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# Voluntary Land Consolidation Approaches and Their Adaptability to Experimental Farm-based Land Consolidation in Finland

Kimmo Sulonen<sup>a\*</sup>, Seija Kotilainen & Juhana Hiironen

<sup>a</sup>National Land Survey of Finland

email: kimmo.sulonen@gmail.com

**Abstract:** *There is a need to develop a voluntary and flexible Finnish land consolidation procedure that is less reliable on government funding. To fulfil these development needs, an experimental farm-based land consolidation is currently being tested in Finnish fields. This research aims to compare and evaluate foreign voluntary land consolidations with Finnish practices. The research utilises content analysis of written material and qualitative semi-structured interviews of land consolidation specialists. The study found that voluntary participation increases the commitment of the participants, but may endanger the whole project in some cases. Therefore, rules for voluntary participation (dropping-out rules, etc.) were seen as important. In voluntary processes, the government's role shifts from that of a leader to that of a facilitator, which may mean the redistribution of funding sources as well. There is a hypothesis that participants would be more willing to fund a project that is directly focused on their own issues rather than on regional issues like traditional land consolidation. The study concludes with suggestions of key points by which guiding principles or rules should be defined.*

**Key words:** Finland, land consolidation, voluntary approach

## 1 Introduction

In Western Europe, land consolidation is traditionally used to shape vast areas of agricultural land and as a tool for land reforms or small-scale land reallocation. The value of land consolidation is often related to the needs of the farmer to improve the efficiency of the land by reallocating the fragmented holdings in a more suitable manner. Today, land consolidation can obtain multiple different goals. For instance, participatory approaches, where the solution of the reallocation is negotiated with the right landholders, is becoming more and more common (Lemmen et al. 2012, p.11). Overall, the rural development concept has become

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<sup>a</sup>) Main author.

broader and includes environmental awareness and other non-agricultural concerns (Varga and Bazik 2013, p. 527). New needs have emerged for other approaches along with the traditional approach of land consolidation. To complement these needs, land consolidation in Finland is developed based on customers' aims and wishes. In this context, a voluntary approach and flexibility in land consolidation are seen as key aspects (MMM 2015; Potka 2016a, pp. 12–15, 21–23; MML 2007; Ylikangas 2003, p. 25).

To comprehensively test the possibilities for the voluntary approach and flexibility, an experimental farm-based land consolidation model was introduced. The aim of this research is to supplement experimental land consolidation by investigating and providing possible aspects and adaptability problems if implemented into the Finnish experimental land consolidation. To consider the aspect in an international context, this paper provides insights on the different voluntary-based approaches in different countries and compares their major differences and similarities in relation to the traditional land consolidation model of Finland.

This study analyses a problem that can be divided into two questions: What aspects do different approaches for the voluntary land consolidation provide for experimental land consolidation projects in Finland (Q1), and how adaptable would these international approaches be in the Finnish context (Q2)? To provide an answer to the first question, suitable international voluntary-based approaches are recognised and examined. For the second question, empirical data acquired by interviews with land consolidation specialists is utilised.

## **2 Study design**

The research uses qualitative methods as content analyses<sup>1</sup> to find the differences and similarities between international voluntary-based and Finnish experimental land consolidation. Since land consolidation is an international concept, it is worth exploring different approaches for the comparison. Structurally, the first section of the research describes land consolidation as a concept. Two voluntary-based land consolidation approaches were selected to represent the comparison based on the criteria explained in chapter 4.

Overall, the research is based on two major sources of data acquired by secondary and primary research. The data were acquired in two subsequent phases in order to improve the comparativeness with the material. Based on the analysis, the researcher was able to form interview topics about major differences among the selected voluntary-based approaches and their possible adaptability problems. The data acquisition in the aforementioned sections is based on analysis of available literal sources (secondary research). Because of the nature of the experimental land consolidation, there was a limited amount of written data, which is why the actual empirical data acquisition was based on interviews (primary research).

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<sup>1</sup> Content analysis is used to interpret meaning from the content of text data, where the directed approach is to conceptually validate or extend a theoretical framework or theory. Such an approach is also labelled as a deductive approach (Hsieh and Shannon 2005).

The second section of the research portrays the aspects of different approaches for the key land consolidation specialists who have the latest field experience in experimental land consolidation. It also provides insights into the adaptability problems of presented aspects. The first phase (acquiring secondary data) consists of the analysis of literal sources, e.g., recent articles, theses, reports and memorandums related to voluntary-based approaches in land consolidation. The analysis provides material to determine the current approaches applied internationally and the current status of land consolidation in Finland. The approaches are later compared to form the set of aspects used in the interviews. During the second phase (acquiring the primary data), empirical data were collected by interviewing key land consolidation specialists involved in experimental land consolidation projects. The perspective was acquired through five interviews (*the respondents<sup>2</sup> of the survey*) conducted by phone and private meetings. The interviews were semi-structured, allowing the interviewer to adopt a conversational style guided by pre-designed themes (e.g., Kvale and Brinkmann 2008). The interviews were supplemented by personal correspondences, workshops and meetings.

The pre-defined themes that led the discussion were:

- Voluntary participation of land consolidation
- The roles of land consolidation
  - Authorities conduct and lead the land consolidation process
  - The initiative from landowners and other stakeholders
  - Active involvement of landowners and other stakeholders, e.g., co-operation and co-creation of the reallocation plan and launching workshops
- Project area and external lands
- Land banking and land exchange systems
- Land consolidation in the local development context
- Aims of land consolidation and division of costs

The limitations of the study relate to chosen methods, e.g., general limitations of qualitative research and variations of the concepts. As for qualitative research, there is generally no hypothesis for the results, and research is based on minimal pre-thoughts (Eskola and Suoranta 1998, pp. 13, 19). In this case, it is important to evaluate the adaptability of the presented aspects with minimal pre-thoughts. To avoid misconceptions and biased cases, terms (e.g., land consolidation) should be defined for the case. Furthermore, the voluntary approach has a different basis in different variations of land consolidations. In some areas, land consolidation is based on the voluntary approach since there are no immediate needs to improve cadastral outlooks. In other areas, the voluntary approach is based on chances in overall administrative policies. It is important to find approaches with a similar

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<sup>2</sup> Respondents: Konttinen, Kalle. 11.4.2017. 1 h. Chief of Land Consolidations, Southern Finland at National Land Survey of Finland. Mäki-Valkama, Ismo. 16.9.2016. 1,5 h. Chief of Land Consolidations, Western Finland at National Land Survey of Finland. Oja, Hannu. 6.4.2017. National Land Survey of Finland. Pehkonen, Juho. 1 h. 17.3.2016, 12.4.2016. National Land Survey of Finland. Patana, Juha. 6.2.2017. 1 h. National Land Survey of Finland. Potka, Timo. 1 h. 23.8.2016, 2.1.2017. Director of Land Consolidations at National Land Survey of Finland.

basis of development needs.

