An Overview of Land Consolidation in Europe

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Abstract. *Rural development by land consolidation is used in several countries in the Continent of Europe. At the moment, land consolidation projects are executed mainly in Germany, the Netherlands, France, Belgium, Luxembourg, Austria and Switzerland as well as Finland, Norway and Sweden. The demand for land consolidation arises from a similar source in all countries: the need for readjusting unfavourable land division and promoting the appropriate use of the real property without changing the status of ownership. There are differences in the objectives and procedures of land consolidation depending on the country in question, as the development of the procedure has been influenced by the historical trends, culture, tradition and legislation in each of the countries. The common initiative for land consolidation in different countries has, however, offered the possibility of adopting well-proven solutions, and the features of the land consolidation process have developed similar in all of Europe. Based on literature research the objective of this article is to discuss the similarities and differences in the land consolidation procedure in various European countries. The article considers the organisation, objectives, legal procedure, costs and financing, and the development prospects. Furthermore, the article compares the objectives and contents of land consolidation in Finland, Germany, the Netherlands and Sweden in more detail.*

Keywords: *land consolidation, procedure, process, reallocation, reallotment*

1 Introduction

In this context, land consolidation (in German: Flurbereinigung or ländliche Neuordnung; in Dutch: ruilverkaveling; in French: remembrement; in Swedish: fastighetsreglering/omarrondering; in Finnish: uusjako) means a comprehensive reallocation procedure of a rural area consisting of fragmented agricultural or forest holdings or their parts. The legally defined aims of the land consolidation procedure vary from country to country. The general objective is, however, to

improve land division and to promote the appropriate use of the real estates. The objective is pursued by consolidating land plots through land exchanges to form plots that are better adapted to their proper use (e.g. plots are larger and/or better shaped). At the same time, the relative value and the ownership of the real estates are normally kept constant. In addition to actual land exchanges, improvement of the road and drainage network, different building, landscaping, environmental management and conservation projects, and other functions (see e.g. Figure 2) necessary for the objectives may be implemented in land consolidation. A strictly limited area and the project-oriented procedure are also the characteristics of land consolidation.

Proceedings regarded as predecessors for land consolidation were already common in Europe in the Middle Ages, for example in England and in Southern Germany (Gamperl 1955, p. 55; Lambert 1963, p. 37). The present type of land consolidation process was adopted in Europe in the late 19th century and early 20th century. According to a report made in 1963 (Lambert 1963, p. 33 and 46) land consolidation had already been concluded in Western Europe in an area of appr. 38 million agricultural hectares, i.e. one fourth of all cultivated land.

Another report made in 1988 estimated the need for land consolidation still exist for example for appr. 0,7 million agricultural hectares in the Netherlands, appr. 1,7 million hectares in Spain, 4,0 to 5,0 million hectares in Portugal, appr. 1,5 million hectares in Poland, appr. 7,4 million hectares in France, and appr. 0,3 million forested hectares in Sweden (Beun 1992, p. 78; Casado Lopez and Martinez Velasco 1992, p. 190; Dorémus 1992, p. 184; Duarte Mendes 1992, p. 203–204; Hopfer 1992, p. 337; Österberg and Pettersson 1992 p. 271).

The objective of this article is to discuss the similarities and differences in the land consolidation procedure in various European countries. Based on literature research the article considers the organisation, objectives, legal procedure, costs and financing, and the development prospects. Furthermore, the article compares the objectives and contents of land consolidation in Germany, the Netherlands, Finland and Sweden in more detail. Only the traditional land consolidation procedures are included in the comparison. For instance, the reallotment procedures for implementing various conservation projects and modernisations of the infrastructure have been excluded.

2 Land consolidation legislation

Land consolidation is based on legislation in all countries. Generally the legislation regulating land consolidation dates back to the 1970's (e.g. in Austria, Belgium, Germany, Norway and Sweden) or to the 1980's (e.g. in the Netherlands, Poland, France and Hungary). In Finland the new Real Property Formation Act became effective in 1997. Land consolidation also has direct or indirect connections to the land use legislation, building legislation, environmental protection legislation, nature conservation legislation, and to the agricultural, forest, road, water and expropriation legislation. (Meuser 1992, p. 67–91.)

