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Land Consolidation and the Value of Rural Cultural Landscape

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***Abstract.** The formation of rural cultural landscape can be studied as an entity comprising the visible elements, the background processes which have formed and are forming these visible elements, and the values that are given to the landscape. The value of rural cultural landscape can be based, for example, on well-kept cultivated landscape, buildings, and diverse culturally affected nature. Changes in real estate and property structure have had a major influence on rural cultural landscape. Earlier forms of land use are layered in the current landscape affecting the values of the landscape at the same time. The consideration of landscape change is a pressing issue as the current scattered property structure is being enhanced by implementing land consolidations. In order to preserve the values of cultural landscape, the process of land consolidation should include a separate landscape analysis.*

***Keywords.** Cultural landscape, land consolidation, land division, landscape analysis, value of cultural landscape*

1 Background

Cultural landscapes are entities formed by the synergy of man and nature (YM 1992a, p. 10). Cultural landscape can be studied either by its visible elements, non-visible elements (perception, experience, values) or by the background processes which form the landscape. When landscape is studied, one can stress either its visible or non-visible parts or study it as an entity comprising all of them. (Keisteri 1990, p. 50–51.)

Changes in property division have affected the rural cultural landscape of Finland already since 15th century. Strip divisions started during that era in parts of Finland. In strip division the field parcels were divided in long and narrow strips according to the tax rate of the farmers. The strip division was followed by

the Basic Land Consolidation. It meant that farmers' fields were gathered more closely together in bigger parcels and nearer the homestead (Hyvönen 1998, p. 110 and Vitikainen 2003, p. 39–47.). Nowadays the property structure in Finland is scattered, as farmers in order to acquire more land, either buy or lease land even from a long distance away from farmers giving up farming. As a result of this trend, farmers are interested in reforming the scattered field parcels to improve the cost-effectiveness of their farms. (Hiironen and Ettanen 2012, p. 6.) Land consolidation means that field structure is improved by exchanging field parcels between farmers. Land consolidation is based on the Real Estate Formation Act (554/1995), according to which property division in the countryside and the appropriate use of real property is enhanced without changing the ownership structure (Vitikainen 2003, p. 1.). The strategy for land consolidations for 2008–2013, written by the Ministry for Agriculture and Forestry in Finland, states that there is a constant need for land consolidations in Finland because of the historical development of property division and natural conditions. The focus of land consolidations will be on field consolidations. According to this strategy the emphasis of land consolidations will be on environmental, natural and landscape issues. (MMM 2007, p. 7, 15–17.)

The demand for land consolidation results from the current scattered property structure. The problem of scattered property structure in Finland has been studied, for example, by the National Land Survey (Hiironen and Ettanen 2012). Additionally, van Dijk (2002, 2006) and van Dijk and Kopeva (2006) have studied the same kind of problem in Central Europe. The changes in biodiversity caused by land consolidations have been studied for example by Liseč and Pintar (2005). Also in Poland the field structure is very scattered. Pulecka (2004) and Kupidura (2010) have written about land consolidation as a tool for landscape preservation.

During the planning phase of land consolidation the preservation of landscape values will be part of the plan (Kupidura 2010). In order to recognize landscape in land consolidations, ecological elements, sights, landscape accessibility, the use of landscape, landscape values, and the preservation and change of the different parts of landscape should be examined (Pulecka 2004.). Liseč and Pintar (2005) have also studied the change and preservation of natural ecosystems in land consolidations in Slovenia. According to their results 50 % of the ecological elements in ditches disappeared because of land consolidation as the number of field parcels decreased significantly and field areas got more unified.

This article shows an example of the significance of land divisions as a landscape shaper. Factors affecting the value of the landscape, as well as taking them into account in land consolidation, will be addressed. The value of landscape will be defined by the features indicating valuable traditional landscapes and the openness of landscape. Defining these factors is important in land consolidations in order to be able to give suggestions of action for important landscape issues in land consolidations.

2 Material and method

The factors which make up the value of landscape are divided in three parts as defined by the Ministry of Environment (YM 1992b p. 6). They are well-kept cultivated landscape, buildings, and diverse culturally affected nature. The writings of Hietala-Koivu and Aakkula (2004), Asunmaa (2009) and Luoto et al. (2004) concerning the value of landscape have also helped in making the list of the value factors of landscape.