### 3 Definitions of basic land consolidation concepts

#### 3.1 Land consolidation in the Finnish context

Currently, there are two main types of land consolidation applied in Finland, a *regional land consolidation* and a *project-based land consolidation*. Land consolidations focus on ownership fragmentation without changing the ownership of the land. Regional land consolidation is most common and best resembles traditional Western European comprehensive land consolidation. Regional land consolidation is mainly applied to improve the fragmented land division of agricultural areas with large quantities of small parcels<sup>3</sup> (MMM 2015; MML 2007). Another type of land consolidation is project-based land consolidation, which can be implemented simultaneously with large infrastructure projects to modify existing land division to ease the construction of road or railway. Project-based land consolidation operates with principles

**Table 1.** Finnish land consolidation phases (Regional comprehensive land consolidation) based on Vitikainen (2003, p. 162) and Vitikainen (2004).

<b>Phase</b>	<b>Description</b>
Preparation	
Feasibility studies	<i>Assessing interested landowners, mainly voluntarily.</i>
Land consolidation procedure	
<b>Inventory and planning</b>	
Project plan (project area), Inventory of the rights and valuation of the land.	<i>Primarily voluntary. Some areas may need to be included compulsorily to form (comprehensive) project area.</i>
Preparation of the reallocation plan.	<i>Devised by land professionals, hearing the interest of participants.</i>
<b>Implementation</b>	
Registration of the plan, demarcation and taking into possession of new parcels.	<i>To finalise the planning.</i>
Costs of the land consolidation.	<i>Partial state funding for the procedure and the improvement works.</i>
<b>Conclusion</b>	
<b>End of the procedure</b>	
Additional processes	
Improvement of agricultural infrastructure	<i>Improvement of the road and drainage network</i>
Governmental land acquisition	<i>Land acquisition before the project</i>
Co-operation with interest groups	<i>Interviews and procedural meetings</i>

<sup>3</sup> The trend in the agricultural areas in Finland is the decreasing number of farmsteads and rising of the size of the average farmstead, where average parcel size is 2,37 ha (Hiironen and Ettanen 2013 pp. 10–12; Järvenpää 2017).

similar to regional land consolidation, where the party implementing the project finances the consolidation, but its aim is to reduce the effects of the project for the land division that improves it (MMM 2015; MML 2007; Uimonen 2004).

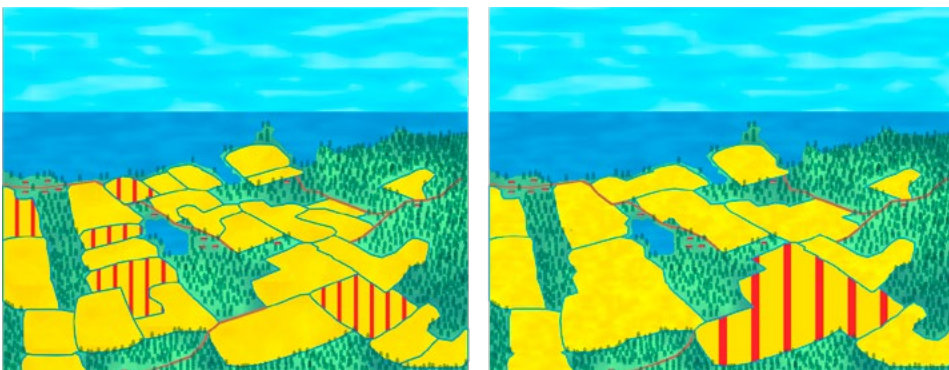
An experimental land consolidation model was implemented (a farm-based land consolidation) as an alternative for regional land consolidation. A farm-based land consolidation is a faster one to solve land fragmentation problems for farmsteads without the improvement of agricultural infrastructure, e.g., road and drainage network, implemented in a regional model (Potka 2016a, p. 80).

The land consolidation procedure in Finland is based on the Real Estate Formation Act (REFA) and presents land consolidation as a tool to improve land division and the usability of real estates (REFA section 67.1). The procedure is implemented through government organisation, the National Land Survey (NLS). The procedure, including preparation, implementation and reconstruction of the area's capital improvement (improvement of agricultural infrastructure), is conducted by cadastral authorities. The land consolidation process includes three major phases: preparation, planning and implementation. The contents of the phases are presented in table 1.

### ***3.2 The aspects of regional land consolidation***

The precondition for regional land consolidation is a strong support among the landowners. In addition, the project must be profitable (Hiironen 2012, p. 2; Potka 2016a, p. 22). The strong support has indicated that almost all the landowners favour the project. The approach may require compulsory participation for some parties to increase the overall possibilities for reallocation. The land consolidation area must form a functional entity (REFA section 69). In regional land consolidation, a comprehensive project area is formed where the parcels are reallocated. In principle, all parcels in the project area are taken into account.

The land division can be improved in land consolidation, e.g., by replacing parcels, increasing parcel size, decreasing the total number of parcels and improving their shape (Hiironen et al. 2009, pp. 9–12). Figure 1 presents a typical



**Figure 1.** A typical regional land consolidation project area and its reallocation outcome from the perspective of one landowner (highlighted red pattern) (Sulonen 2014).

regional land consolidation area and outcome of the land consolidation from one landowner's perspective.

Since the turn of the millennium, customer friendliness and reducing the length of the process have been targets for the development of Finnish land consolidation (Hyvönen 2001, pp. 331–333; Hiironen 2012, pp. 58–60; Kotilainen 2009a; Kotilainen 2009b). The NLS has conducted several projects to improve customer friendliness as well as to adopt it in its guidelines for cadastral procedures during the 21st century. The challenge in land consolidation processes has been the difference between terms of customer friendliness and complete voluntary participation (Potka 2016b).