The reason for amending the land consolidation legislation in all of Europe in the late 20th century was the quick changes occurring in the land consolidation environment making new agricultural and socio-political demands on the land consolidation activity. Land consolidation was seen as a tool for cutting down agricultural production in a controlled manner and for increasing productivity by lowering the costs of production. Together with this the objectives of land consolidation were incorporated with social, ecological and cultural aspects. Along with the amendments of legislation the traditional land consolidation has, especially in Central Europe, formed into multidimensional rural development, which can additionally be used for improving the infrastructure, enhancing landscape and nature protection, and implementing various recreation area projects. For example the Dutch rural development act (Wet Inrichting Landelijk Gebied), the German land consolidation act (Flurbereinigungsgesetz) or the Real Property Formation Act in Finland does not restrict land consolidation just for improving agricultural productivity but enables its use for readjusting the rural land division widely from the viewpoint of other industries and land use needs as well. (Meuser 1992, p. 25–34; Tenkanen 1994, p. 4.)

3 Executive organisation

The land consolidation procedure is regarded as administrative decision-making, and in most of the countries it is entrusted to the administrative authorities. On the central government level land consolidation generally falls to the ministry in charge of agriculture and forestry. The administrative organisation is typically tripartite. In addition to the Central Administrative Board it consists of the land consolidation authorities of the regional and local administration level.

There are two primary alternatives for the execution responsibility for the land consolidation procedure: the “cadastral surveyor model” and the “committee model”. In the “cadastral surveyor model” (e.g. in Austria, Finland, Germany and Sweden) a cadastral surveyor appointed by the land consolidation authorities is in charge of implementing the projects. In the “committee model” (e.g. in Belgium, France, the Netherlands, Portugal, and Switzerland) the responsibility is with a panel committee. The committee may be nominated by the ministry, the regional administrative authority or the land consolidation authorities. In some of the countries the landowners have a representative in the committee and in some countries the committee merely consists of the representatives of various organisations and authorities. When necessary, experts may be used for assistance in both of the models. (Meuser 1992, p. 92–102; Sky 2001, p. 44–46.)

The landowners in the consolidation area generally form a competent association, which, depending on the country, has a weaker or stronger role in implementing the projects. Such an association has a strong statutory position, for example in France, Germany and the Netherlands where it can participate in the valuation, project planning and the implementation. (Dorémus 1992, p. 171; Meuser 1992, p. 92–102.)

4 Objectives of land consolidation

The objectives of land consolidation vary in different countries, as the development of the procedure has been effected by the historical trends, culture, traditions and legislation in each country (compare Viitanen 2000, p. 49). The objectives of land consolidation can, however, be operationally grouped into objectives concerning agriculture and forestry, the development of other industries, the housing and living environment, and other land use needs. Regarding the goal setters the objectives of land consolidation can be considered from the viewpoint of the landowners, other interested parties, society and other interest groups. According to these two classifications the objectives of land consolidation can be grouped as presented in Figure 1 (compare Viitanen 2000, p. 51). (Läpple 1992, p. 6-8; Meuser 1992, p. 65; Tenkanen 1994, p. 4-5.)

