159-166.

Pflug, W. (1998): Braunkohlentagebau und Rekultivierung – Landschaftsökologie, Folgenutzung, Naturschutz (Hrsg.). Springer-Verlag Berlin/ Heidelberg. ISBN 378-3-540-60092-2.

Pieper, Thorsten (2016): Wertschöpfungsanalyse – Ökonomische Beurteilung ländlicher Bodenordnungsmaßnahmen im Sinne eines wirkungsorientierten Controllings. Deutsche Landeskulturgesellschaft, Sonderheft 8/ 2016.

Platen, Ch. (2015): Berücksichtigung der ökologischen Landwirtschaft in der Flurbereinigung – ein Lösungsansatz aus Rheinland – Pfalz. In: Berücksichtigung der ökologischen Landwirtschaft in der Flurbereinigung. DVW – Gesellschaft für Geodäsie, Geoinformation und Landmanagement e.V., Wißner-Verlag, Augsburg. ISBN 978-3-95786-058-3 Schriftenreihe Band 80/ 2015, S. 61- 71.

Richter, U. (2015): Grundlagen, Rahmenbedingungen und Vorgaben der Biolandwirtschaft. In: Berücksichtigung der ökologischen Landwirtschaft in der Flurbereinigung. DVW – Gesellschaft für Geodäsie, Geoinformation und Landmanagement e.V., Schriftenreihe Band 80/ 2015, S. 11-24. Wißner-Verlag, Augsburg. ISBN 978-3-95786-058-3.

Richter, U. (2022): Notwendigkeit, Möglichkeiten und Grenzen der Umsetzung von Maßnahmen zur Erosionsvermeidung in der Flurbereinigung. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 147, S. 261-267.

Ruwenstroth, G.; Schierenbeck, B. (1980): Effizienz der Flurbereinigung. Bundesministerium für Ernährung, Landwirtschaft und Forsten. Schriftenreihe B: Flurbereinigung, Heft 69. Landwirtschaftsverlag Münster.

Schäuble, D. (2007): Nutzungstausch auf Pachtbasis als neues Instrument der Bodenordnung. Dissertation an der Universität der Bundeswehr München, Fakultät für Bauingenieur- und Vermessungswesen.

Schumann, M. (2014): Besonderheiten des Plans nach § 41 FlurbG in der Unternehmensflurbereinigung. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 139, S. 25.

Schumann, M.; Fehres, J. et al. (2015): Berücksichtigung der ökologischen Landwirtschaft in der Flurbereinigung. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 140, S. 1-8.

Schwantag, F.; Wingerter, K. (2008): Flurbereinigungsgesetz – Standardkommentar. 8. Auflage, Agricola-Verlag GmbH, ISBN 978-3-92000_904-9.

Schwertmann, U.; Vogl, W.; Kainz, M. (1990): Bodenerosion durch Wasser. ISBN 978-3-8001-3088-7.

Seher, W.; Mansberger, R. (2014): Landmanagement in Österreich. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 139, S. 141-150.

Seehusen; Schwede (1997): Flurbereinigungsgesetz – Kommentar, 7. Auflage. Aschendorffsche Verlagsbuchhandlung GmbH, Münster. ISBN 978-3-402-04148-2.

Seyer, G.; Pieper, T. (2006): Gesamtwirtschaftliche Wertschöpfungsbeiträge durch Unternehmensflurbereinigungen. Flächenmanagement und Bodenordnung (FuB), 68, pp. 39.

StBA (2014/ 2020): Statisches Bundesamt für Bauwesen und Raumordnung, Bonn.

Steuer, R. (1967): Flurbereinigungsgesetz – Kommentar. Verlag C.H.Beck München/ Berlin.

Strössner, G. (1986): Bayerische Gesetzgebung zur Flurbereinigung. In: Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten 1986, S. 49-67.

Tcherkinski, M. (1942): Das Problem der Grundstückszusammenlegung in Europa. Inter-nationales landwirtschaftliches Institut Rom. Internationale landwirtschaftliche Rundschau, I. Agrarwirtschaft, 3/1942, S. 61-98.

Thiemann, K.-H. (2004): Zum Neuordnungsauftrag der Flächenverfahren nach § 56 des Landwirtschaftsanpassungsgesetzes (LwAnpG). Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 129, S. 242-247.

Thiemann, K.-H. (2008): Das vereinfachte Flurbereinigungsverfahren zur Landentwicklung nach § 86 Abs. 1 Nr. und 3 FlurbG (Landentwicklungsverfahren). Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 133, S. 90-97.

Thiemann, K.-H.; Mock, J.; Schumann, M. (2016): Erste Neugründung einer Waldgemeinschaft auf Basis von § 1008 BGB im Flurbereinigungsverfahren Kell am See, Rheinland-Pfalz. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 141, S. 397-406.

Thöne, K.-F. (1993): Die agrarstrukturelle Entwicklung in den neuen Bundesländern. Verlag Kommunikationsforum GmbH Köln. ISBN 978-3-814-58043-5.

Thomas, J. (1986): Ein leistungsfähiges Modell zur Beschreibung differenzierter Grundstückswertverhältnisse in Verfahren nach dem Flurbereinigungsgesetz. Vermessungswesen und Raumordnung, 48, S. 32-44.

Thomas, J. (1990): Die technische Entwicklung von Wertermittlung, Planung und Vermessung in der ländlichen Bodenordnung in Nordrhein-Westfalen. In: Die Entwicklung der ländlichen Bodenordnung in Nordrhein-Westfalen. Verlag Witwer, Stuttgart. ISBN 978-3-87919-155-7.

Thomas, J. (1992): Bodenordnungsbedarf bei der Realisierung von investiven Großbauvorhaben. In: Tagungsbericht über das 2. deutsche Flurbereinigungsseminar. Bundesminister für Ernährung, Landwirtschaft und Forsten. Bonn, Germany.

Thomas, J. (1993): Zur Bedeutung des freiwilligen Landtausches bei der Lösung bodenordnerische Aufgaben. Zeitschrift für Vermessungswesen (ZfV), 118, S. 515-523.

Thomas, J. (1998): Bodennutzungsansprüche und deren Befriedigung durch Interessenausgleich mittels Flurbereinigung. In: Wolfram Pflug (1998) (Hrsg.) Braunkohlentagebau und Rekultivierung – Landschaftsökologie, Folgenutzung und Naturschutz, S. 132-141. Springer-Verlag Berlin, Heidelberg, New York,
ISBN 978-3-540-60092-2.

Thomas, J. (2005): Zur Bedeutung und zum Bedeutungswandel der Flurbereinigung in Deutschland. Flächenmanagement und Bodenordnung, 67, S. 179-188.

Thomas, J. (2006a): Landentwicklung – international. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 131, S. 281-287.

Thomas, J. (2006b): Künftige Ansätze und Instrumente zur ländlichen Entwicklung. In: Flächenmanagement und Bodenordnung (FuB), 68, S. 248-256.

Thomas, J. (2006c): Property Rights, Land Fragmentation and Emerging Structure of Agriculture in Central and East European Countries. In: Food and Agriculture Organization, eJADE, 2/2006, pp. 225-275.

Thomas, J. (2009): Möglichkeiten und Grenzen der Vereinfachten Flurbereinigung nach § 86 FlurbG bei der Lösung von Landnutzungskonflikten. Flächenmanagement und Bodenordnung, 71, S. 56-64.