There is no state-wide land banking system in Finland, and the land exchange and reserve activity vary depending on the area. The government acquires the lands for the consolidation projects as reserves, and during the hold, it usually leases the land for a market price to local farmers. In project-based land consolidations, the land acquisition is initiated and funded by the party implementing the project, e.g., by the Finnish Transport Agency (Heinonen 2005, pp. 6–7). The activity is based on cooperation with government authorities and state funding for rural area development.

The status of state funding for land consolidation projects had different roles in the past. The possibilities for state funding of land consolidations in Finland gradually increased during the 20th century, when landowners could cover a significant portion of the costs of land consolidation from state funds (Uljas 1983, pp. 147–149; LCFA 81 24/1981). Legislative changes in the beginning of 2015 indicated a turning point. The change in the Land Consolidation Funding Act (LCFA 14 1423/2014; HE 193/2014) decreased the funding possibilities for land consolidation projects, especially for the improvement of agricultural infrastructure, e.g., road and drainage network. With the change of the REFA, improving the road and drainage situation of the region was removed from the land consolidations aims (REFA 554/1995 67§; 1424/2015).

### ***3.3 Farm-based land consolidation in comparison to regional land consolidation***

Farm-based land consolidation in Finland is an experimental approach aimed to complement the (traditional) regional land consolidation approach. The approach is based on the same structural principles as regional land consolidation (Potka 2016a). Thereby, farm-based land consolidation cannot be considered a simple voluntary land exchange, but rather can be described as a simplified version of comprehensive land consolidation with a voluntary aspect.

In 2016, NLS decided<sup>4</sup> that in 11 land consolidations, new farm-based land consolidation shall be tested. The first three currently ongoing experimental land consolidations are modified versions of regional land consolidations that were started as such and later modified as experimental projects for the farm-based

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<sup>4</sup> The experimental projects have been presented and accepted by the Ministry of Agriculture and Forestry (Potka 2016b; Timo Potka, personal correspondence, 30 May, 2016 and 13 January, 2017).

land consolidation. The later projects will already have the experimental status at the beginning (Potka 2016b; Timo Potka, personal correspondence, 30 May, 2016 and 13 January, 2017; Juha Patana, personal correspondence, 6 February, 2017).

The farm-based land consolidation approach is based on voluntary and flexibility principles. The involvement of the participants in the process is voluntary, and the project aims are constructed with the needs of the applicants in mind (Potka 2016a; MMM 2015). Due to its voluntary nature, the project area is usually more incoherent than in regional land consolidations (Potka 2016b). All the landowner's parcels are taken into account (whole farm) when evaluating the reallocation possibilities and not just those locating in the project area (Patana 2017, p. 8; Potka 2016 b). The improvement of agricultural infrastructure, like the local road and drainage network, is not included in the farm-based land consolidation, as it is in regional land consolidation (Potka 2016b). The major differences of the farm-based land consolidation in comparison to regional land consolidation are presented in table 2.

**Table 2.** Major differences on the project phase of the farm based land consolidation in comparison of Finnish regional land consolidation (table 1). Based on Potka (2016a; 2016b) and personal correspondence with Timo Potka (22.8.2016) and Juho Pehkonen (17.3.2016; 12.4.2016).

<b>Phase</b>	<b>Description</b>
Preparation	
Feasibility studies	<i>Assessing interested landowners, voluntarily (limited feasible studies)</i>
Land consolidation procedure	
<b>Inventory and planning</b>	
Project plan (project area), Inventory of the rights and valuation of the land.	<i>Only from the lands that are voluntary included, all of the landowner's parcels are taken into account.</i>
Preparation of the reallocation plan.	<i>Devised by land professionals with participants. Participants are encouraging in co-operation.</i>
<b>Implementation</b>	
Registration of the plan, demarcation and taking into possession of new parcels.	<i>To finalise the planning.</i>
Costs of the land consolidation.	<i>Limited state funding, stronger role of financial contribution of participants.</i>
<b>Conclusion</b>	
Additional processes	
Improvement of agricultural infrastructure	<i>Improvement road and drainage network is not included</i>
Governmental land acquisition	<i>Land acquisition before the project (important)</i>
Co-operation with interest groups	<i>Interviews, procedural meetings, co-operational workshops led by authorities</i>

The characteristics of the farm-based land consolidation in comparison to regional land consolidation can be formed as follows:

- Voluntary participation in the process
- Non-comprehensive project area, parcels of the whole farm are considered if possible
- Flexibility in methods depending on the case
- Improvement in road and drainage network are not included in the process
- Minimal state funding.

### **3.4 Land consolidations in the international context**

In the Finnish context, the term land consolidation generally refers to physical land reallocation and equivalent cadastral reorganisation of fragmented land areas. The use of both terms, land consolidation and land fragmentation, varies broadly in an international context (Van Dijk 2003; Thomas 2006b). Van Dijk (2003) classifies land fragmentation into five main categories: ownership fragmentation, land use fragmentation, internal fragmentation and the discrepancy between land ownership and use, adding (in 2005) co-ownership fragmentation as a separate type (Van Dijk 2003, pp. 15–18; Van Dijk 2005, pp. 18–19). From these categories, internal fragmentation has traditionally been the main subject of Western land consolidations (Van Dijk 2005, p. 19). The general meaning of land consolidation is to improve land division and promote the appropriate use of real estates by appropriately reallocating parcels, decreasing the number of parcels, and/or by enlarging or improving the shape of the parcels (Vitikainen 2004, p. 26; Hiironen et al. 2009, pp. 9–12). Land consolidation is often classified into rural, forestry, urban, regional or environmental land consolidations (Demetriou 2014, p. 45).

There are fundamental differences in the methodological procedure and in the legality of land consolidations (Thomas 2006b). For example, five types of land consolidations can be applied in Germany alone: comprehensive land consolidation, voluntary land exchange, accelerated land consolidation, simplified land consolidation and land consolidation in the case of permissible compulsory acquisition (Thomas 2014). On the other hand, Eberlin (2015) presents four different approaches for land consolidation: virtual (leasing to one company/farmer or joint production), market-based (leasing and buying/selling), voluntary (exchange of parcels) and comprehensive (rearrangement of parcels).