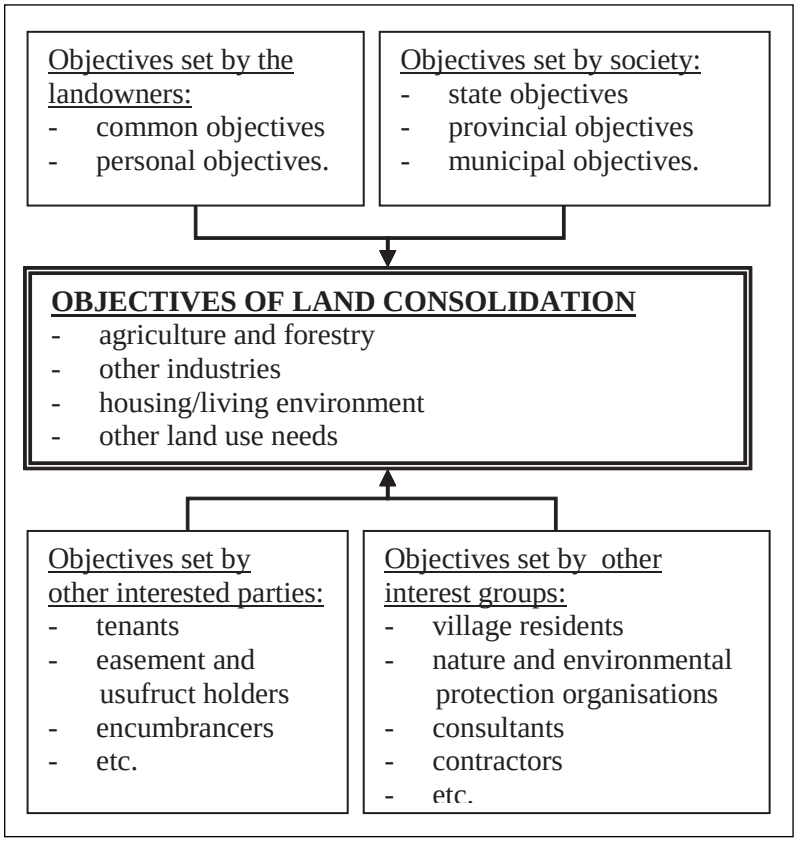

Figure 1. *Objectives of land consolidation*

Table 1 describes the main objectives of land consolidation in Finland, Germany, the Netherlands and Sweden. Regarding the objectives of land consolidation we must keep in mind that different goal setters may have different emphases considering the same operational objective. The farmers,

for instance, may set the reduction of the production costs as the primary goal for land consolidation. The residents in a rural village may emphasise the need for adjusting agricultural production to the other land use needs of the village community. Considering the national economy (the state) the objective may be, in addition to reducing the production costs, a controlled adaptation (increase or decrease) of the amount of production to market demand.

Table 1. *The main objectives of land consolidation in Finland, Germany, the Netherlands and Sweden*

	Finland	Germany	The Netherlands	Sweden
Improvement of agricultural land division	xxx	xxx	xxx	(x)
Improvement of forest land division	xx	(x)	(x)	xxx
Improvement of property division in village centres	x	xxx	xxx	0
Reallotment of leasehold areas	x	xxx	xxx	x
Enlargement of the farm size	xx	xxx	xxx	xx
Land use planning in village centres	x	xxx	xxx	0
Acquisition of land for the municipality/state in village centres	0	xx	xx	0
Readjustment of building land (homestead areas) in village centres	x	xx	xx	0
Improvement of road network in the land consolidation area	xx	xxx	xxx	x
Improvement of drainage network in the land consolidation area	xxx	xxx	xxx	x
Implementation of environment and nature conservation projects, etc	x	xxx	xxx	x
Promotion of regional development projects	x	xxx	xxx	x

xxx = primary objective xx = secondary objective
x = of minor importance 0 = not the objective

4.1 Agriculture and forestry

The objectives of agriculture and forestry are related to improving the working and production conditions, the decrease of the production costs, and the controlled

adaptation of the amount of production to market demand. Land consolidation may also have other important objectives regarding agriculture and forestry and associate industries in each country. Such objectives are, for example, the division of joint property units and the readjustment of water areas (fishing rights) in Norway, the alleviation of congested village centres by the readjustment of the road system and homestead areas in France and Germany, and actions for preventing erosion in the South European countries.

Improvement of the fragmented property division in the forest areas, and the enhancement of balanced use of the forest and sustainable development through reallotment are the natural objectives of land consolidation in the forested countries (e.g. in Sweden and Finland). In Sweden, for example, land consolidation is implemented at the moment only for improving the weak forest property division.

A general objective for land consolidation is also the enlargement of active farms by giving them additional land obtained by land consolidation. In the countries where land leases are common (e.g. in Belgium, France, Germany, Luxembourg and the Netherlands) the objectives for land consolidation generally consider both personal and leased areas, and the property units can also be readjusted for improving the status of the tenant farmers.

4.2 Other industries

The inclusion of the goals for developing other industries in the objectives of land consolidation is based on the fact that agriculture alone cannot offer jobs for all people living in rural villages. In this situation the land use decisions implemented by land consolidation will create opportunities for job supply outside agriculture. By improving means of communication, for instance, working in the neighbouring urban centres is facilitated.

4.3 Housing and living environment

An objective for land consolidation is also to ensure a good housing and living environment to all residents in the consolidated area. This requires the preservation of the flora and fauna diversity in the living environment and the protection of natural conditions by enhancing, for example, water, air and soil conservation, and the prevention of erosion and acidification.

