

Cost-Benefit Analysis of Land Consolidation in Sweden from the ViewPoint of Society and a Landowner

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Key words: Costs of Land Fragmentation, benefits of Land Consolidation (LC), influencing factors on the costs of the LC procedure.

SUMMARY

Land Fragmentation is often acknowledged as a problem by decision makers, even if its impact on economic growth in rural areas is largely underestimated. Land Fragmentation in Sweden is mainly concentrated to the county of Dalarna in Central Sweden where there is an urgent need of Land Consolidation of 500 000 hectares of forest land. The Swedish government initiated an official investigation 1993 regarding the financing, co-ordination and legal regulation of the mapping and property formation activities. One of the findings was that the costs for the land register, the cadastre and taxation were approx. 1,7 Million USD higher per year in the county of Dalarna than in the neighbouring counties due to the high fragmentation of properties in Dalarna. Furthermore Land Fragmentation causes considerable extra costs for society regarding access to land for the municipalities, the National Road Administration, the National Rail Administration, the telecommunication companies and the electric power suppliers. The total extra costs for society related to Land Fragmentation in Dalarna is approx. 3,4 Million USD annually. This amount with a perpetual capitalization at a real rate of interest of 3 % is 112 Million USD. Work with planning and land use is also more expensive for municipalities and the county administration. Land Fragmentation causes retained activities and employment in forestry as well as retained tax revenues. As a matter fact the increase of tax revenues in Land Consolidation project in Dalarna concluded during 1993 – 1997 was at least as large as the governmental subsidies assigned for these projects.

Land Fragmentation from a landowner's commercial point of view causes reduced income in agriculture and forestry, high management costs, long boundary lengths and complicated ownership conditions. The Swedish Property Formation Act requires that the benefit condition is fulfilled, which means that the profits and advantages must exceed the costs and disadvantages of the procedure. It should be emphasized that sentimental values must not be considered. The benefit condition was for the first time trialled by the Court of Appeals, Stockholm, in June 2009 regarding a Land Consolidation project in Dalarna. The appellants with support of the National Land Survey argued that the benefits were approximately four times larger than the costs of the procedure. The court accepted the arguments from the appellants and approved the appeals.

The main costs for a Land Consolidation project are

- investigation of the composition and size of every owner's farm
- individual talks with the land owners at "*days of wishes*"

- elaboration of the design of the new consolidated properties
- valuation of all properties
- mediation and negotiation with all participating land owners
- surveying of the new boundaries

The costs for a Land Consolidation project are influenced by:

- degree of fragmentation
- number of real properties/parcels
- number of landowners and their attitude
- size of the consolidation area
- the length of all boundaries

Besides the measurable costs and disadvantages of Land Fragmentation for the proprietors there are factors which cannot be measured e.g.

- Inefficient management in forestry
- Inaccurate property registers and cadastral index maps
- Uncertain boundaries
- Ignorance among the proprietors regarding rights and location of boundaries causing disputes and conflicts
- Decision problems in co-owned properties

Experiences from several Land Consolidation project show that the benefits for both society and the land owners substantially exceed the costs. Land Consolidation is therefore a very profitable investment.

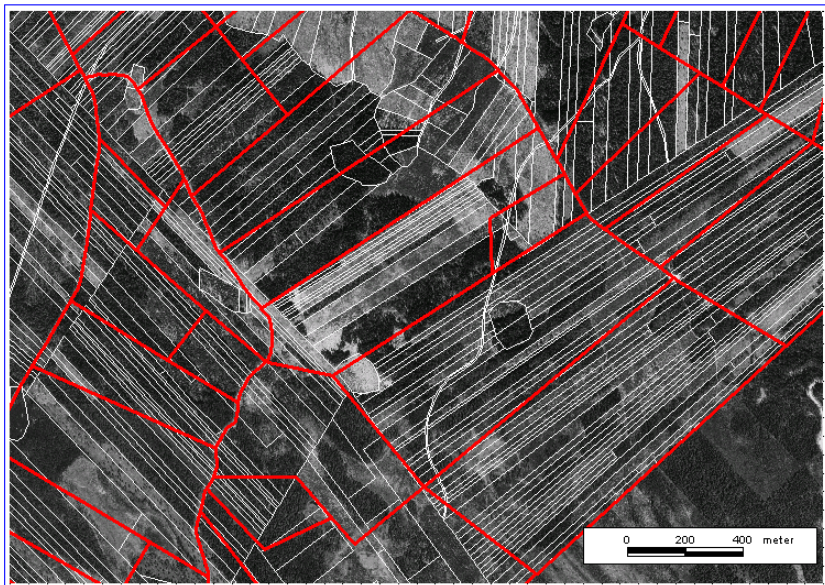
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1. INTRODUCTION

Land Fragmentation is often acknowledged as a problem by decision makers, even if its impact on economic growth in rural areas is largely underestimated. At the same time decision makers underestimate the advantages and benefits of Land Consolidation.