Thomas, J. (2010): Entwicklung ländlicher Räume. In: Kummer/ Frankenberger (Hrsg.): Das deutsche Vermessungs- und Geoinformationswesen, S. 398. Wichmann Verlag 2010. ISBN 978-3-87907-487-7.

Thomas, J. (2011a): Uncontrolled land consumption versus resource saving land use in Germany. FAO Land Tenure Journal 1/2011, pp. 79–99. Rome. http://www.fao.org/nr/tenure/land-tenure-journal/index.php/LTJ/article/viewArticle/19

Thomas, J. (2011b): Landentwicklung 2011 in Europa – Gemeinsamkeiten im Grundsätzlichen und Vielfalt im Detail (Teil 1+2). Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 136, S. 360-367, sowie 137, S. 46-57.

Thomas, J. (2012a): Die Flurbereinigung in Nordrhein-Westfalen (F5 NW). Die Praxis der Kommunalverwaltung, Stand Juli 2012. Kommunal- und Schul-Verlag GmbH, Wiesbaden. ISBN 978-3-880-61474-1.

Thomas, J. (2012b): Entwicklung ländlicher Räume. In: Kummer/ Frankenberger (Hrsg.): Das deutsche Vermessungs- und Geoinformationswesen 2013, S. 433-620; Wichmann Verlag 2014. ISBN 978-3-87907-523-2.

Thomas et al. (2014a): Entwicklung ländlicher Räume. In: Kummer/ Kötter/ Eichhorn (Hrsg.): Das deutsche Vermessungs- und Geoinformationswesen 2015, S. 521-588; Wichmann Verlag 2012. ISBN 978-3-879-07547-8.

Thomas, J. (2014b): Bedeutung von Technik und Automation für die Landentwicklung in Deutschland – Entwicklungslinien. In: Technikumbau in der Landentwicklung in Deutschland. Deutsche Landeskulturgesellschaft, Schriftenreihe Sonderheft 07/2014, S. 36-59. ISSN 1614-5240.

Thomas, J. (2014c): Safeguarding real property rights and rational use by conflicting private and public interests – the German approach. Journal of the Association of Surveyors of Slovenia 58: 517–534.
http://www.geodetski-vestnik.com/58/3/gv58-3_thomas.pdf

Thomas, J. (2017): Zur Fortentwicklung von Flurbereinigungsrecht und Flurbereinigungspraxis in der Republik Serbien; Teil 1: Status quo und Veränderungsbedarf. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV),143, S. 23-29.

Thomas, J. (2020a): Beiträge zur Gestaltung effizienter Rahmenbedingungen im Bereich der landwirtschaftlichen Bodennutzung in der Ukraine. APD Deutsch- Ukrainischer Agrarpolitischer Dialog.
https://apd-ukraine.de/de/uber-das-projekt/publikationen

Thomas, J. (2020b): 5th Sino-German Agricultural Week vom 18. bis 22. November 2020 in Beijing/ VR China. Tagungsbericht. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 145, S. 74 ff.

Thomas, J. (2020c): Legal Guide on Land Consolidation: Based on Regulatory Practices in Europe. Buchbesprechung. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 145, S. 325.

Thomas, J. (2021**):** Handbuch zur ländlichen Bodenordnung und Flurbereinigung in Deutschland. Kiew 2021, ISBN 978-617-640-554-2.
Türker, Metin; Gülsever, Fatma (2013): Land Consolidation – Plan and Finances in Turkey.
www.fao.org/fileadmin/user_upload/Europe/documents/Events_2013/TAIEX

UBA (2011):Themenblatt: Anpassung an den Klimawandel – Boden.
www.umweltbundesamt.de/sites/default/files/medien/364/publikationen/kompass_themenblatt_boden_net.pdf

umwelt.nrw (2021): umwelt.nrw#laendlicheraeume – 200 Jahre Verwaltung für Agrarordnung in Nordrhein-Westfalen. Ministerium für Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen. Düsseldorf.
https://www.umwelt.nrw.de/landwirtschaft/laendliche.raeume/bodenordnung/200-jahre-verwaltung-fuer-agrarordnung-in-nrw

van Holst, F.; Eberlin, R.; Onega Lopez, F. (2014): LANDNET and Land Market Issues in Europe. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 139, S. 183 ff.

Vasiljević, D. (2019): Land Consolidation in the Republic of Serbia: A Needs and Obstacles Assessment – land consolidation as an unused development potential. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 144, S. 301 ff.

Veršinskas, Tomas et al. (2020): Legal Guide on Land Consolidation: based on regulatory practices in Europe. Food and Agricultural Organization of the United Nations (ed.), FAO Legal Guide No. 3, Rome 2020. ISBN 978-92-5-132858-3. https://doi.org/10.4060

Waldbericht Bund (2021): Waldbericht der Bundesregierung 2021. https://www.bmel.de/DE/themen/wald/wald-in-deutschland/waldbericht2021.html

Werner, A.; Haberstock, W. (2001): Landeskultur – quo vadis? Jahrestagung der Deutschen Landeskulturgesellschaft (DLKG) in Halle. In: Landnutzung und Landentwicklung, 42, S. 97-99.

Weiss, Erich (1982): Zur Entwicklung der ländlichen Bodenordnung im Lande Nordrhein-Westfalen. Beiträge der Akademie für Raumforschung und Landesplanung, 62, Hannover.

Weiss, Erich; Gante, Jürgen (2004): Landeskulturgesetze in Deutschland – Eine Sammlung historischer Gesetze zur Gemeinheitsteilung, Zusammenlegung und Umlegung sowie zur Reallastenablösung. Verlag Dr. Kovac, Hamburg. ISBN 978-3-8300-1654-9.

Welling, F. (1955): Flurzersplitterung und Flurbereinigung im nördlichen und westlichen Europa. Schriftenreihe für Flurbereinigung. Bundesministerium für Ernährung, Landwirtschaft und Forsten. Eugen Ulmer Verlag, Stuttgart.

Wippel, B. (2012): Selbständigkeit forstlicher Zusammenschlüsse – Waldnutzungsansätze in der Zukunft. In: Wertschöpfung durch Waldflurbereinigung und ländliche Infrastrukturen. Deutsche Gesellschaft für Landeskultur (DLKG), Schriftenreihe Heft 5, ISSN 1614-5240.

Wizesarsky, Andreas (2012): Erneuerte Wege der Kooperation – Kernpunkte des ZusArbErl FlurbG. Zusammenarbeit der Katasterbehörden, Grundbuchämter und der Finanzämter mit den Flurbereinigungsbehörden anlässlich von Bodenordnungsverfahren nach dem Flurbereinigungsgesetz. In: Nachrichten aus dem öffentlichen Vermessungsdienst NRW, 45, S. 37-45.

Wizesarsky, Andreas (2020): LEFIS als (weiterer) Baustein für die Digitalisierung der Flurbereinigung. Zeitschrift für Geodäsie, Geoinformation und Landmanagement (ZfV), 145, S. 49-55.

7.2 Laws and regulations

AbgrabG NRW (1979): Gesetz zur Ordnung von Abgrabungen (Abgrabungsgesetz) des Landes Nordrhein-Westfalen in der Fassung der Bekanntmachung vom 23. November 1979 (GV. NRW. S. 922), zuletzt geändert durch Artikel 6 des Gesetzes vom 26. März 2019 (GV. NRW. S. 193).