4.4 Other land use needs

Another objective of land consolidation is to prevent the emergence of conflicts between different forms of land use. The provincial and state land-use reservations, e.g. for traffic areas, as reserve areas of natural resources and the increasing use of the rural areas for recreation and leisure, shall be unavoidably considered in the objective setting for individual land consolidation projects.

In Central Europe land consolidation often is a part of a wider regional development programme for rural areas. For example, in the Netherlands land

consolidation is implemented as a part of the national development programme for rural areas (Voorbereidingsschema Landinrichting). In Germany land consolidation is included in the GAK Programme (Gemeinschaftsaufgabe: ”Verbesserung der Agrarstruktur und des Kűstenschutzes“) meant for improving the rural structure and protecting the coastal areas. (Beun 1992, p. 50–55; GAK 2002.) In addition to improving land division land consolidation is used in the regional development programmes for enhancing systematic land use in the rural areas and for readjusting the areas according to the assignment of the programme.

Southern and Eastern Europe and in the Nordic Countries (Denmark, Finland, Norway, and Sweden) land consolidation was until now understood as being outside rural development programmes or indirectly supporting their implementation at the most. The objective setting in these countries is generally on a smaller scale. The primary objective for land consolidation is the improvement of fragmented property division and the enhancement of the use, although land consolidation may also include tendencies towards enhancing various regional development projects.

5 Land consolidation procedure

The contents of the land consolidation procedure include similar main stages in all countries. The process consists of the preparation stage, inventory and planning stage, and the implementation stage, each varying in extent and duration (Figure 2).

5.1 Preparation stage

A precondition for land consolidation in every country is the fact that the benefits gained are considered larger than the costs of the implementation. In addition to this another precondition may be the fact that a certain group of landowners in an area subscribes to the implementation, either by the number and/or the acreage owned by them, or by the (taxable) value. Therefore, e.g. in Switzerland, a majority of landowners shall subscribe to land consolidation, and the supporters shall also own at least one half of the acreage of the land consolidation area. (Meuser 1992, p. 112–114; Sky 2001, p. 47.) On the other hand, e.g. in Sweden, Germany and Finland, the preconditions for land consolidation are solved by the decision of the land consolidation authorities on the basis of the reports made in the preparation stage. Table 2 compares in more detail some essential preconditions for the implementation of land consolidation in Finland, Germany, the Netherlands and Sweden.

Task		Time (years) 1.	2.	3.	4.
1	**PREPARATION**				
1.1	Feasibility studies				
2	**LAND CONSOLIDATION PROCESS**				
2.1	**Inventory and planning stage**				
	- Project plan				
	- Inventory of the rights on the land				
	- Valuation of the land				
	- Preparation of the reallocation plan				
2.2	**Implementation stage**				
	- Registration of the reallocation plan				
	- Demarcation of the new parcels				
	- Taking into possession of the new lots				
	- Payment of compensation				
	- Division of the cadastral survey costs				
2.3	**Conclusion of cadastral survey**				
3	**RECONSTRUCTION OF CAPITAL IMPROVEMENTS**				
	- Road network				
	- Drainage				
4	**ENVIRONMENTAL IMPACT PLANNING (EIA)**				
	- EIA -process				
5	**LAND USE PLANNING**				
	- Planning process				
6	**SUPPORTING PROCESSES**				
	- Governmental land acquisition				
	- Co-operation with interest groups				
	- Update of data stores				
	- Management processes				

***Figure 2**. The Finnish land consolidation procedure (derived from Vitikainen 2003, p. 162)*

Table 2. *The preconditions for land consolidation in Finland, Germany, the Netherlands and Sweden*

Preconditions/reference	Finland	Germany	The Netherlands	Sweden
Initiation of the preparation phase for land consolidation presumes that the project is included in the development programme for rural areas	no	yes	yes	no
Initiation of the preparation phase for land consolidation requires an application from the landowners	yes	no	no	yes
Financial benefits of land consolidation must exceed the costs (cost-benefit analysis)	yes	yes	yes	yes
Land consolidation must improve land division and/or contribute to appropriate use of the real property	yes	yes	yes	yes
Authorities and other partners involved in the implementation of land consolidation must be well disposed to the implementation of the project	no	(yes)	yes	(yes)
Land consolidation authorities must make an affirmative decision on the implementation	yes	yes	no	Yes
Politically elected organ (Provincial Government) must make an affirmative decision on the implementation	no	no	yes	No
Initiation of land consolidation requires the assent of the majority of the landowners (vote)	(no)	no	yes	(yes)