Virtual and market-based approaches are used in Eastern Europe and Asia. For example, Russia and Ukraine have minor fragmentation problems and only a little experience with land consolidation (Hartvigsen 2015, pp. 188–189, 206). Voluntary land exchanges are used in Central and Eastern European countries that had not adopted the compulsory land consolidation. In Western Europe (e.g., Germany and the Netherlands), voluntary land exchange is an alternative to comprehensive land consolidation (Thomas 2006a; Hartvigsen 2015, pp. 206, 212–216, 256, 266–269). There are cases for land consolidations based on the voluntary approach, for example in Denmark and the Netherlands. Comprehensive land consolidations are traditionally implemented in Western Europe (including in Finland), where market-based or voluntary land exchange approaches are not seen as tools that are effective enough to reduce the fragmentation.



#### 4 Land consolidation approaches selected for comparison analyses

In this paper, two voluntary approaches were selected to provide insights for the voluntary-based experimental land consolidation in Finland. Since the experimental farm-based land consolidation aims to concentrate on a voluntary basis, the voluntary aspect was the main criteria when selecting the international examples for comparison. Furthermore, it was seen as important to look into approaches based on Western European land consolidation tradition, thus having a similar background to Finnish land consolidation. These criteria outline voluntary land exchanges. The cases with recent studies available were favoured.

The first approach is Hartvigsen's (2015) integrated voluntary land consolidation model, which focuses on the unique aspect of Central and Eastern Europe (CEE). The voluntary approach is partially based on the Danish model, where almost all land consolidations are carried out in a completely voluntary process and are based on agreements (FAO 2003; FAO 2004a, p. 21; Hartvigsen 2015, p. 40; Haldrup 2015). Hartvigsen's model provides a general structure for the basis of the national adaptation for CEE countries. The second approach is a new voluntary-based land consolidation approach used in the Netherlands. The approach especially consists of collective decision-making, where the key component is the role of co-operation and co-creation between the participants (Louwsma et al. 2014; Beunen and Louwsma 2016).

##### 4.1 Integrated voluntary land consolidation model

Hartvigsen (2015) designed a land consolidation model<sup>5</sup> (*integrated voluntary land consolidation*) for former CEE countries to resolve various fragmentation problems caused mainly by large land reforms during the past decades (Hartvigsen 2015, pp. 189–192). The land consolidation model was created since the two classical types of European land consolidations, comprehensive and voluntary, had several weaknesses when applied in the Central and Eastern European situations (Hartvigsen 2015, p. 417). According to Hartvigsen, the comprehensive land consolidation was too expensive for many CEE countries, and voluntary land consolidation alone wasn't enough to ease the fragmentation problem (Hartvigsen 2015, pp. 410–417).

Hartvigsen considers the voluntary approach important because it respects the rights of the landowners and reduces the time and costs of the project. The wishes of the landowners and stakeholders to not participate are respected, even when it would not be economically rational. In the voluntary approach, structural problems are not solved for those landowners that do not participate in the project (Hartvigsen 2015, pp. 412–413, 417). Because of voluntary restrictions, land mobility should be promoted otherwise. Methods such as land banking and two-level project areas allow more flexibility in reallocation with land exchanges.

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<sup>5</sup> The model is presented in a doctoral thesis done at Aalborg University 2012–2015 (Hartvigsen 2015). Hartvigsen analyses e.g. experiences gained from introduction of land consolidation instruments, and the coherence between the land reform approaches applied in 25 Central and Eastern-European countries. Seven of those countries already had ongoing national land consolidation programs while 13 of those countries had not yet an operational land consolidation program. (Hartvigsen 2015.)

A high participation rate is crucial in voluntary reallocation planning. To promote awareness of the project and its benefits, Hartvigsen states that active involvement of the individual stakeholders is important. It is important to understand the incentives of individual landowners to consider and offer solutions they will appreciate. Interviewing single landowners is an opportunity to discuss their perceptions of needs for development. To achieve this goal, a series of direct interviews of the landowners and community workshops will often help. To determine a possible initiative in many cases, it is a good idea to begin with farmers who are present in the community since they are able and willing to farm in the project area (Hartvigsen 2015, pp. 411–412). Furthermore, in Hartvigsen's model, land mobility is assessed based on landowners' interviews to determine parcels for sale, parcels for exchange or reallocation and parcels that are not included in the project (Hartvigsen 2015, pp. 413–414).

Hartvigsen's model uses two-level project areas, including the core project area and the area surrounding it as the secondary project area. Operating within two levels allows for the shifting of parcels outside the core project area, especially for those landowners who only have one or a few parcels. Controlling the process can be applied by allowing only targeted land transactions in the secondary area, which benefits the core project area (Hartvigsen 2015, pp. 414–415).

Hartvigsen (2015) states the importance of land banks in his model to ease the effects of low land mobility. The land markets are usually not solely sufficient for the development of efficient and sustainable agricultural economies (FAO 2004b). The opportunity for a land banking system is good in CEE countries since most have a large reserve of state-owned agricultural land. If the land banking system is not possible, e.g., for political reasons, it is important to offer existing state land available for land exchanges or preferably for sale (Hartvigsen 2015, pp. 415–417). Furthermore, the model utilises the structural development of farms by promoting land sales to farmers willing to increase their production, thereby decreasing the total number of landowners in the area (Hartvigsen 2015, pp. 411).

The important element in the model is the aim to integrate the allocation planning within a local rural development context. Most rural communities in CEE countries have many more development needs than structural problems caused by land fragmentation and small farm sizes that cannot be solved by land re-parcelling alone. Such needs are, for example, rehabilitation of main rural roads, renewal of irrigation systems, tourist path construction and planting of forest lines. Planning should be coordinated with the existing development plan for the community, for example at the municipal level (Hartvigsen 2015, pp. 274, 410).

The funding of the land consolidation often concentrates on the reallocation planning and registration of the agreed land transactions. Rural development needs such as roads and irrigation improvements, etc., are often left out of the funding. Additional funding is needed from different governments or institutions, which is often difficult in practice (Hartvigsen 2015, p. 411).

The major differences of the integrated voluntary model in comparison of the regional land consolidation of Finland are presented in table 3.

**Table 3.** Major differences on the project phase of integrated voluntary land consolidation model in comparison of Finnish regional land consolidation (table 1).

Based on the model by Hartvigsen (2015).