BauGB (2017): Baugesetzbuch in der Fassung der Bekanntmachung vom 03. November 2017 (BGBl. I S. 3634), zuletzt geändert durch Artikel 1 des Gesetzes vom 28. Juli 2023 (BGBl. I Nr. 221).

BayKompV (2013): Verordnung über die Kompensation von Eingriffen in Natur und Landschaft (Bayerische Kompensationsverordnung) vom 07. August 2013 (GV Bl. S. 517).

BBergG (1980): Bundesberggesetz (BBergG) vom 13.August 1980 (BGBl. I S. 1310), zuletzt geändert durch Artikel 4 des Gesetzes vom 22.März 2023 (BGBl. I Nr. 88).

BewG (1991): Bewertungsgesetz (BewG) in der Fassung der Bekanntmachung vom 01. Februar 1991 (BGBl. I S. 230), zuletzt geändert durch Artikel 20 des Gesetzes vom 16. Dezember 2022 (BGBl. I S. 2294).

BGB (2002): Bürgerliches Gesetzbuch in der Fassung der Bekanntmachung vom 02.Januar 2002 (BGBl. I S. 42, 2909; 2003 I S. 738), zuletzt geändert durch Art. 1 des Gesetzes vom 14.März 2023 (BGBl. I Nr.72).

BKompV (2020): Verordnung über die Vermeidung und Kompensation von Eingriffen in Natur und Landschaft im Zuständigkeitsbereich der Bundesverwaltung (Bundeskompensationsverordnung-BKompV) vom 14. Mai 2020 (BGBl. I S. 1088).

BlaueRichtl (2010): Richtlinie für die Entwicklung naturnaher Fließgewässer in Nordrhein-Westfalen- Ausbau und Unterhaltung. Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz des Landes Nordrhein-Westfalen, Düsseldorf.
www.lanuv.nrw.de/fileadmin/lanuvpublikation

BNatSchG (2009): Gesetz über Naturschutz und Landschaftspflege (Bundesnaturschutz-gesetz – BNatSchG) vom 29. Juli 2009 (BGBl. I S. 2542), zuletzt geändert durch Artikel 3 des Gesetzes vom 08.Dezember 2022 (BGBl. I S. 2240).

BodSchätzG (2007): Gesetz zur Schätzung des landwirtschaftlichen Kulturbodens (Bodenschätzungsgesetz – BodSchätzG) vom 20. Dezember 2007 (BGBl. I S. 3150, 3176), zuletzt durch Artikel 15 des Gesetzes vom 26. November 2019 (BGBl. I S. 1794).

BWaldG (1975): Gesetz zur Erhaltung des Waldes und zur Förderung der Forstwirtschaft (Bundeswaldgesetz) vom 2. Mai 1975 (BGBl. I S. 1037), zuletzt geändert durch Artikel 112 des Gesetzes vom 10. August 2021 (BGBl. I S. 3436).

BWVO (1975): Verordnung über die Durchführung des Besitzwechsels bei Bodenreformgrundstücken (Besitzwechselverordnung) vom 09. September 1975 (GBl. der DDR, S. 629 ff).

DIN (2016): DIN 1185 – Bewässerung, Entwässerung. DIN-Taschenbuch 187, 6. Auflage. Deutsches Institut für Normung (Hrsg.), Beuth, Berlin/ Wien/ Zürich. ISBN 978-3-410239628.

DWA (2016/2018): Richtlinien für den ländlichen Wegebau. Deutscher Verein für Wasserwirtschaft, Abwasser und Abfall e. V., Arbeitsblatt DWA-A 904.
www.dwa.de

(EC) 834/2007: Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91, OJ L 198, 20 June 2007, p. 1.

(EC) 889/2008: Commission Regulation (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic

production and labelling of organic products with regard to organic production, labelling and control, OJ L 250, 18 September 2008, p. 1.

EAFRD (2013): Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005.

EGBGB (1994): Einführungsgesetz zum Bürgerlichen Gesetzbuch in der Fassung der Bekanntmachung vom 21.September 1994 (BGBl. I S. 2494; 1997 I S. 1061, zuletzt geändert durch Artikel 2 des Gesetzes vom 26.Juli 2023 (BGBl. I Nr. 205).

ErbbauRG (1919): Gesetz über das Erbbaurecht (Erbbaurechtsgesetz – ErbbauRG) vom 15. Januar 1919, BGBl. III Nr. 403-6, zuletzt geändert durch Artikel 4 Abs. 7 des Gesetzes vom 01. Oktober 2013, (BGBl. S. 3719).

EU Birds Directive (2009): Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, OJ L 103, 26 January 2010, p. 1.

EU Habitats Directive (1992): Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, OJ L 206, 22 July 1992, p. 7, amended several times, most recently on 13 May 2013.

EU WFD (2000): Water Framework Directive 2000/60/EC, OJ L 327, 22 December 2000, p. 1.

FlurbG (1976): Flurbereinigungsgesetz in der Fassung der Bekanntmachung vom 16. März 1976 (BGBl. I S. 546), zuletzt geändert durch Artikel 17 des Gesetzes vom 19. Dezember 2008 (BGBl. I S. 2794).

FZusG (1969): Gesetz über forstwirtschaftliche Zusammenschlüsse vom 1. September 1969 (BGBl. I S. 1543).

GAKG (1988): Gesetz über die Gemeinschaftsaufgabe „Verbesserung der Agrarstruktur und des Küstenschutzes (GAK)“ in der Fassung der Bekanntmachung vom 21. Juli 1988 (BGBl. I S. 1055), zuletzt geändert durch Gesetz vom 11. Oktober 2016 (BGBl. S. 1934).

GBO (1994): Grundbuchordnung in der Fassung der Bekanntmachung vom 26. Mai 1994 (BGBl. I S. 1114), zuletzt geändert durch Art. 6 des Gesetzes vom 19.Dezember 2022 (BGBl. I S. 2606).

GKG (2014): Gerichtskostengesetz in der Fassung der Bekanntmachung vom 27.Februar 2014 (BGBl. I S. 154), zuletzt geändert durch Artikel 4 des Gesetzes vom 07.November 2022 (BGBl. I S. 1982; 2023 I Nr. 216).

GOSpSt (2023): Geschäftsordnung der Spruchstelle für Flurbereinigung beim für die Landwirtschaft zuständigen Ministerium. Runderlass des Ministeriums für Landwirtschaft und Verbraucherschutz NRW vom 07.August 2023 (SMBl. NRW 7815).

GrEStG (1997): Grunderwerbsteuergesetz in der Fassung der Bekanntmachung vom 26. Februar 1997 (BGBl. I S. 418, 1804), zuletzt geändert durch Artikel 23 des Gesetzes vom 16.Dezember 2022 (BGBl. I S. 2294).

GWG (1975): Gesetz über den Gemeinschaftswald im Land Nordrhein-Westfalen (GWG NRW) vom 8.April 1975 (GV. NRW. S. 304), zuletzt geändert durch Artikel 53 des Gesetzes vom 11. Dezember 2007 (GV. NRW. S. 662).

HöfeO (1976): Höfeordnung in der Fassung der Bekanntmachung vom 26. Juli 1976 (BGBl. I S. 1933), zuletzt geändert durch Artikel 24 des Gesetzes vom 20. November 2015 (BGBl. I S. 2010).

HWaldG (2013): Hessisches Waldgesetz vom 08. Juli 2013 (GVBl. 2013, S. 458).