It is natural that the definition of a land consolidation area is made in the same connection and by the same decision-maker than the implementation decision. In practice, a land consolidation area may be defined on the basis of the existing administrative division (e.g. in France), from the functional grounds (e.g. in Finland and Germany), primarily based on the definition presented by the petitioners (e.g. in Sweden), or only the real property of the landowners in favour of land consolidation is included (e.g. in Denmark). Although the main purpose of land consolidation is the improvement of rural land division, the readjustment area may also include the central area of a rural village. A village development project (Dorferneuerung) related to land consolidation may be implemented, for example, under certain conditions in German village centres. (Meuser 1992, p. 112–114.)

There has been a similar change in various parts of Europe in the compulsion

of the landowners to take part in a land consolidation process already decided upon. The landowners participated voluntarily in the first reallotment projects. As the existing land division prevented or hindered practical production renovations, individual landowners tried to make changes in their real property conditions by agreements. Gaining unanimity among a larger number of landowners (e.g. in a village) was, however, difficult, as the members of the community may have had different reasons for not joining. Voluntary reallotments thus became economically inefficient and long in duration. In addition, the risk of being unfinished was always great. As the new financial benefits were wanted quickly and as large as possible, an efficient way to settle the situation was the use of state compulsion, by which the resistance could be broken and the necessary changes implemented. The landowners in a land consolidation area were imposed by compulsion to participating in the reallotment after the decision on implementing the project was made. (Pettersson 1983, p. 35.)

5.2 Inventory stage

The inventory tasks in land consolidation include the surveys of the extent of the real properties and surveys of the titles of the proprietary and other real estate rights, the layout of land compartments and valuation (assessment), and the compilation of the inventory material into a numeric database.

5.2.1 Surveys of titles

The owners of the real properties and the various titles, such as tenancies, easements, usufructs, rights of way, and mortgages, shall be surveyed in the inventory stage. The surveys are based on checking and possible updating of the data either in the cadastre, on the cadastre map and in the land register (e.g. in Germany and the Netherlands). The acquisition of this data may also be a part of the land consolidation process (e.g. in Finland and Sweden). (Backman 2002; Beun 1992, p. 77; Meuser 1992, p. 114.)

Confusions in proprietary and other rights and in the real property boundaries are generally settled in the court of justice in the inventory stage. In some countries (e.g. in Denmark, Finland, France, Spain and Sweden) the land survey authorities are entitled to settle these confusions in the first stage. This procedure has turned out to expedite the implementation (Sky 2001, p. 48). The reports of the surveys of titles are generally informed to the landowners and tenants in public for ensuring their possibility of verifying the information. (Meuser 1992, p. 114–116; Sky 2001, p. 48.)

5.2.2 Valuation tasks

Land consolidation follows the so-called surrogate principle, according to which the financial situation of any of the landowners must not change due to the reallocation. Each landowner shall have land according to his prescription, so that the value of the land transferred is equal to the value of the land obtained.

Compliance of the surrogate principle provides that the relative value of the real properties readjusted will be valuated against each other, i.e. assessed.

Depending on the valuated object the assessment in a land consolidation procedure is made by the market comparison method, by the income method, or by the cost method. The assessment of real properties in agriculture or forestry use is generally based on their natural productive capacity, yet so that the location of the property related to a farmstead or a village centre is not always considered (e.g. in France, Germany, the Netherlands and Sweden). The assessment can either be made by the committee implementing the land consolidation procedure (e.g. in the Netherlands), by agricultural experts (e.g. in Germany), or by a surveying engineer and two trustees (e.g. in Finland and Sweden). Previous assessed valuations can also be used for the assessment, if they are included e.g. in the cadastre (e.g. in Austria, Denmark, France, Germany, and Hungary). (Meuser 1992, p. 121–125.)

When the assessment has been completed the partition is made. It shows the assessment value of the partitioned property unit, which shall be given to each of the landowners according to the partitioning basis. The partitioning can generally be departed to a lesser degree for reaching appropriate division.

In some countries certain percentual limits have been defined for such departure from the partition. In the Netherlands and Belgium the departure may not surpass –15 % of the assessment value, in France –10 % of the acreage or –1 % of the income value. In Sweden and Germany there are no exact limits for the departure, but in practice, the property units have been given at the maximum of ca. 5 % less in Sweden, and in Germany ca. 6 to 7 % less of the assessment value, compared to the prescription of the landowner prior to the partitioning. In Finland, for reaching an appropriate division, a landowner may be given, at the maximum, 10 % less or 20 % more than what is due to him according to the partitioning basis. (Meuser 1992, p. 125–129.)