The forms of land use in the past as factors affecting the value of landscape were studied using the old maps of an example village, which is Sääksjärvi village in the municipality of Mäntsälä in Southern Finland. Landscape change over time was studied by comparing digitized old maps with the map of 2000. The old maps used for this study are the strip division map from 1693, the Basic Land Consolidation map from 1784 and its arrangement map from 1916.

The description of the process of land consolidation is based on the process model by Vitikainen (2003). The separate landscape analysis is inserted in this process model. It illustrates the possibilities of land consolidation as a tool for the consideration of landscape and securing the preservation of landscape values.

3 The factors affecting the value of rural cultural landscape

The recognition of landscape values is important when the forms of land use change. In order to preserve the inner nature of landscape, the history and structure of it should be understood. Based on this understanding significant values and features can be nurtured (Eurooppalainen maisemayleissopimus 2008, p. 4.). The features layered in cultural landscape over time illustrate the history of the countryside (YM 1992a, p. 14). Different catalogues of valuable landscape areas and built environment list many rural cultural landscapes. In addition to these lists, there are far more of them. In any case, most of the Finnish cultural landscapes are not classified as valuable in cultural history. However, every rural cultural landscape or village has its own local historical content, meaning and character. Every landscape has only one past, but many possible futures. (Forsius-Nummela 1997, p. 38–39.)

According to the Finnish Ministry of Environment, the values of rural cultural landscape are based on well-kept cultivated landscape, buildings, and a versatile culturally affected nature (Table 1). For example, according to Asunmaa (2009) the visible natural and landscape values are the openness of cultivated landscape, the border zones of forests, old barns, tree alleys, natural biotopes, traditional fences, landscape trees, wetlands, pasturing cattle, game pastures and ecological corridors (Hietala-Koivu and Aakkula 2004, p. 55 and Luoto et al. 2004, p. 174).

As a part of well-kept cultivated landscape, the openness of cultivated landscape is the most significant goal and subject to surveillance in Finland (Hietala-Koivu and Aakkula 2004, p. 57). The studies of the Ministry of Environment similarly state that the closing of open landscape resulting from the ending of cultivation and abandonment of the countryside is the biggest threat to rural landscape. Open cultivated landscape is the most important feature of the Finnish cultural landscape, so keeping the fields cultivated is very important. (YM 1992b, p. 6 and YM 1992a, p. 80.)

Table 1. *The values of landscape (YM 1992b, p. 6; Asunmaa 2009; Hietala-Koivu and Aakkula 2004, p. 55 and Luoto et al. 2004, p. 174).*

Main categories	Values of landscape
Well-kept cultivated landscape	<ul style="list-style-type: none"> • openness of cultivated landscape • fields staying in cultivation
Buildings and roads	<ul style="list-style-type: none"> • well-kept courtyards • barns • traditional fences • old roads • old bridges
Versatile culturally affected nature	<ul style="list-style-type: none"> • traditional biotopes (meadows, traditional pastures, forest meadows) • pasturing cattle • road and river banks • border zones of forest • ecological corridors • protection zones against drainage • wooded islands • wetlands • rock piles • tree alleys • landscape trees

Buildings and roads are important when considering the value of cultural landscape. Well-kept courtyards and buildings are remarkable formers of landscape values. For example, old barns in the middle of field areas and traditional fences indicating the old cultural landscape are part of these values. Also, old road lines following the contours of the ground and the sides of the fields as well as old bridges indicate the values of landscape from the viewpoint of both cultural history and cultural landscape. (YM 1992a, p. 84–85.)

Traditional landscapes which indicate diverse culturally affected nature include a variety of valuable landscape elements. The number of natural biotopes has decreased and the quality of them has declined as a result of mowing, the end of pasturing, eutrophication, forestation, and building (Pykälä and Alanen 2004, p. 203). Road and river banks, border zones of forests, and forest islands are remarkable in diversity. They form ecological corridors used by plants and animals (Tarmi and Bäckman 2004, p. 98.). Wetlands are meant to support water preservation in the first hand, but typically also wild plants, trees and bushes grow there (Kuussaari et al. 2004, p. 267). As singular objects in landscape, rock piles, tree alleys and landscape trees give structure and variety to it (YM 1992a, p. 80).