ImmoWertV (2021): Verordnung über die Grundsätze für die Ermittlung der Verkehrswerte von Grundstücken (Immobilienwertermittlungsverordnung - ImmoWertV) vom 14.Juli 2021 (BGBl. I S. 2805).

LAWA (2016): LAWA Verfahrensempfehlung „Typenspezifischer Flächenbedarf für die Entwicklung von Fließgewässern“. LFP-Projekt O 4.13. Bund-Länder-Arbeitsgemeinschaft Wasser. Kulturbuch-Verlag Berlin.

LPGG (1952): Gesetz über Landwirtschaftliche Produktionsgenossenschaften vom 07. August 1952 (GBl. I S 713), 03.Juni 1959 (GBl. I S 577) und 02.Juli 1982 (GBl I S. 443).

LPlG NW (2001): Landesplanungsgesetz in der Fassung der Bekanntmachung vom 11. Februar 2001 (GV. NRW. S. 50), zuletzt geändert durch Gesetz vom 08.Juli 2021 (GV.NRW. S. 904).

LwAnpG (1991): Gesetz über die Anpassung der Landwirtschaft an die soziale und ökologische Marktwirtschaft in der Deutschen Demokratischen Republik (Landwirtschaftsanpassungsgesetz – LwAnpG), in der Fassung der Bekanntmachung vom 03. Juli 1991 (BGBl. I S. 1418), zuletzt geändert durch Artikel 136 des Gesetzes vom 10.August 2021 (BGBl. I S. 3436).

PlanFestRichtl (2002): Richtlinien für die Aufstellung und Feststellung des Planes über die gemeinschaftlichen und öffentlichen Anlagen in der Flurbereinigung (Planfeststellungsrichtlinien FlurbG). RdErl. des Ministeriums für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz vom 22. August 2002 (SMBl. NRW. 7815).

RAS-K-2001: Richtlinie für die Anlage von Straßen. Knotenpunkte: (RAS-K) Abschnitt 1; Plangleiche Knotenpunkte RAS-K-1 .Verlag Kirschbaum, 1991, ISBN 978-3-781-21218-3.

RealVerbG (1969): Realverbandsgesetz im Land Niedersachsen vom 4. November 1969 (Nds. GVBl. S. 187), zuletzt geändert durch Artikel 5 des Gesetzes vom 07. Dezember 2021 (Nds. GVBl. S. 830).

ROG (2008): Raumordnungsgesetz vom 22. Dezember 2008 (BGBl. I S. 2986), zuletzt geändert durch Artikel 1 des Gesetzes vom 22. März 2023 (BGBl. Nr. 88).

RSiedlG (1919): Reichssiedlungsgesetz vom 11. August 1919, zuletzt geändert durch Artikel 8, Absatz 2 des Gesetzes vom 29.Juli 2009 (BGBl. III, Gliederungsnummer 2331-1).

SachenRÄndG (1977): Gesetz zur Änderung sachenrechtlicher, grundbuchrechtlicher und anderer Vorschriften vom 22.Juni 1977 (BGBl. I S.998).

SachenRBerG (1994): Gesetz zur Sachenrechtsbereinigung im Beitrittsgebiet (Sachenrechtsbereinigungsgesetz) vom 21.September 1994 (BGBl. I S. 2457), zuletzt geändert durch Artikel 15, Absatz 20 des Gesetzes vom 04.Mai 2021 (BGBl. I S. 882).

SchuldRAnpG (1994): Schuldrechtsanpassungsgesetz vom 21. September 1994 (BGBl I S. 2538), zuletzt geändert durch Artikel 20 des Gesetzes vom 20.November 2015 (BGBl. I S. 2010).

ThürWaldG (2008): Gesetz zur Erhaltung, zum Schutz und zur Bewirtschaftung des Waldes und zur Förderung der Forstwirtschaft (Thüringer Waldgesetz) in der Fassung der Bekanntmachung vom 18.September 2008 (GVBl. S. 327), zuletzt geändert durch Gesetz vom 21. Dezember 2020 (GVBl. S. 665).

ThürWaldGenG (1999): Thüringer Waldgenossenschaftsgesetz vom 16. April 1999 (GVBl. 1999, S. 247).

UmwRG (2017): Umwelt-Rechtsbehelfsgesetz in der Fassung der Bekanntmachung vom 23.August 2017 (BGBl. I S. 3290), zuletzt geändert durch Artikel 2 des Gesetzes vom 14.März 2023 (BGBl. I Nr. 71).

UVPG (2021): Gesetz über die Umweltverträglichkeit (UVPG) in der Fassung der Bekanntmachung vom 18. März 2021 (BGBl. I S. 540), zuletzt geändert durch Artikel des Gesetzes vom 22.März 2023 (BGBl. I Nr. 88).

VermG (2005): Gesetz zur Regelung offener Vermögensfragen (Vermögensgesetz), vom 9. Februar 2005 (BGBl. I S. 205), zuletzt geändert durch Artikel 15, Absatz 33 des Gesetzes vom 04.Mai 2021 (BGBl. I Nr. 882).

VwGO (1991): Verwaltungsgerichtsordnung in der Fassung der Bekanntmachung vom 19. März 1991 (BGBl. I S. 686), zuletzt geändert durch Artikel 1 des Gesetzes vom 14.März 2023 (BGBl. I Nr. 71).

VGGT (2012): Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security. FAO 2012, Rome. http://www.fao.org/docrep/016/i2801e.pdf

VO Erbbrauch NRW (1976): Verordnung zur Feststellung des Erbbrauchs vom 07. Dezember 1976 (GV. NRW. S. 426), zuletzt geändert durch Artikel 29 der VO vom 24. September 2014 (GV. NRW. S. 647).

VwVfG (2003): Verwaltungsverfahrensgesetz in der Fassung der Bekanntmachung vom 23. Januar 2003 (BGBl. I S. 102), zuletzt geändert durch Artikel 24 Absatz 3 des Gesetzes vom 25. Juni 2021 (BGBl. I S. 2154).

WaldR (2000): Richtlinien für die Ermittlung und Prüfung des Verkehrswertes von Waldflächen und für Nebenentschädigungen (Waldwertermittlungsrichtlinien 2000 – WaldR 2000) in der Fassung vom 12. Juli 2000 (BAnz. Nr. 108a vom 06. September 2000), zuletzt geändert am 20.März 2019. Bundesanstalt für Immobilienaufgaben (BAnz. AT 28.März 2019)

WEG (2021): Gesetz über das Wohnungseigentum und das Dauerwohnrecht (Wohnungseigentumsgesetz – WEG) in der Fassung der Bekanntmachung vom 12. Januar 2021 (BGBl. I Nr. 2, S. 34), zuletzt geändert durch Artikel 7 des Gesetzes vom 07.November 2022 (BGBl. I S. 1982).

WHG (2009): Wasserhaushaltsgesetz vom 31. Juli 2009 (BGBl. I S. 2585), zuletzt geändert durch Artikel 5 des Gesetzes vom 03.Juli 2023 (BGBl. I Nr. 176).

ZGB (1975): Zivilgesetzbuch der Deutschen Demokratischen Republik vom 19. Juni 1975 (GBl. I Nr. 27, S.465).

ZTV-LW (1999): Zusätzliche technische Vertragsbedingungen und Richtlinien für die Befestigung ländlicher Wege. FGSV Nr. 675. ISBN 978-3-86446-154-5.