On the contrary, on the landowner's approval he may be quite freely given more land than are due to him according to the partitioning. This procedure, combined to functional land acquisition proceedings, enables a size rationalisation of the property units.

Along with the assessment different valuation tasks are made in the various stages of the land consolidation process, e.g. for determining the compensations payable by the landowners. A valuation task of its own is the valuation of the benefit falling on the landowners. The objective of such valuation is to determine the final benefit for each property or functional unit according to which the landowners will participate in the costs caused by the procedure.

5.2.3 Procedure database

The inventory material is compiled into a numeric database and a prescription report is printed, showing the outcome of the inventory in a written form. The prescription report shows the assessed values and acreages of the property units, and the assessment values per property unit, parcel and land use type for each

landowner according to his possession and prescription. The property units presented in the prescription specification are described on the cadastral survey map, either prepared from the existing map material (e.g. in Germany and the Netherlands) or based mostly on new aerial photography (e.g. in Finland and Sweden).

Versatility of application is a characteristic of a modern procedure database. It is established in the preparation stage. This geographical information material may be supplemented during the land consolidation procedure and exploited e.g. in the inventory, preparation of the land consolidation plan, planning and implementation of various development projects and other associated projects, and when officially registering the situation after the land consolidation procedure. An obvious trend is that as the use of numeric material is becoming general, a larger part of the tasks in the terrain is replaced by less demanding, more simple and quicker updating of the existing material. (Sky 2001, p. 49.)

The introduction of an integral database also means that the inventory and planning stages of the land consolidation procedure are forming into an entity where different tasks are performed in parallel. The use of information technology in the land consolidation procedures is covering the whole process, e.g. in Sweden where the ArcCadastre and GISOM programs are used in forest property readjustments, and in Finland where the JAKO geographical information system is used. (Backman 2002; JAKO 2003.)

5.3 Land consolidation plan

The most important task in the planning stage is the preparation of the land consolidation plan showing the new reallocation. The land consolidation plan includes, e.g.:

- the new reallocation of the real property units (the new parcel division), possible building demolitions and displacements
- joint property units and possible public areas
- areas reserved for possible nature conservation, landscape preservation and recreation use
- easements and other usufructs
- the time of taking into possession of the new property units and instructions on the regulations of ownership and tenancy.

The land consolidation plan regularly includes a road and drainage plan, and also a landscape preservation plan, for example in the Netherlands and Germany. In the Swedish forest consolidation “green” management plans for all forest owners will be prepared according to the new property division. (Backman 2002, p.10; Batz 1990, p. 74; Dorémus 1992, p. 171 and 177–178; Meuser 1992, p. 65.)

The preparation of a land consolidation plan is a multistage and defining process in which the co-operation between the landowners and experts from

various fields are on focus. In most countries it is further enacted, for guaranteeing judicial relief of the landowners, that the production conditions of each landowner prior to land consolidation shall be considered when preparing the plan. Land consolidation plan shall thus provide that the reshaped property unit of a landowner is corresponding to the former one as for the use, quality, rating, and e.g. traffic conditions. In Central and Southern Europe, where tenancy of farmland is common, the land consolidation plan shall guarantee the situation of the tenants. (Dorémus 1992, p. 160; Meuser 1992, p. 48–49.)

The responsibility for preparing the land consolidation plan may be with the implementing committee (e.g. in Austria, Denmark, France and the Netherlands), or with the association of the landowners (e.g. in Bavaria and Switzerland). In Spain the land consolidation plan is prepared by a private consultant under the supervision of the authorities. In Germany, Sweden and Finland the land consolidation plan is prepared by the cadastral surveyor in co-operation with the landowners and experts in various fields. (Flury 1992, p. 149; Sky 2001, p. 49.)

The land consolidation draft is regularly displayed for public inspection and the claims received will be considered when preparing the final plan. The practice of approving the final land consolidation plan varies in different countries. In Denmark half of the landowners possessing the minimum of 2/3 of the acreage of the real properties involved and 2/3 of the value of the areas shall approve the land consolidation plan. In Portugal it is required that a majority of the landowners measured by the taxable value of the property units is in favour. The most common practice is, however, that the land consolidation authorities confirm the plan after hearing the interested parties without any kind of voting. Those discontented with the land consolidation plan generally have the right to separately appeal to the court. (Durate Mendes 1992, p. 212; Sky 2001, p. 49.)