<b>Phase</b>	<b>Description</b>
Preparation	
Feasibility studies	<i>Assessing interested landowners, voluntarily</i>
Land consolidation procedure	
<b>Inventory and planning</b>	
Project plan (project area), Inventory of the rights and valuation of the land.	<i>Only from the lands that are voluntary included, two-level project area.</i>
Preparation of the reallocation plan.	<i>Devised by land professionals encouraging the participants in co-operation.</i>
<b>Implementation</b>	
Registration of the plan, demarcation and taking into possession of new parcels.	<i>To finalise the planning.</i>
Costs of the land consolidation.	<i>State funding is advised.</i>
<b>Conclusion</b>	
Additional processes	
Improvement of agricultural infrastructure	<i>Implemented local development needs</i>
Governmental land acquisition	<i>Land banking established, if possible</i>
Co-operation with interest groups	<i>Interviews, group meetings, etc...</i>

Major principal characteristics of Hartvigsen's integrated voluntary land consolidation model are (Hartvigsen 2015, p. 416)

- Voluntary participation of the landowners in the project area.
- Land professionals presiding over the reallocation planning.
- Encouragement of the active involvement of landowners and other stakeholders in a participatory process.
- Inclusion of land transactions from surrounding areas in the re-allotment planning when they benefit the outcome of the core project area (two-level project area).
- Land banking application when the land mobility is low.
- Integration of reallocation planning into a local rural development context through the elaboration and implementation of community development plans.

#### **4.2 Participatory land consolidation approaches**

The Netherlands has long traditions in comprehensive land consolidations, led by the government's initiating, preparing and implementation of land consolidation. However, a shift towards more participatory and voluntary approaches can be noted in society and governance (Beunen and Louwsma 2016, p. 2). There are

currently two participatory land consolidation approaches that are applied in the Netherlands. Landowners may either individually discuss the development with the process manager on a one-on-one basis (called *facilitated decision-making*), or the landowners are invited to participate and discuss together different possibilities for the land exchanges and development of the area (called *collective decision-making*) (Beunen and Louwsma 2016, pp. 1, 3–5). The individual approach of participants through cadastral authorities is applied in regional land consolidations in Finland. In this context, the method resembles the facilitated decision-making approach applied in the Netherlands. This paper focuses more on the collective decision-making approach, since the group discussion and development aspect are not commonly applied in Finland.

In the Netherlands, there has been a political trend to involve citizens to take responsibility for their own environment and neighbourhood instead of expecting the government to do so (Louwsma et al. 2014, p. 3). As for the responsibility to initiate the processes, there is an option for voluntary participation. Since land consolidation is based on a voluntary approach, not all the landowners are involved, which may limit the land exchange possibilities (Louwsma et al. 2014, p. 6). Notably, the role of the government is substantially different in the land consolidation approach. The government is considered a landowner among other things, and is therefore treated equally with other participants. However, for the government, the allocation aims might have more public characteristics (Louwsma et al. 2014, 5–6; Beunen and Louwsma 2016).

In the collective decision-making approach, landowners and users (farmers) are invited to discuss the new reallocation together in the beginning of the land consolidation process. All the participants take part in one or more group sessions. The major difference in the previous approach is that participants were approached individually, where in the new approach, participants try to find possibilities for land exchange and allocation together through collaborative negotiation. For instance, the group sessions cover verifying accuracy and completeness of the data, participants' wishes for the allocation, land exchange possibilities and consensus on the first allocation draft (Louwsma et al. 2014, p. 5; Beunen and Louwsma 2016, pp. 2–4).

Collective decision-making allows participants to see the complexity of the whole situation and not just their own situation as in individual discussions. However, co-operation requires open discussions about the preferences of their own situation as well, that some participants are reluctant to do. Landowners may not always feel comfortable sharing partly personal information with other actors, since this may delimit their possibilities to negotiate possible transactions and desired outcomes. The method signals the importance of trust among the group (Beunen and Louwsma 2016, pp. 7–9).

Furthermore, to increase the bottom-up initiative, an allotment barometer for rural areas has been developed to show the quality of agricultural parcel structure in a more or less homogenous area. The barometer can play an important role in the discussion about whether it is reasonable to start land consolidation, voluntary or formal (traditional land consolidation) (Louwsma et al. 2014, pp. 3, 7).

**Table 4.** Major differences in the project phase of participatory land consolidation approach (collective decision-making) in comparison of Finnish regional land consolidation (table 1). Based on Louwsma et al. (2014) and Beunen and Louwsma (2016).

<b>Phase</b>	<b>Description</b>
Preparation	
Feasibility studies	<i>Assessing interested landowners, voluntarily</i>
Land consolidation procedure	
<b>Inventory and planning</b>	
Project plan (project area), Inventory of the rights and valuation of the land.	<i>Only from the lands that are voluntary included.</i>
Preparation of the reallocation plan.	<i>co-created by landowners/stakeholders with the help of land professionals.</i>
<b>Implementation</b>	
Registration of the plan, demarcation and taking into possession of new parcels.	<i>To finalise the planning.</i>
Costs of the land consolidation.	<i>Limited state funding.</i>
<b>Conclusion</b>	
Additional processes	
Improvement of agricultural infrastructure	
Governmental land acquisition	<i>Active land bank system</i>
Co-operation with interest groups	<i>Active involvement of participant and co-creation, e.g. interviews, meetings workshops</i>

As for the land banking system in the Netherlands, the system has always been an important factor for the success of land consolidation. Even in cases without concentrated land masses, e.g., those acquired from shallow seas, dynamic land banking is the mandatory key for the realisation of multi-purpose land reallocation (Damen 2004, pp. 2–4).

In the Netherlands, the local governments point out that farmers who benefit most from a better allocation can be asked for a higher financial contribution. To a certain extent, farmers are willing to contribute to the financing of the project if they have more influence on the outcome of the process (Louwsma et al. 2014, pp. 2–3).

The major differences of the participatory land consolidation approach (collective decision-making) in comparison to regional land consolidation in Finland are presented in table 4.

Based on the aforementioned comparison, major principal characteristics of the Netherland's participatory land consolidation approach can be formed as the following:

- Voluntary land consolidation
- Different roles
  - Landowners have more responsibility for their own environment and neighbourhood
  - State is also considered a landowner
- Different methods to increase initiative and participation.

## **5 Analysis of adaptability challenges**

This chapter presents the adaptability challenges of different voluntary land consolidations in relation to Finnish farm-based land consolidation. The adaptability challenges are analysed based on interviews with key land consolidation specialists of Finland.

### ***5.1 Voluntary approach over compulsory approach***

The voluntary approach is a key aspect connecting Hartvigsen's (2015) model, the Netherlands participatory land consolidation model (Louwsma et al. 2014; Beunen and Louwsma 2016) and the farm-based land consolidation in Finland. Since the models rely strongly on the voluntary approach, the aspect is carefully inspected in comparison to the compulsory approach of regional land consolidation.