ZusArbErl FlurbG (2016): Zusammenarbeit der Katasterbehörden, der Grundbuchämter und der Finanzämter mit den Flurbereinigungsbehörden anlässlich von Bodenordnungsverfahren nach dem Flurbereinigungsgesetz (Zusammenarbeitserlass Flurbereinigung – ZusArbErl FlurbG). Gemeinsamer Runderlass des Ministeriums für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz – II B 4 – 851.12.04 des Ministeriums für Inneres und Kommunales – 37-51.13.05, des Justizministeriums – 3850 – I. 42 und des Finanzministeriums – S 4500 – 18 – V A 6 / S 3300 – 85 – V A 6 vom 16. März 2016. MBl. NRW 2016, S. 204.

8 List of figures

9 Appendices

9.1 Land Consolidation Act (Flurbereinigungsgesetz)

An English translation of the Land Consolidation Act dating from 1995 is available on the website of ARGE Landentwicklung, the Federal-Länder Working Group on Land Development. The wording of the Act cited in this book is based on that translation, with some revisions for consistency:
https://www.landentwicklung.de/fileadmin/sites/Landentwicklung/Dateien/Internationales/Land_Consolidation_Act_Synopsis.pdf

The German text of the Act is available here:
https://www.gesetze-im-internet.de/flurbg/BJNR005910953.html

9.2 Agricultural Adjustment Act (Landwirtschaftsanpassungsgesetz)

To our knowledge, no English translation of the Agricultural Adjustment Act is available. The German text of the Act is available here:
https://www.gesetze-im-internet.de/lanpg/DDNR006420990.html

9.3 Land register folio from the Arnoldsweiler land register (example)

Preliminary remarks

At the time of writing, as described in section 4.2.1, the German land register is in the process of digital migration. This has major implications for data transfer between the judicial administration, which maintains the land register, and land consolidation authorities. Digital migration does not significantly change the data structure of the land register, but it does affect operating procedures between authorities, and also the media and formats used for data exchange. The changeover will take a few years to complete. Until then, land consolidation authorities will still have to work with land register excerpts like the one shown in the example below. For data protection reasons, it is a fictitious example with entries that are characteristic of land consolidation procedures.

Cover sheet

1 The introductory text indicates that the land register folio has already been migrated to the SolumSTAR IT system, enabling the land register to be maintained in digital form with online access for registered users. The land consolidation authority can thus obtain the entire content of the land register in this form for any plot of land included in a land consolidation procedure.

2 In the states of Hamburg, Lower Saxony, North Rhine-Westphalia and Schleswig-Holstein, it can be recorded in the land register that a property is a *'Hof'* – a (family) farm or forestry holding – within the meaning of the *Höfeordnung* (Farm Succession Code; HöfeO 1976). In this instance, the entry states that the property's *'Hofeigenschaft'* (designation as a *'Hof'*) was revoked in 1960. Section 1 of the Farm Succession Code sets out the formal criteria under which a property can be designated a *'Hof'.* The reason why this is important is because under the Farm Succession Code, a '*Hof*' can only be inherited by one single heir, without certain other relatives having a legal right to a share as is otherwise the case in German law. State-specific secondary implementing legislation (for North Rhine-Westphalia, for example, see VO Erbbrauch NRW 1976) specifies the applicable inheritance custom; that is, whether the property is inherited by the oldest heir (primogeniture) or the youngest heir (ultimogeniture). Because the designation has been revoked in this instance, the normal succession rules under the German Civil Code (BGB 1896) apply to this property.

Amtsgericht Euskirchen

Grundbuch von Stockhausen

Blatt 10101

Dieses Blatt ist zur Weiterführung auf EDV umgestellt worden und dabei an die Stelle des bisherigen getreten. In dem ursprünglichen Blatt enthaltene Rötungen sind nunmehr schwarz sichtbar.
Freigegeben am 30. Juli 2002.

Unterschrift

1

Die Hofeigenschaft ist mit dem 19. August 1960 verloren gegangen. Eingetragen aufgrund des Antrags des Amtsgerichts Euskirchen vom 25. August 1960 am 29. August 1960.
Übernommen am 31.Juli 2002.

Unterschrift

2

· letzte Änderung 31.07.2002 · Ausdruck vom 23.09.2021 · Seite 1 von 10

Inventory (three pages)

The inventory contains a list – on pages 2 and 3 – of the names of the plots of land and the rights attached to ownership as recorded in the cadastral register, stating the cadastral district (*Gemarkung*), cadastral district subdivision (*Flur*), parcel (*Flurstück*) number, general land use and location (*Wirtschaftsart und Lage*, where *Lage* is the name of the field block going back to the former *Gewanne* or open field), and area in ares (*Flächengröße*). Entries updating the inventory are recorded on page 4, headed *Bestand und Zuschreibungen/Abschreibungen* ('inventory and transfers in/out', meaning transfers to and from other land register folios).

On the date of the land consolidation authority's excerpt from land register folio no. 10101 (23 September 2021), the active inventory of plots thus comprised:

Number in inventory	Cadastral district	Cadastral district subdivision	Parcel no.	Size (a)	Note
3	Stockhausen	7	394	80.39	
4	Dassel	2	242/70	56.12	
5	Dassel	3	216/99	71.38	
7	Hennef	5	345	34.89	See *Bestandsverzeichnis* (inventory) columns 5 and 6
10	Dassel	2	87	22.33	
11	Dassel	3	119/56	44.94	
12	Stockhausen	10	516	5.51	See *Bestandsverzeichnis* columns 5 and 6 and *Abteilung II* (Division II), entry no. 4
13	Stockhausen	10	517	0.05	
14	Stockhausen	31	17	303.03	See *Bestandsverzeichnis* columns 5 and 6
Total				**618.64**	

Amtsgericht Euskirchen **Grundbuch von** Stockhausen **Blatt** 10101 **Bestandsverzeichnis**

Laufende Nummer der Grundstücke	Bisherige laufende Nummer der Grundstücke	Bezeichnung der Grundstücke und der mit dem Eigentum verbundenen Rechte						Größe		
		Gemarkung (Vermessungsbezirk)	Karte		Katasterbücher		Wirtschaftsart und Lage	ha	a	m²
			Flur	Flurstück	Lieg B	Geb B				
		a	b		c	d	e			
1	2	3						4		
1		Stockhausen	10	215	345		Hof- und Gebäudefläche, Zülpicher Straße 99		5	56
2		Stockhausen	7	48			Gartenland, Kirchbenden		12	50
3		Stockhausen	7	394			Ackerland, Kirchbenden		80	39
4		Dassel	2	242/70			Ackerland, Obererz		56	12
5		Dassel	3	216/99			Grünland, Im kurzen Tal		71	38
6		Stockhausen	12	222			Ackerland, An der Maar	2	05	47
7		Hennef	5	345			Ackerland, Bäckerskreuz		34	89
8		Stockhausen	13	34			Ackerland, Kirchfeld		29	45
9		Stockhausen	13	78			Ackerland, Kirchfeld		73	99
10		Dassel	2	87			Ackerland, Obererz		22	33
11		Dassel	3	119/56			Grünland, Im kurzen Tal		44	94
12	1	Stockhausen	10	516			Hof- und Gebäudefläche, Zülpicher Straße 99		5	51

- letzte Änderung 30.06.2021 - Ausdruck vom 23.09.2021 - Seite 2 von 10

Amtsgericht Euskirchen **Grundbuch von** Stockhausen **Blatt** 10101 **Bestandsverzeichnis**