5.4 Implementation stage

Tasks in the implementation stage are the demarcation of the boundaries, when necessary, and taking into possession of the new property units, calculation of compensation between the landowners and the land consolidation costs, and the apportionment between the parties liable for payment. The primary improvements of the road and drainage networks, building demolitions, displacements and other construction projects, if not realised in the planning stage, are implemented in this stage. The changes are entered in the cadastre, land register, and depending on the country, also in other necessary registers. (Meuser 1992, p. 135–136.)

6 Appeal proceedings

In most countries the appeals against the decisions of the land consolidation procedure are, in the first stage, made by a demand for rectification to the land consolidation authorities and after that possibly to the central government authorities (e.g. in France, Germany, the Netherlands and Spain). The final decisions of the authorities can be appealed either to a specific real estate court

(e.g. in Finland, Germany and Sweden), to the administrative court (e.g. in France and Spain) or to a local court (e.g. in the Netherlands). Mostly the disputes on the land consolidation procedure are treated in three different administrative levels before the legal proceedings, and after that in two different instances (Zhou 1999, p. 13). Appealing in a multi-phased process is economically unfavourable and will prolong the implementation. According to Sky (2001, p. 49) the three-level appeal procedure is in practice sufficient to guarantee the landowners' legal protection.

7 Costs and financing of the land consolidation procedures

The costs of the land consolidation procedure can be divided into two groups:

1) costs of the procedures, including the costs to the land consolidation authorities, e.g. wages, rent of the premises etc.
2) implementation costs, e.g. including the costs for the improvements of the road and drainage network, displacement of the buildings, and the planning and construction costs for other associated projects implemented in connection with the land consolidation project, demarcation costs, and auxiliary personnel, etc.

The costs of the land consolidation procedures are paid in total or in part by the state (50–100 %) in different countries. The landowners primarily pay the implementation costs, but they regularly get government subsidies and/or loan for the financing. (Meuser 1992, p. 162–163.)

Table 4 presents an example of the implementation costs of a land consolidation procedure in a relatively small Finnish rural village. The total acreage is appr. 700 hectares (cultivated area appr. 300 hectares and forest area appr. 400 hectares). There are about 10 to 15 farms in the area.

In addition to the actual division costs the land consolidation process may also cause personal trusteeship, and court and disturbance costs during the process (e.g. temporary crop losses) to the interested parties. These costs generally remain in total to the landowners.

8 Process duration

The duration of a land consolidation process from the start-up to becoming legal considerably varies in different countries. In Norway the duration is about 2 to 4 years (Sky 2001, p. 44). In Sweden the forest readjustments are implemented in 5 to 7 years (Backman 2001). In the Netherlands the preparation stage may last more than 10 years at the maximum, and the actual duration may thus be 10 to 12 years (Beun 1992, p. 62). In Germany, for instance in the constituent state of Rheinland-Pfalz, the total duration of a land consolidation procedure from the execution decision to the conclusion has been about 16 to 17 years, and the duration of the special land consolidation procedures (vereinfachtes Flurbereinigungsverfahren, Unternehmensflurbereinigung and Beschleunigtes Zusammen-legungsverfahren) about 8 to 14 years (RLP 2002). In Finland the duration is appr. 8 to 12 years at the moment.

Table 4. *Example of the costs of a land consolidation procedure in Finland*

Cost group	**Costs, €**	**Share of state subsidy**[1)]
Costs for the procedure - reallotments - planning - environmental impact assessment - etc.	400,000 €	85 - 100 %
Drainages - main ditching of the fields - underdraining of the fields - forest drainage	300,000 €	40 - 75 %
Road projects - farm roads - forest roads	50,000 €	50 - 75 %
Other costs - auxiliary personnel, etc	25,000 €	0 - 100 %

1) In Finland the Ministry of Agriculture and Forestry may determine, even prior to the execution decision, what is the share of the state subsidy in various costs if the land consolidation procedure is commenced. In Finland the costs payable by the landowners are financed by a government's loan during the process and recovered after the implementation. The repayment period is about 20 years.