According to Hartvigsen (2015, p. 413), the voluntary approach respects the wishes of the participants, even when they are not economically reasonable. Based on the situation in the Netherlands (Louwsma et al. 2014, p. 6), the voluntary approach sometimes limits the possibility of exchanging lands, since not all landowners are involved. Hartvigsen, moreover, specifies that the problems are not solved for those landowners not participating in the project (2015, p. 417). Such limitations need to be understood when applying the voluntary approach.

In comparison to regional land consolidation, the comprehensive approach reduces fragmentation by reorganising the land and cadastral divisions of the area completely. The outcome is definite since participation in the process is ultimately compulsory. Due to its voluntary basis, the project area in voluntary land consolidation is often more concise and incoherent, and thereby the expected outcome from the cadastral viewpoint may be less effective. However, on a small scale, the outcome may be significantly beneficial in the viewpoint of single or several farm units. For instance, a professional farmstead that acquired numerous small parcels from various landowners may benefit greatly from land consolidation conducted from its viewpoint.

According to the respondent, the commitment of the participants of the land consolidation process may be significantly greater in the voluntary approach, where the compulsory aspect is generally less favourable from participants' points of view. This viewpoint is one of the strongest advantages of the voluntary approach in regards to the acceptability of the land consolidation project. To outline the differences, the compulsory approach is based more on common good and regional comprehensive improvement, whereas the voluntary approach is based on better acceptability and improvement needs of those willing to contribute to the cause.

To summarise, in the interviews, the voluntary participation provoked comments about the extent of the concept. The respondents saw the voluntary participation of land consolidation as a principle and supportable approach in general that may inspire a better commitment among the participants. The approach was favoured among the respondents, especially since land consolidation needs the strong support of potential participants of the planned project area. However, the respondents acknowledged that if the participant withdraws from the land

consolidation process at any time, the approach is challenging and may cause the process to become non-beneficial for the rest of the participants. One participant stated that in the worst case, unconditional exit options allow participants to threaten the others. The respondents stated that the reason for leaving may be based upon feelings or bad relations with other participants. Interviewees further elaborated on the question of whether participants should be able to drop out after the process has been initiated, even if the process becomes undesirable for the remaining participants. Customer friendliness, a key aspect of Finnish land consolidations, relates the voluntary approach, where the wishes of the participants are highlighted, resting on the fundamental right of landowners to choose the use of their properties; the participants' wishes must not contradict each other. However, the definition requires equal treatment of the participants. One respondent proposed that in practice, the term "voluntary approach" could be presented as either a customer-friendly land consolidation or customer-friendly negotiation process, to avoid confusion.

Regarding farm-based land consolidation, the rules for dropping out of the process should be defined. Most of the respondents stated that the commitment is essential after the reallocation plan has been accepted, especially when the implementation of the plan has begun, since ultimately there will be cases when a participant wants to leave or join the process afterwards. To maintain the voluntary aspect, this problem may be outlined by using agreements for land transactions with participants, that are utilised, e.g., in the Danish voluntary model.<sup>6</sup> The authorities and participants can make an agreement for necessary land transactions.

## **5.2 Roles in land consolidation**

In the Netherlands, the responsibility to initiate land consolidation is increasingly up to landowners and stakeholders themselves, and furthermore, they are invited to discuss and co-operate (e.g., co-create the reallocation plan) (Louwsma et al. 2014, p. 3, 6). The roles are slightly different in Hartvigsen's (2015) model, in which land professionals preside over the reallocation planning. The initiative in Finland for comprehensive land consolidation is mostly taken by government authorities (feasible studies), whereas landowners are the party applying the land consolidation procedure. At this point, a strong support among the landowners is needed, where the majority must favour the procedure. This requirement is important, especially in comprehensive land consolidations. In the voluntary approach, the support is naturally mandatory. The cadastral authorities in Finland are the party conducting and implementing the procedure, since the role of cadastral authorities is strongly based on legislation (REFA). However, the actual planning is done in co-operation among the participants.

As highlighted by the approach taken in the Netherlands (Louwsma et al. 2014) and in Hartvigsen (2015), active involvement of the landowners and other stakeholders is encouraged to participate in the process. According to Beunen and Louwsma (2016), in the collective decision-making approach, landowners and users (farmers) are invited to discuss the new reallocation together to search

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<sup>6</sup> See, e.g., Haldrup (2015).

for possibilities for land exchange in a collaborative negotiation. In the previous approach, participants were contacted individually (Beunen and Louwsma 2016).

Based on the legislation, respondents saw the roles of the cadastral authorities in land consolidation as stable, and especially as facilitators of land consolidation procedures. The landowners, however, may have increased responsibility, for instance of the preparation, implementation and improvement of agricultural infrastructure. Especially in the latter case, one respondent indicated that the cadastral authority may act as advisor rather than implementer.

Several respondents in the interview highlighted that increasing the participation of landowners is a positive development, and reallocation should be done in deep co-operation with the landowners and cadastral authorities in Finland. This improves the participant's capabilities to influence the outcome. Furthermore, the respondents acknowledged that the responsibility of local development and of the initiating and planning in farm-based land consolidation may be weighted more to landowners and stakeholders from the government and its authorities. To promote the idea in practice, the cadastral authorities can encourage the participants to co-operate and co-create a land consolidation suitable for their aims among themselves. In ideal cases, the cadastral authorities may act more as facilitators for the participants rather than directors of the procedure, but in conflict situations, their roles may eventually be to direct the course of the procedure if necessary. From a legal perspective, the cadastral authority is the party implementing the plans.

To grant the farmers, landowners and other stakeholders more influence over their local conditions, the initiative and involvement should be encouraged. Generally, the respondents are in favour of a land consolidation initiative that originates from landowners, emphasising the voluntary aspect. However, the respondents present that the situation in Finland may be challenging since a great portion of landowners are non-professional actors. One respondent argued that in agricultural areas, participants usually do not have the required technology to fully comprehend the reallocation possibilities in their local area. The respondent also mentioned that some landowners may have lacked land maintenance, allowing the land to degrade and making the appropriate reallocation challenging even for cadastral authorities. In such cases, involvement of the cadastral authorities in preparing and presenting the procedure is crucial. However, some respondents noted that active farmers, young farmers and farmers who have participated in prior land consolidation projects have great potential for applying land consolidation.