Laufende Nummer der Grundstücke	Bisherige laufende Nummer der Grundstücke	Bezeichnung der Grundstücke und der mit dem Eigentum verbundenen Rechte						Größe		
		Gemarkung (Vermessungsbezirk)	Karte		Katasterbücher		Wirtschaftsart und Lage	ha	a	m²
			Flur	Flurstück	Lieg B	Geb B				
		a	b		c	d	e			
1	2	3						4		
13	1	Stockhausen	10	517	345		Hof- und Gebäudefläche, Zülpicher Straße 99		0	05
14	6, 8, 9	Stockhausen	31	17			Ackerland, Kirchfeld	3	03	03

- letzte Änderung 30.06.2021 - Ausdruck vom 23.09.2021 - Seite 3 von 10

Amtsgericht Euskirchen **Grundbuch von** Stockhausen **Blatt** 10101 **Bestandsverzeichnis**

Bestand und Zuschreibungen		Abschreibungen	
Zur lfd. Nr. der Grundstücke		Zur lfd. Nr. der Grundstücke	
5	6	7	8
7	Auf Ersuchen der Flurbereinigungsbehörde Siegburg vom 03. März 1964 von Blatt 1774 übertragen und eingetragen aufgrund des bestandskräftigen Flurbereinigungsplanes Buisdorf (O.Nr. 111) am 24. April 1964. **1** Unterschrift1 Unterschrift 2	2	Ohne Landabfindung abgeschrieben aufgrund des Ersuchens der Bezirksregierung Köln als Flurbereinigungsbehörde vom 20.Februar 2021unter Bezug auf den bestandskräftigen Flurbereinigungsplan Odendorf (O.Nr. 631/01) am 30.Juni 2021. Unterschrift 1 Unterschrift 2 **4**
1	Fortgeschrieben in den laufenden Nummern der Grundstücke 12 und 13 gemäß Veränderungsnachweis Nr. 68/2016 am 10. April 2016. **2** Unterschrift 1 Unterschrift 2		
14	Anstelle von lfd. Nr. 6, 8 und 9 eingetragen aufgrund des Ersuchens der Bezirksregierung Köln als Flurbereinigungsbehörde vom 20. Februar 2021 unter Bezug auf den bestandskräftigen Flurbereinigungsplan Odendorf (O.Nr. 631/01) am 30. Juni 2021. **3** Unterschrift 1 Unterschrift 2		

· letzte Änderung 30.06.2021 · Ausdruck vom 23.09.2021 · Seite 4 von 10

Division I (Abteilung I, one page)

1 Division I lists the owners of the plots of land recorded in the inventory. The (originally red) underlining indicates that the ownership rights to all plots in the inventory are extinguished and the previous owner's place is taken by the new owner, in this case by inheritance.

Amtsgericht Euskirchen **Grundbuch von** Stockhausen **Blatt** 10101 **Abteilung I**

Laufende Nummer der Eintragungen	Eigentümer	Laufende Nummer der Grundstücke im Bestandsverzeichnis	Grundlage der Eintragung
1	2	3	4
1	Frau Anna Rosauer, geb. Schmitt, geb. am 13.09.1940, Landwirtin in Stockhausen **1** Unterschrift 1 Unterschrift 2	1 – 12	
2	Herr Stefan Rosauer, geb. am 29.März 1976, wohnhaft in Niederzier Unterschrift 1 Unterschrift 2	1 – 12	Umgeschrieben aufgrund Erbfolge, 8 VI 249/ 2002 Amtsgericht Jülich, am 03. August 2002. Unterschrift 1 Unterschrift 2
		3,4,5,7,10-14	Umgeschrieben auf Ersuchen der Bezirksregierung Köln als Flurbereinigungsbehörde unter Bezug auf den bestandskräftigen Flurbereinigungsplan Odendorf (O.Nr.631/01) am 30.Juni 2021. Unterschrift 1 Unterschrift 2

· letzte Änderung 30.06.2021 · Ausdruck vom 23.09.2021 · Seite 5 von 10

Division II (Abteilung II, three pages)

Division II records encumbrances and restrictions on the plots of land listed in the inventory. In this case, these comprise a limited personal servitude, an easement, a priority notice of conveyance and a restraint on disposition under section 52 (3) of the Land Consolidation Act.

1 A limited personal servitude on the plot identified as Stockhausen cadastral district, cadastral district subdivision 7, parcel 394, recorded at the request of the President of Aachen District Government, permits the beneficiary, a company, to build, operate and maintain a long-distance gas pipeline.

2 A consolidation legally concluded by a *Rezess* (settlement) in 1907 resulted, among other things, in the construction of drainage systems. So that the parts of the drainage system that are not on their own property could be properly maintained, an easement was recorded on the plot listed under number 11 in the inventory, and identified as Dassel cadastral district, cadastral district subdivision 3, parcel 119/56, for a group of beneficiaries (defined by ownership of specific, identified plots of land) so that they were able to carry out certain work.

3 A limited personal servitude on the plot identified as Stockhausen cadastral district, cadastral district subdivision 13, parcel 78, permits the beneficiary, a company, to build, operate and maintain a high-voltage overhead line.

4 By means of the priority notice of conveyance, the purchaser (Josef Müller) of the plot identified as Stockhausen cadastral district, cadastral district subdivision 10, parcel 389 seeks to ensure that the owner of the plot identified as Stockhausen cadastral district, cadastral district subdivision 10, parcel 215, after division of his plot by means of a cadastral survey, does indeed give up the required strip of land.

5 In the Odendorf land consolidation procedure, the owner has, in favour of the body of participants, waived compensation in land in relation to the plot that is listed under number 2 in the inventory and identified as Stockhausen cadastral district, cadastral district subdivision 7, parcel 48. So that the equalisation payment could be made immediately following declaration of the waiver rather than having to wait until the land consolidation plan entered into effect, a restraint on disposition was recorded under section 52 (3) of the Land Consolidation Act. Recording of the restraint on disposition was requested by Cologne District Government. Since 2018, the five district governments (*Bezirksregierungen*) in North Rhine-Westphalia have been the state's land consolidation authorities.