4 The change of landscape and values

The visible elements of landscape are the results of earlier functional processes. Natural elements, buildings, roads and the division of fields and forests are the results of historical development. The development of land division is a significant background subject in the development of rural cultural landscape. Land divisions

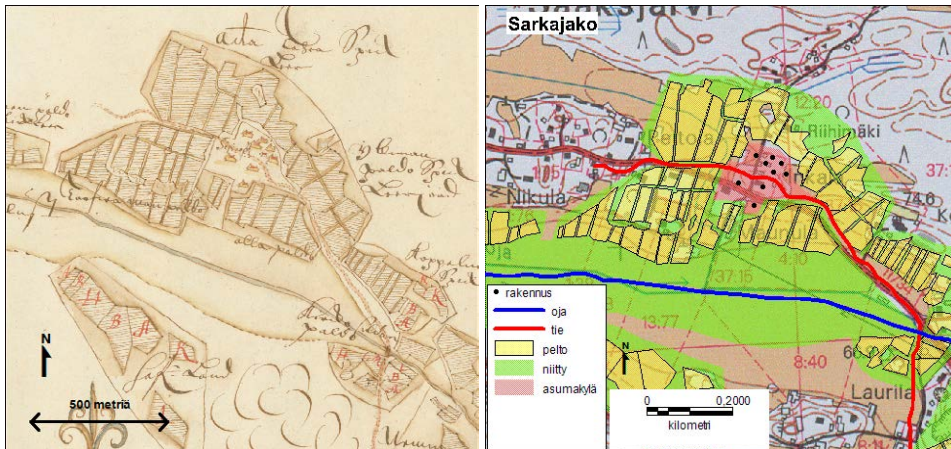


Figure 1. a) The fields of Sääksjärvi village in 1693 (Kansallisarkisto B30 al 11/1), **b)** The digitized objects layered over the map of 2000, base map number 2044 11 (51/MML/11).

in the past have significantly affected the values of the current rural landscape. Past land use is layered in the landscape. The historical meaning of land divisions can be studied with geographical information systems by digitizing old land division maps and studying change over time. The figures above show how land divisions have affected the cultural landscape of the Sääksjärvi village in the municipality of Mäntsälä in Southern Finland. Sääksjärvi village was a group village in the 17th century and the fields had a strip division. Figure 1a shows the fields of the village in 1693 and Figure 1b shows the digitized items layered over the map from 2000.

The picture pair in Figure 1 shows the village centre and its fields in strip division, which can be seen outside the village centre. From this time comparison it can be seen that fields have previously been situated in current forest areas, but mostly the places of old fields are still in use for cultivation today. The area of fields has grown towards the south and northeast. The old village centre included nine houses and was situated on a higher hill-like place. In the 17th century there was already a local road going through the village centre. The current road is almost in the same place as the old one. Also the Saarenniitynoja (the main ditch in the middle of the largest field area) was situated largely in the same place as nowadays. The courses of the road and the ditch have changed a little.

The Basic Land Consolidation in Sääksjärvi started in 1783. Then there were 18 farms in Sääksjärvi. In order to get the land in as large parcels as possible, some farmers agreed to move from their old plots to new ones. There were 19 new farms established in the village. Because of the Basic Land Consolidation the number of farms subsequently rapidly doubled and the sides of the village got completely new residents (Oksanen 1991, p. 449). Figure 2a shows a part of the Basic Land Consolidation map of Sääksjärvi from 1784. In Figure 2b the digitized objects are placed on top of the map from 2000.

The field area of the village increased considerably during the Basic Land Consolidation compared to the time of strip division. Field areas became bigger and