According to the experts (see e.g. Sky 2001, p. 44; Sonnenberg 2002, p. 10) the duration is prolonged by the extent of the processes (acreage and/or a large number of part-owners), and the great number of associated projects (e.g. road and drainage projects). In addition to these there are other factors prolonging the procedure, such as waiting times in the starting stage and between the various partial tasks, lack of the numeric inventory material (digital data), the increased planning need due to the rapid structural change in agriculture and the increasing tendency towards consensus in the decision-making (RLP 2002).

9 Development scenarios for land consolidation

9.1 Demand for land consolidation

The operational environment of land consolidation is undergoing thorough changes in all of Europe at the moment. In the territory of the European Union the states are pursuing to decrease the productivity of agriculture through farming subsidies and structural policy, and to reducing the production costs. At the same time the farmers wishing to continue agricultural production want to increase their income level by rationalising the use of their production resources and adapting the production to the new market situation. The chance of increasing the farm size

by purchasing or leasing property units from farmers relinquishing production has become a tool for this adaptation. A problem with this is, however, that the growth of farm size by acquiring additional land regularly fragments the property division. This in turn will cause extra costs to the farmers and threaten to eliminate the benefit obtained from the size rationalisation.

A similar problem arising from the fragmentation of the property units is developing in the farms of the Central European transition economy, where the privatisation of the real property and the opening of the land market are offering a new kind of chance for growing the farm size. (Dijk van 2002, p. 2-4.)

The traditional land consolidation and other reallotments aiming to the improvement of property division are seen as means to rectifying fragmented property conditions and obtaining the full benefits arising from production intensification (increase of income) to the farmers continuing the production. The prerequisite for this is, however, that the reallotments can be implemented so rapidly and economically that the landowners feel the benefits obtained be larger than the present costs. (Pettersson 1983, p. 35; Sonnenberg 2002, p. 2-6.)

The increase of tenant property units in the farms is causing an additional need for planning the reallotments individually so that the location of the tenancy units together with the own property units is considered. Similarly, the demand for smaller and flexible special land consolidation regarding one land use type or one form of agricultural production is on the increase. Such reallotment processes are, e.g. land consolidation in the vine culture areas, forest consolidation and property readjustments of water areas. (Läpple 1992, p. 11–12.)

A clear development trend in Central Europe is the integration of land consolidation into the means of implementing the rural development programmes. This indicates the fact that land consolidation and various project reallotments are confirming positions outside the traditional sphere of function as means of implementing such projects where the areal needs of e.g. regional planning, infrastructural projects, various conservation programmes or village development projects are to be adapted.

9.2 Proceedings

The targeting of land consolidation has continuously diversified. Along with the objectives set by agriculture the consideration of landscape preservation, nature and environmental conservation and the needs of village development, for instance, are emphasised. Regarding the development of the process there is a problem with this trend in all parts of Europe. The problem is the expansion of the land consolidation projects into oversized in the workload and costs and overlong in duration. The rapid change of the rural development in the 1990's has, however, brought out the need of expediting the duration of land consolidation. At the same time the limited potentials of both the landowners and the national economy for project financing have caused pressure to lowering the costs of the procedures and the implementation costs.

It is the objective to develop the land consolidation procedure so that the proceedings will be simplified, cost-effective and shorter in duration. This is achieved by cutting the project sizes, availing the existing data banks and modern information technology, combining and performing in parallel the different stages of the process, minimising the waiting times between the different stages and tasks of the process, and omitting the associated projects delaying the process, such as improvements of the road and drainage networks. (Backman 2002, p. 6-9; Sonnenberg 2002, p. 2.) The emphasis of the targeting and the proceedings will thus be on the solving of certain core problems in an area. Examples of such simplified land consolidation processes are the Swedish forest reallotments and the German special land consolidation proceedings.

On the other hand, it is obvious that all the features of the present land consolidation procedure promoting the delivery and improving the quality will be preserved and emphasised. This means that the targeting of the land consolidation projects shall be in concord with the objectives of the regional development programmes based on political decision-making, and that land consolidation will more frequently act as the means of implementation for these programmes. From the viewpoint of improving the quality of land consolidation the preliminary environmental impact assessment (EIA) and social impact assessment (SIA) of various projects will be emphasised. The endeavours for promoting the delivery and quality will also increase the transparency of the land consolidation projects and participation in the project planning and implementation.

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