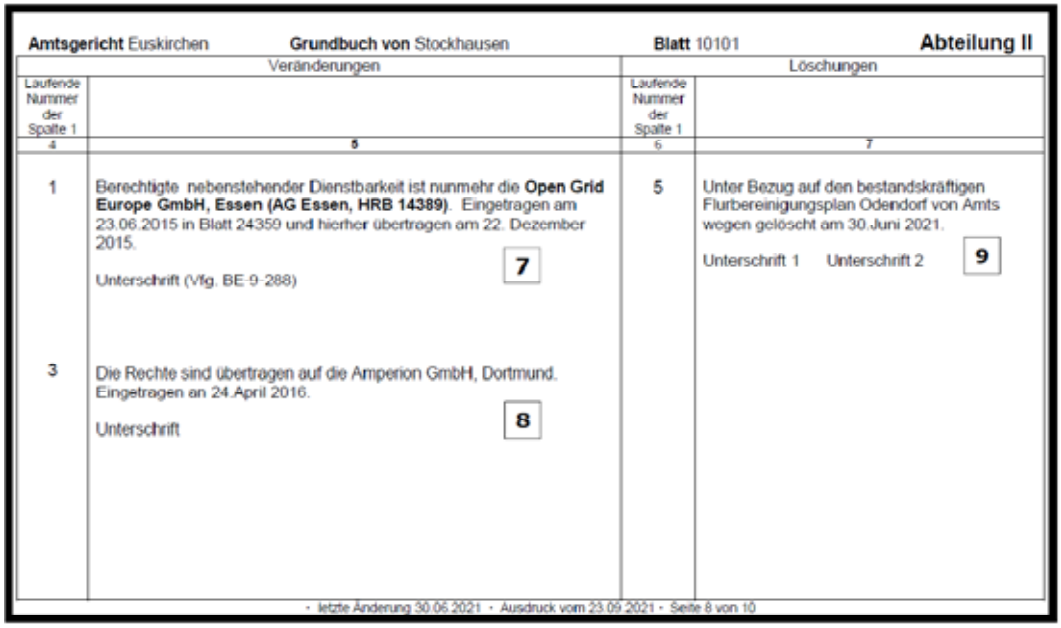
6 The limited personal servitude for construction, operation and maintenance of a high-voltage overhead line had to be transferred to the compensatory parcel – Stockhausen cadastral district, cadastral district subdivision 31, parcel 17 – evidently because the compensatory parcel was (at least in part) on the route of the power line. If the compensatory parcel was no longer crossed by the overhead power line, the limited personal servitude in land register folio 10101 would have had to be deleted at the request of the land consolidation authority. An easement with the same wording as before would have to be established on the compensatory parcels then crossed by the overhead power line in order to preserve the rights of the beneficiary.

Amtsgericht Euskirchen | **Grundbuch von** Stockhausen | **Blatt** 10101 | **Abteilung II**

Laufende Nummer der Eintragungen	Laufende Nummer der betroffenen Grundstücke im Bestandsverzeichnis	Lasten und Beschränkungen
1	2	3
1	3	Beschränkt persönliche Dienstbarkeit zu Gunsten der Thyssen Gas- und Wasserwerke GmbH, Duisburg-Hamborn, zu Bau, Betrieb und Unterhaltung einer Ferngasleitung. Unter Bezugnahme auf den Enteignungsbeschluss des Regierungspräsidenten in Aachen vom 09.November 1959 – 13.II.5-41/73 – eingetragen am 18.Juli 1960. Unterschrift 1 Unterschrift 2 **1**
2	11	Zur Erhaltung der bei Gelegenheit der Zusammenlegung Bödingen angelegten Drainageanlagen lastet auf dem Grundstück eine Grunddienstbarkeit. Auf Grund und unter Bezugnahme auf § 15 Nr. 2, § 11 Nr. III a des rechtskräftig bestätigten Rezesses von Bödingen vom 13.Dezember 1907 eingetragen zu Gunsten der jeweiligen Eigentümer der Flurstücke Gemarkung Hennef, Flur 5, Flurstücke 17, 18, 19, 153, 346 in Blatt 1444 von Stockhausen, umgeschrieben Birkesdorf von Blatt 0389 am 15. Dezember 1967. Unterschrift 1 Unterschrift 2 **2**
3	9	Beschränkt persönliche Dienstbarkeit (Hochspannungsfreileitung) für die Rheinisch-Westfälische Aktiengesellschaft in Essen (RWE). Eingetragen mit Bezug auf die Bewilligung vom 16.Februar 1974 am 11. Juni 1974. Unterschrift 1 Unterschrift 2 **3**

Amtsgericht Euskirchen | **Grundbuch von** Stockhausen | **Blatt** 10101 | **Abteilung II**

Laufende Nummer der Eintragungen	Laufende Nummer der betroffenen Grundstücke im Bestandsverzeichnis	Lasten und Beschränkungen
1	2	3
4	13	Auflassungsvormerkung – mit Abtretungs- und Verpfändungsbeschränkung – für Josef Müller, geboren am 19.Juni 1959 und wohnhaft in Stockhausen, Zülpicher Straße 97, unter Bezug auf die Bewilligung vom 06. Juli 2016 (UR-Nr. 176/ 2016, Notar Alexander Minter, Euskirchen). Eingetragen am 10. Juli 2016. Unterschrift 1 Unterschrift 2 **4**
5	2	Gesetzliches Verfügungsverbot gemäß § 52 Abs. 3 Flurbereinigungsgesetzes in der Fassung vom 16 März 1976 (BGBl. I S. 546) zu Gunsten der Teilnehmergemeinschaft der Flurbereinigung Odendorf. Eingetragen aufgrund des Ersuchens der Bezirksregierung Köln vom 25.Juni 2018 am 03.Juli 2018. Unterschrift 1 Unterschrift 2 **5**
6	14	Beschränkt persönliche Dienstbarkeit (Hochspannungsfreileitung) für die Amperion GmbH, Dortmund, eingetragen mit Bezug auf die Bewilligung vom 16.Februar 1974, übertragen auf Ersuchen der Bezirksregierung Köln als Flurbereinigungsbehörde vom 20.Februar 2021 unter Bezug auf den bestandskräftigen Flurbereinigungsplan der Flurbereinigung Odendorf (O.Nr. 631/01) am 30.Juni 2021. Unterschrift 1 Unterschrift 2 **6**



Amtsgericht Euskirchen **Grundbuch von** Stockhausen **Blatt** 10101 **Abteilung II**

Laufende Nummer der Spalte 1	Veränderungen	Laufende Nummer der Spalte 1	Löschungen
4	5	6	7
1	Berechtigte nebenstehender Dienstbarkeit ist nunmehr die **Open Grid Europe GmbH, Essen (AG Essen, HRB 14389)**. Eingetragen am 23.06.2015 in Blatt 24359 und hierher übertragen am 22. Dezember 2015. Unterschrift (Vfg. BE 9-288) **7**	5	Unter Bezug auf den bestandskräftigen Flurbereinigungsplan Odendorf von Amts wegen gelöscht am 30.Juni 2021. Unterschrift 1 Unterschrift 2 **9**
3	Die Rechte sind übertragen auf die Amperion GmbH, Dortmund. Eingetragen an 24.April 2016. Unterschrift **8**		

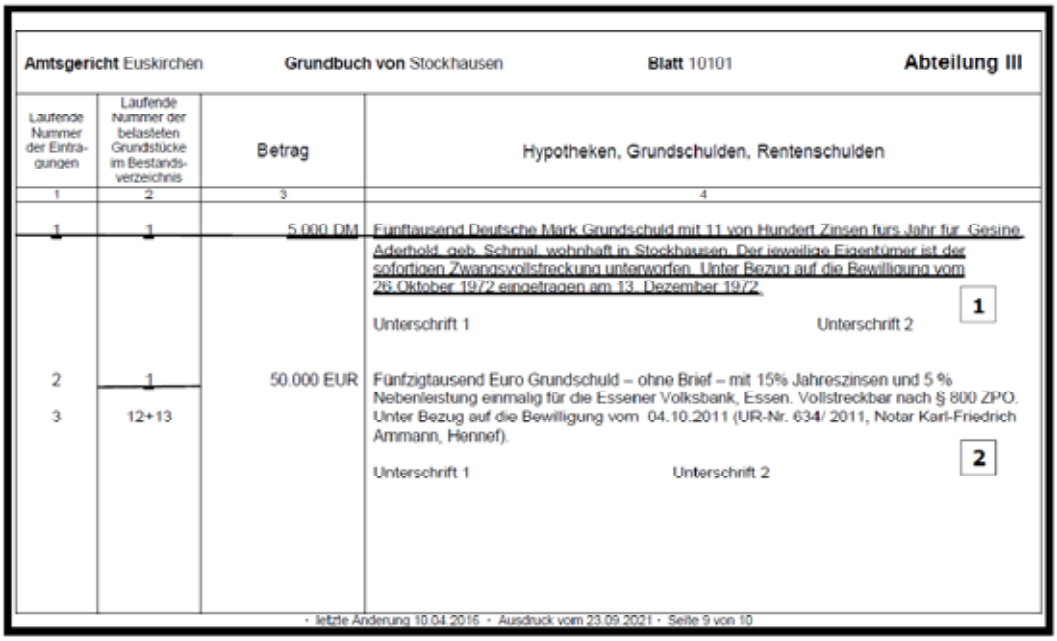
· letzte Änderung 30.06.2021 · Ausdruck vom 23.09.2021 · Seite 8 von 10

Division III (Abteilung III, two pages)

Division III records mortgages and land charges, including annuity land charges.