In approaches where the landowners and other stakeholders have a notable role in planning and applying land consolidation, a strong social capital<sup>7</sup> and trust

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<sup>7</sup> Social capital generally refers to the social networks between individuals or groups of individuals; however, the term has various definitions. Generally, the Organisation for Economic Co-operation and Development (OECD) defines social capital as "networks together with shared norms, values and understandings that facilitate cooperation within or among groups" (OECD 2001, p 41). There are some related studies of social capital, e.g., Haldrup (2015) has brought out the significance of social capital in agreement-based land consolidation, and Immonen (2009) has studied the significance of social capital in the Finnish context.



among landowners and stakeholders is highlighted, especially if government authorities have a minimal role in the process. Authorities may take a smaller role if the participants are capable of deep co-operation among themselves. As Beunen and Louwsma (2016) indicated, the co-operation requires an open discussion of the landowners' preferences. As in collective decision-making in the Netherlands (Beunen and Louwsma 2016), the information is partly personal and the landowners may not always feel comfortable sharing it with others since the other landowners may be seen as competitors. The aforementioned problem may appear in Finland, especially among non-professional actors like lessors (Sulonen and Kotilainen 2016).

Despite the challenges, the participants' active involvement and co-operation was seen as a positive and beneficial development, albeit a challenging one. Based on the respondents' propositions to adjust the overall situation, the authorities may provide easy tools for landowners, for instance a web-based interface or informational planning sessions, allowing participants to present self-created reallocation wishes.

Several respondents noted that communities or groups have better resources for land consolidation use as a tool to improve the agricultural situation. The key is to encourage stakeholders and representatives responsible for land use development to more intensively use land consolidation. One respondent highlighted that in Finland, a method is applied in forestland consolidations, in which the state-funded organisation representing forest owners applies and uses land consolidation as a tool to improve forest properties. In conclusion, regional stakeholders and representatives may provide solutions to the challenges in Finland, providing farmers and landowners with a better understanding of the whole complexity of the situation as in the Netherlands (Louwsma et al. 2014).

### ***5.3 The use of the two-level project area and land banking system in the reallocation of farm-based land consolidation***

It is obvious that voluntary participation brings challenges to reallocation. To extend the reallocation, Hartvigsen (2015) presents possibilities for land banking and the two-level project area. The same concepts are evaluated from the farm-based land consolidation point of view. In Hartvigsen's (2015) model, there is the core project area and the secondary project area surrounding the core area. Based on the experience of the respondents, the structural nature of the farm-based land consolidation relies more on land exchanges and external lands in comparison to a more coherent regional land consolidation area. While the need for external land acquisition and exchange possibilities seems clear, to maintain the flexibility of land consolidation, limiting the second area may be unnecessary. The flexibility in this sense allows cadastral authorities to consider the situation case by case.

Generally, land banking in the land consolidation context refers to a temporary hold of lands by the government agency in order to provide a land reserve for land exchange and allocation. Consequently, for the CEE countries, Hartvigsen (2015) states the importance of land banks in his approach, since most of the CEE countries have large land reserves. The Netherlands (Damen 2004, pp. 1–2), on

the other hand, has a long history of using land banking in the context of land consolidation. The respondents point out that in farm-based land consolidation, government acquisition and exchange of lands have great significance, allowing for flexibility in reallocation. Several respondents stated that the land exchange system is highlighted in farm-based land consolidation. One respondent stated that having a good reserve of exchange lands leads to good results in the reallocation. Furthermore, it would be convenient to promote land sales between the farmers as Hartvigsen (2015, pp. 411) proposed in the integrated voluntary model. Such actions would limit the number of farmers in the reallocation area.

#### ***5.4 Local developments in land consolidation***

Hartvigsen (2015) indicates the possibilities of integrating the allocation planning in the rural development context, since most of the rural communities in CEE countries have many more development needs than just structural problems. The needs are applicable in other rural areas as well, including areas in Finland. For instance, the improvement of agricultural infrastructure caused by reallocated parcels is included in regional land consolidation in Finland. Based on the respondents' experiences, the actions correspondingly take a considerable amount of time and usually widen the group of participants. According to the respondents' experience, there are some experimental projects involving local development needs in land consolidation, for instance environmental and landscape protection, but the overall experience of the context is minimal.

The respondents saw that there is no immediate need to implement additional local development tasks into land consolidation. Since the additional local development tasks usually extend past the duration of the process and require a more coherent reallocation area and participant pool, possibilities of including additional local development tasks are limited in farm-based land consolidation. Thereby regional comprehensive land consolidation provides a better basis for such aims when compared to farm-based land consolidation.

As NLS had planned, farm-based land consolidation does not include capital improvements traditionally included in regional land consolidation, e.g., drainage and road construction (Potka 2016b). The responsibilities of local development are weighted more from cadastral authorities to landowners and farmers, allowing land consolidation projects to be conducted more quickly and generally with less funding. In such cases, the aforementioned tasks may be carried out in other processes improving local needs. Furthermore, some respondents noted that the cadastral authorities may act as consultants for the participants in such improvement works. Funding may also be directed from other government sources. However, it is possible to include local rural development aims in the project implementation to some extent if the landowners are willing to fund them.

#### ***5.5 Sources of land consolidation funding in Finland***

State funding in Finland is based on the societal benefits. When direct financial support possibilities of the state decrease, other sources of funding are needed. In the Netherlands (Louwsma et al. 2014), it is reasonably assumed that farmers who

benefit most from a better allocation can be asked for a higher financial contribution to conduct the land consolidation. The respondents acknowledged that funding in farm-based land consolidation may come directly from participants, stakeholders or other groups representing them if the party has a greater possibility to determine the aims of land consolidation. As for a general statement of the respondents, the project should be economically beneficial for financiers without economic support of the state. In terms of financing, if the funding responsibility shifts more towards participants from the government, the participants should have more influence in the process and its aims.

## **6 Conclusion**

The aim of the research was to provide insights of voluntary-based approaches in different countries and compare their major differences and similarities in relation to the traditional land consolidation model of Finland. Hartvigsen's model for the CEE countries and the Netherlands' participatory land consolidation approach (collective decision-making) were selected for comparison. The later comparison of the models was to evaluate adaptability issues of the aforementioned models or their aspects if implemented in the Finnish farm-based land consolidation.