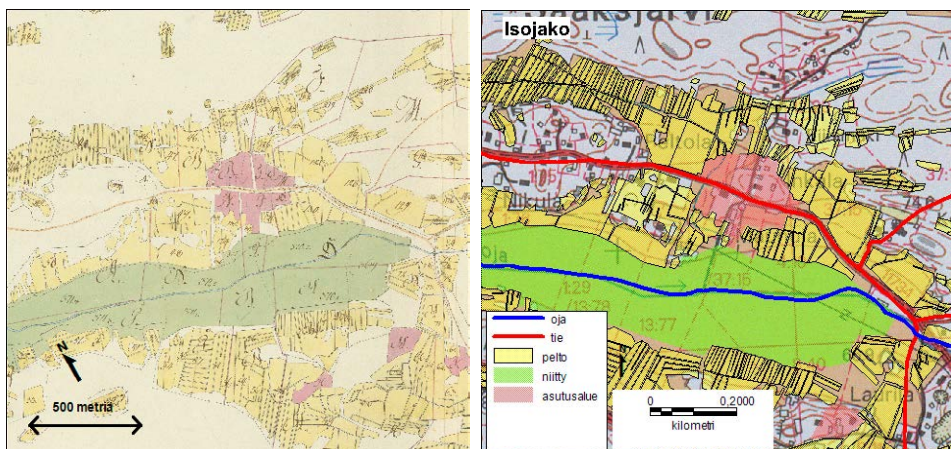


Figure 2. *a)* Map of the Basic Land Consolidation in Sääksjärvi village in 1784 (B30 a1 11/2–3), *b)* The digitized objects layered over the map of 2000, base map number 2044 11 (51/MML/11).

more uniform, although some smaller field parcels still remained. The comparison in Figure 2 shows also that some old and smaller fields in the middle of forests have become forested. The village centre has remained in the same place, but new households have also been established on higher grounds. The area west of the old village centre was not inhabited during the Basic Land Consolidation. The course of the Saarenniitynoja ditch has changed to its current form. The old village road still exists but new roads have also been built.

After the arrangement of the Basic Land Consolidation of 1875–1876 the cultural landscape of Sääksjärvi continued to change. Figure 3a shows part of the map of the arrangement of the Basic Land Consolidation from 1916. Figure 3b compares this map with the map of 2000.

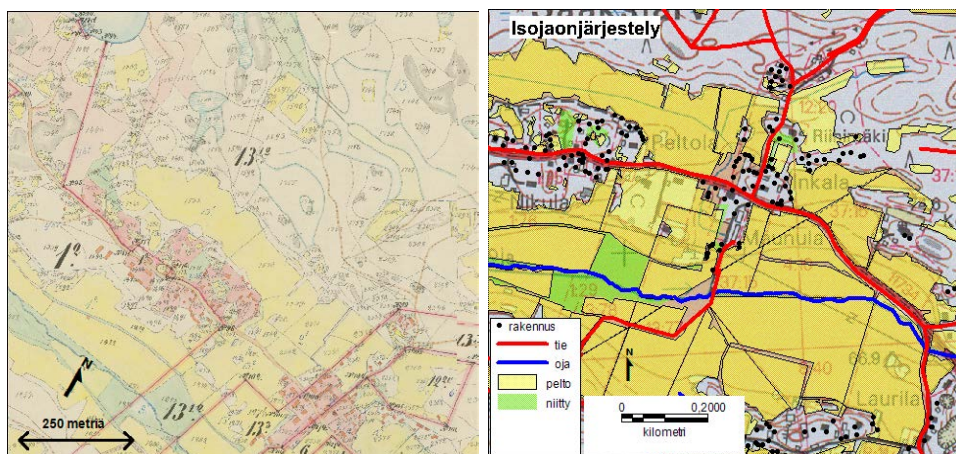


Figure 3. *a)* Map of the arrangement of the Basic Land Consolidation in Sääksjärvi village from 1916 (B30 a1 11/79–87), *b)* The digitized objects over the map of 2000, base map number 2044 11 (51/MML/11).



Figure 4. a) A forest island, b) the old Prusila courtyard (pictures Saija Ettanen).

From the comparison it can be stated that field areas have reached almost the same wideness and uniformity as in 2000. The old village road and Saarenniitnoja ditch are at their current place. The number of roads and ditches has increased even more. The village settlement has spread towards the east and west along the village road from inside the old village centre. The black dots indicate both of the main buildings and other buildings such as cattle sheds. In Sääksjärvi there is some openness in the landscape when looking from the village road towards the fields. The old village road is still in use. Overall, the landscape is slightly hilly. There are some forest islands in the middle of the fields giving some indication of traditional landscapes and giving variety to the landscape (Figure 4a). The border zones of fields and forests as well as the bank vegetation maintain a variable biodiversity. The courtyard of the old Prusila farm is a valuable landscape object (Figure 4b).