1 The land charge recorded under entry number 1 in Division III of this land register folio was extinguished (‘*gelöscht*’) on 7 February 1978. See columns 9 and 10.

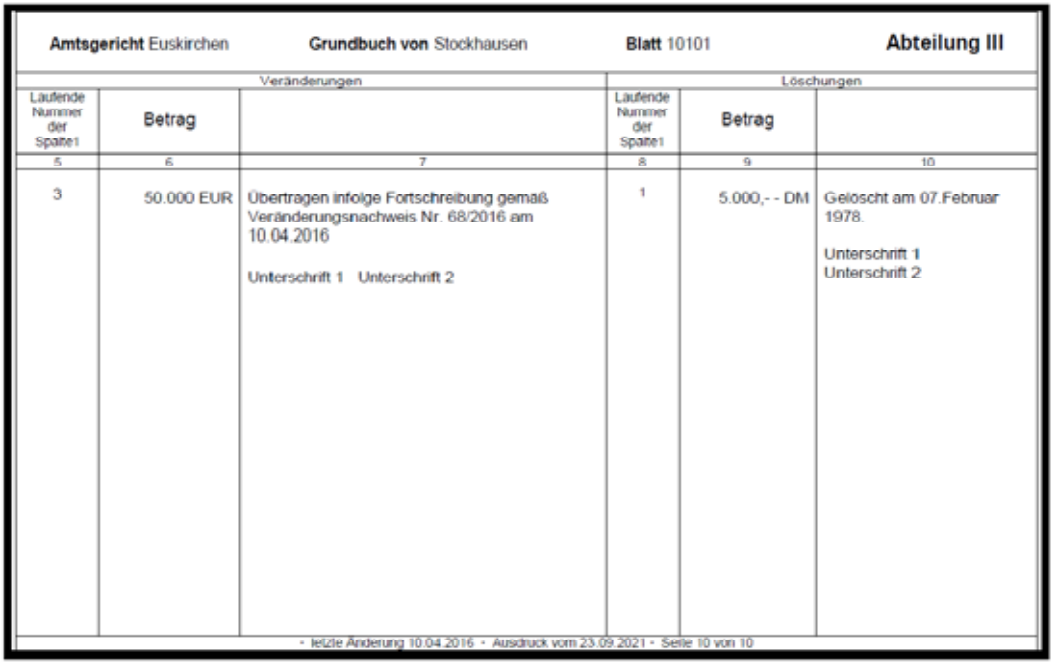
2 Whether and, if so, in what amount the land charge recorded under entry number 2 (in this case for €50,000) is still outstanding cannot (normally) be seen from the land register.



Amtsgericht Euskirchen **Grundbuch von** Stockhausen **Blatt** 10101 **Abteilung III**

Laufende Nummer der Eintragungen	Laufende Nummer der belasteten Grundstücke im Bestandsverzeichnis	Betrag	Hypotheken, Grundschulden, Rentenschulden
1	2	3	4
1	1	5.000 DM	Fünftausend Deutsche Mark Grundschuld mit 11 von Hundert Zinsen furs Jahr für Gesine Aderhold, geb. Schmal, wohnhaft in Stockhausen. Der jeweilige Eigentümer ist der sofortigen Zwangsvollstreckung unterworfen. Unter Bezug auf die Bewilligung vom 26.Oktober 1972 eingetragen am 13. Dezember 1972. Unterschrift 1 Unterschrift 2 **1**
2 3	1 12+13	50.000 EUR	Fünfzigtausend Euro Grundschuld – ohne Brief – mit 15% Jahreszinsen und 5 % Nebenleistung einmalig für die Essener Volksbank, Essen. Vollstreckbar nach § 800 ZPO. Unter Bezug auf die Bewilligung vom 04.10.2011 (UR-Nr. 634/ 2011, Notar Karl-Friedrich Ammann, Hennef). Unterschrift 1 Unterschrift 2 **2**

· letzte Änderung 10.04.2016 · Ausdruck vom 23.09.2021 · Seite 9 von 10



Amtsgericht Euskirchen **Grundbuch von** Stockhausen **Blatt** 10101 **Abteilung III**

Veränderungen			Löschungen		
Laufende Nummer der Spalte1	Betrag		Laufende Nummer der Spalte1	Betrag	
5	6	7	8	9	10
3	50.000 EUR	Übertragen infolge Fortschreibung gemäß Veränderungsnachweis Nr. 68/2016 am 10.04.2016 Unterschrift 1 Unterschrift 2	1	5.000,- - DM	Gelöscht am 07.Februar 1978. Unterschrift 1 Unterschrift 2

· letzte Änderung 10.04.2016 · Ausdruck vom 23.09.2021 · Seite 10 von 10

About the author

Professor Joachim Thomas

Studied geodesy at the University of Bonn, graduating in engineering (Dipl.-Ing. Univ.). Research at the University of Bonn Institute of Photogrammetry and doctorate in engineering (Dr.-Ing.) with a thesis on aerophotogrammetry. Two-year training programme for higher technical administrative service completed with state examinations. Joined the State of North Rhine-Westphalia rural development and land readjustment administration. Several years as project manager for land consolidation procedures in the State of North Rhine-Westphalia before moving to the supervisory authority as a specialist official. Two-year secondment to the state institute of ecology, landscape development and forest planning. Following several years as head of the North Rhine-Westphalia higher land consolidation authority, moved to the Ministry for Environment, Agriculture, Conservation and Consumer Protection of the State of North Rhine-Westphalia as top specialist official in the rural development and land readjustment administration. Lecturer in rural reorganisation at Bochum University of Applied Sciences. Appointed by the Federal-Länder Working Group on Land Development (ARGE Landentwicklung) as international development officer and official representative in international cooperation on rural development and land readjustment. Member of several missions of the United Nations Economic Commission for Europe Working Party on Land Administration (UNECE-WPLA) for the preparation of status reports on land management and rural development in the countries of Central and Eastern Europe. Project experience, field experience and consultant in rural development, land readjustment and land consolidation in the countries of Central and Eastern Europe and the People's Republic of China. Publications in national and international journals and presentations at international congresses and workshops.

Joachim Thomas

Handbook on rural land readjustment and land consolidation in Germany

---

Offset paper.
Arial headset.
Circulation of 50 copies.
Digital printing

Publisher Lysenko M.M.
St. Shevchenko, 20.
Nizhin Ukraine.
e-mail: vidavec.lisenko@gmail.com
+38067 4412124

Certificate of entry into the State Register of Publishers
DK No. 2776 of February 26, 2007