The aspects found focus especially on voluntary participation and roles of land consolidation. The voluntary approach strengthens the roles of landowners and other stakeholders in contrast to the government in terms of local responsibility of land improvement. The decreased role of the government increases the significance of co-operation and initiative among the participants. Generally, voluntary participation was seen as a positive development since it improves the commitment of the participants. Such actions have positive effects on the acceptability of the land consolidation.

The main issue with the voluntary aspect is the extent of the definition of voluntary participation. More specifically, there is a challenge if any of the participants can unconditionally drop out of the process whenever they please. In such cases, the process may become unbearable for the remaining participants. For instance, the costs of land consolidation may exceed its economic benefits, or there may be no reasonable reallocation available. To prevent such situations, mutual rules of commitment should be defined to ensure equal treatment for all participants. To maintain the voluntary aspect, an agreement-based approach might be applicable, as in Denmark. However, regarding flexibility and co-operation principles, exceptions to the rule should be allowed with the consent of the other participants and authorities.

Cadastral authorities may legally lead land consolidation processes in Finland. They have a directing position, for example in reallocation, negotiation and decision-making. To implement the co-operative aspect with and among the participants, cadastral authorities may encourage participants to co-create the planning of the project and to devise the plan as much as they are capable. Even so, the role of cadastral authorities should continue as one of leadership in land consolidation, whether they are facilitating or directing the procedure. The overall development should focus on increasing co-operation and co-

**Table 5.** *The adaptability problems of presented aspects and propositions for actions used in farm-based land consolidation in Finland*

<b>Aspect of the approach</b>	<b>Adaptability challenges</b>	<b>Proposed actions</b>
Voluntary participation	<ul style="list-style-type: none"> <li>– The concept of voluntary participation needs definition. When or in what situations the commitment of the participant is required. Relate to customer-friendly principles (NLS).</li> <li>– May improve the acceptability of land consolidation.</li> <li>– May limit the reallocation possibilities.</li> </ul>	<ul style="list-style-type: none"> <li>– Voluntary participation of the process is implementable, but rules for exiting should be defined.</li> <li>– If the voluntary approach is maintained, an agreement-based approach may be applicable.</li> </ul>
<p>The roles of land consolidation</p> <ul style="list-style-type: none"> <li>– Authorities conduct and lead the land consolidation process.</li> <li>– Initiative from landowners and other stakeholders.</li> <li>– Active involvement of landowners and other stakeholders, e.g., co-operation and co-creation of the reallocation plan and launching workshops.</li> </ul>	<ul style="list-style-type: none"> <li>– Cadastral authorities may promote co-operation and co-creation among participants in order to plan the reallocation, acting more like conductors of the procedure. However, the role of the authorities is eventually to direct the procedure.</li> <li>– Increasing the involvement and co-operation among participants and with authorities is a positive development. Greater significance of social capital among the participants. Should be constantly developed and encouraged in future land consolidations.</li> <li>– Overall, the responsibility of local development may be weighted more towards landowners and farmers.</li> </ul>	<ul style="list-style-type: none"> <li>– Cadastral authorities conduct the procedure and promote the involvement and co-operation among the participants.</li> <li>– Participants devise the reallocation plan as far as they are able.</li> <li>– Ways of increasing involvement, co-operation and co-creation of and among participants should be constantly investigated.</li> </ul>
Project area and external lands	<ul style="list-style-type: none"> <li>– The project area in the farm-based land consolidation is often more concise and incoherent, increasing the significance of the outer layer.</li> <li>– The need to limit the second project area may be unnecessary.</li> <li>– External lands are essential for suitable reallocation.</li> </ul>	<ul style="list-style-type: none"> <li>– Use of external lands for land exchanges is maintained.</li> <li>– Cadastral authorities may evaluate the extent of the second project area by case.</li> </ul>

Land banking and land exchange systems	<ul style="list-style-type: none"> <li>– Land exchange has great significance locally.</li> <li>– Requires funding and land reserve.</li> </ul>	<ul style="list-style-type: none"> <li>– Method used in regional land consolidations is adaptable to farm-based land consolidation.</li> </ul>
Local development and improvement of agricultural infrastructure	<ul style="list-style-type: none"> <li>– Possibilities are numerous, but time consuming, and they require additional funding.</li> <li>– Is better fitted for regional land consolidations.</li> <li>– Improvement of the road and drainage network are not implemented into the farm-based land consolidation.</li> <li>– The aforementioned tasks may be conducted in processes separate from land consolidation.</li> </ul>	<ul style="list-style-type: none"> <li>– Not implemented, but cadastral authorities may guide or act as consultants for participants to reconstruct the road and drainage network.</li> </ul> <p>The process is separate from land consolidation.</p>
Financing the land consolidation	<ul style="list-style-type: none"> <li>– State funding for land consolidation has less significance and other sources, e.g., private funding, have greater significance.</li> </ul> <p>Investors financing the process should have higher possibilities to determine the aims of the project.</p>	<ul style="list-style-type: none"> <li>– Non-government sources provided needed funding.</li> <li>– It should be investigated whether professional farmers are willing to invest in the project.</li> </ul>

creation among participants. The overall initiative of the participants is seen as favourable, but it may become a challenge due to the various aims of professional and non-professional landowners (farmers). Groups of potential landowners and stakeholders should be identified based on their motives for land consolidations. Farm-based land consolidation is a tool for farmers and may focus just on professional farmers who wish to increase their production and are willing to pay for it. Farm-based land consolidation relies on land exchanges and external lands available to the project; these were seen as key features in land consolidation and should be part of the process. The improvement of agricultural infrastructure is included in regional land consolidation, but not in farm-based land consolidation since it requires more funding and takes time to implement.

Government funding for land consolidation has outlined its public nature. Therefore, the role of state funding is different in farm-based land consolidation, where the aim is to acquire funding only for procedural costs from the government. The key aspect is to find other sources of funding. Professional farmers or joint farmers may be more interested in investing in the improvement of their property structure if they can have more influence on the outcome. To summarise, the general view of the adaptability problems of presented aspects and propositions of recommended actions to be used in farm-based land consolidation are presented in table 5.

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CRE Code of Real Estate (540/1995)

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LCFA81 Act of subsidizing the land consolidations – orig. *Laki uusjakojen tukemisesta* (24/1981)

MO Ohjesääntö maanmittaustoimesta, tilusjako- ja verollepanolaitoksesta sekä pituus-, astia- ja painomittain vakaamisesta (15.5.1848)