Land divisions have been a significant background process in the formation of cultural landscape in the village of Sääksjärvi. The old forms of land use are layered in the landscape and mirror the local history of the village. They have also affected the values of the landscape, one of which is the openness of the landscape. It is a result of many changes in land divisions, where field parcels have been divided in narrower strips and again combined into larger ones while the ditches between the field parcels have disappeared. The unifying field areas and the increase of landscape openness have been remarkable changes in rural cultural landscape since the Basic Land Consolidation. The maintenance of the open cultivated landscape and the preservation of the features indicating the life of the past are major challenges of the cultural landscape in the future. For example, existing pastures, old barns, traditional fences, old roads and old bridges are signs of old land use forms that affect landscape values.

5 Landscape analysis as a part of land consolidations

The expansion and unification of field areas are the most significant changes in landscape caused by the current land consolidations, as the ditches between the field parcels disappear as the result of combining the parcels and building underground drains. Also, the biodiversity in the ditches is getting poorer. The form of the field

can change as well. The decrease of ditches in fields and the increase in the openness in wide field plains can increase the monotony of the landscape. In hilly areas the landscape has the natural variety of elevation differences. Land consolidation in hilly areas can also widen the landscape of field areas, but the topography gives variety to the landscape. Changes in the road network are usually connected to the abandoning of smaller roads, the building of new roads and the straightening of roads. Buying or renting fields from long distances away affects landscape in the form of an increase in agricultural traffic on the road network. Also, increasing inhabitation in a village has landscape effects in the form of increasing number of buildings. As an expression of powerful agriculture, the number of large cattle sheds and other agricultural buildings is getting bigger in the current rural cultural landscape. This change takes place naturally in those areas which have the best conditions to continue agricultural production. As an opposite, declining areas are facing the threat of deteriorating buildings as agriculture is diminishing.

If there are valuable landscape elements in a land consolidation area, they should be investigated already when land consolidation is in the planning phase. The effect on landscape can be great if the existence of natural species is threatened in the process. Landscape analysis as a part of the land consolidation process is illustrated in Figure 5.

The land consolidation process has three parts, which are the preparation stage, the inventory and planning stage and the implementation stage. Land consolidation is preceded by feasibility studies, which aim to examine the starting points and goals of the land consolidation project and make a proposal for action. Inventory and planning aims to gather and register information from the units involved in the land consolidation process and to plan the needed road and drainage network and to confirm the borders and dimensions of the real property units. The implementation phase in land consolidation aims to take over the new fields and complete the possible changes in road and drainage network. (Hyvönen 2001, p. 158, 383 and Vitikainen 2003, p. 65, 72, 79, 83.)

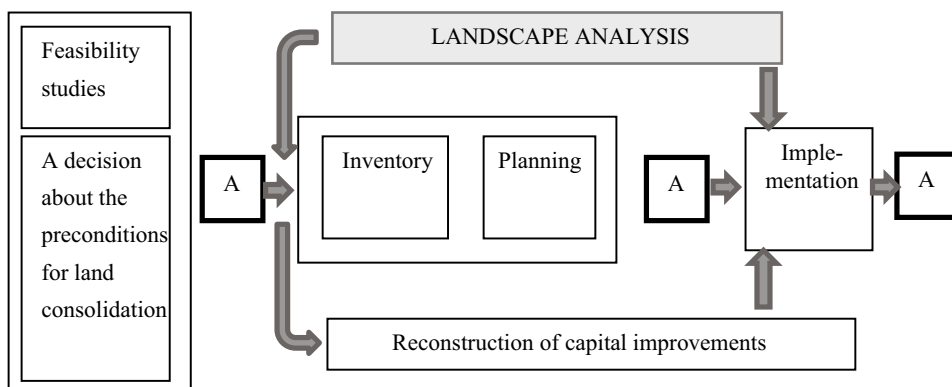


Figure 5. Landscape analysis as a part of the land consolidation process. A signifies a decision or appeal proceedings. (Vitikainen 2003, p. 23; Vitikainen 2004, p. 31.38).

6 Conclusion

Landscape analysis should be taken into the inventory and planning phases so that the preservation of landscape values is secured. Landscape characteristics should be entered as part of the information concerning the implementation of land consolidation in the area. Village residents should be interviewed, so that the knowledge of land owners and other dwellers concerning their own area and their wishes for land use and landscape development can be taken into account more easily. The new plot division implemented during the land consolidation process as well as the changes in the road and drainage network can affect the landscape. The landscape analysis should include the investigation of the historical development of the area's land division. The changes in land division and inhabitation during the historical land divisions and other historical events have had an effect on the visible elements of the current cultural landscape and its values.

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