Land Consolidation projects in Sweden have since the 18th century been implemented as legal procedures. The legislation has been changed several times to adapt to the prevailing situations in the society. The present Swedish Real Property Formation Act requires a cost-benefit analysis on behalf of the participating landowners before a property formation order can be decided. It is, of course, important that the benefits for the participating landowners exceed their costs for the procedure. Otherwise the procedure will be cancelled. However the law does not require any cost-benefit analysis from the viewpoint of society. Instead the influence of Land Consolidation on the society's costs is judged without a formal monetary calculation when the decision of subsidies is taken. This is different from several other European countries where a formal cost-benefit analysis has to be calculated before the implementation decision. Subsidies from the EAFRD fund (EU), are also granted without formal monetary calculations if the conditions in the four axes are fulfilled.



This paper will however consider the cost-benefit analysis of Land Consolidation in Sweden from both the viewpoint of society and a landowner. From some aspects a monetary calculation of costs and benefits is possible but in other aspects such calculations have not been made or cannot be made.

**Figure 1.1. White boundaries *before* Land Consolidation
Red boundaries *after* Land Consolidation**

Figure 1.1 is an example of how the division into property units in a forest area dramatically can be improved by Land Consolidation. The objective of this paper is to show the economic consequences of Land Consolidation. Hopefully the conclusions in this paper may be considered by politicians and landowners.

The cost of Land Consolidation depends on several circumstances e.g. the degree of fragmentation, number of participants, attitude among the participants, voluntary or compulsory approach. This paper will focus on compulsory Land Consolidation in forest areas in Central Sweden with very bad fragmentation.

2. LAND FRAGMENTATION – COSTS FOR THE SOCIETY

Fragmentation of real properties results in considerable costs and disadvantages both for the society and the land owners. From society's viewpoint the costs of fragmentation were investigated ten years ago regarding the county of Dalarna which is characterized by a very high fragmentation of properties. The fragmented area in this county covers approximately 500 000 hectares with an urgent need of Land Consolidation.

The fragmentation of properties is mainly a result of the traditions among the landowners during generations in inheritance situations. The heirs after a deceased person very often have divided the ownership of a real property according to the inheritance act. After some generations the ownership situation will become very chaotic.

The Swedish government initiated an official investigation in 1993 regarding the financing, co-ordination and legal regulation of the mapping and property activities. One of the findings was that the costs for the land register, the cadastre and taxation were approx. 1,7 Million USD/annually higher in the county of Dalarna than in the neighbouring counties due to the high fragmentation of properties.

Furthermore Land Fragmentation causes considerable extra costs for society regarding access to land for the municipalities (pipelines for water supply, sewage and district heating), the National Road Administration, the National Rail Administration, the telecommunication companies and the electric power suppliers. These extra costs are estimated to the same size as those for the authorities i.e. 1,7 Million USD/annually higher in Dalarna compared with similar costs for counties with normal or good division into property units. The total extra costs are then 3,4 Million USD or a perpetual capitalized cost of 112 Mill. USD at a real rate of interest of 3 %. Work with planning and land use is also more expensive for municipalities and the county administration but are not included in calculated costs. Land Fragmentation causes retained activities and employment in forestry as well as retained tax revenues. Therefore the government and authorities should take this into consideration when subsidies to Land Consolidation should be decided in the future.

3. LAND CONSOLIDATION – BENEFITS FROM THE VIEWPOINT OF SOCIETY

The consequences of Land Fragmentation from the viewpoint of society can be reversed by Land Consolidation and the costs related to the division into properties/parcels are decreased considerably for the authorities, municipalities, the National Road Administration etc, approximately 3,4 Million USD/annually in the county of Dalarna compared with the neighbouring counties. If the above mentioned annual extra costs due to Land Fragmentation are capitalized perpetually it will be 112 Million USD. If this amount is compared with the subsidies for Land Consolidation $154 \times 500\,000 = 77$ Million USD presumed that the most fragmented area amounts to 500 000 hectares, it is out of question that the benefits of Land Consolidation from the viewpoint of society considerably exceed the costs related to Land Fragmentation.

At the same time the activities and employment in forestry after a Land Consolidation project increase as well as the tax revenues. As a matter fact the tax revenues as a result of concluded Land Consolidation projects in Dalarna during 1993 – 1997 were at least as large as the subsidies from the government assigned for these projects. Furthermore the increase of employment and activities in forestry should also be considered but these issues have not been calculated.

4. LAND FRAGMENTATION – CONSEQUENCES FOR A LANDOWNER REGARDING COSTS AND BENEFITS

Land Fragmentation from a landowner’s commercial point of view causes reduced income in forestry, high management costs, long boundary lengths and complicated ownership conditions. The fragmentation for a landowner can be described as follows:

In fragmented areas the holding of a land owner is often fragmented in 20 – 75 real properties which are further fragmented into 50 – 500 small parcels. The real properties have furthermore in many cases shares in several joint properties. The number of participating properties in a joint property can be 5 – 50. If each property is owned by several persons the decision situation is just chaotic! See Figure 4.1.

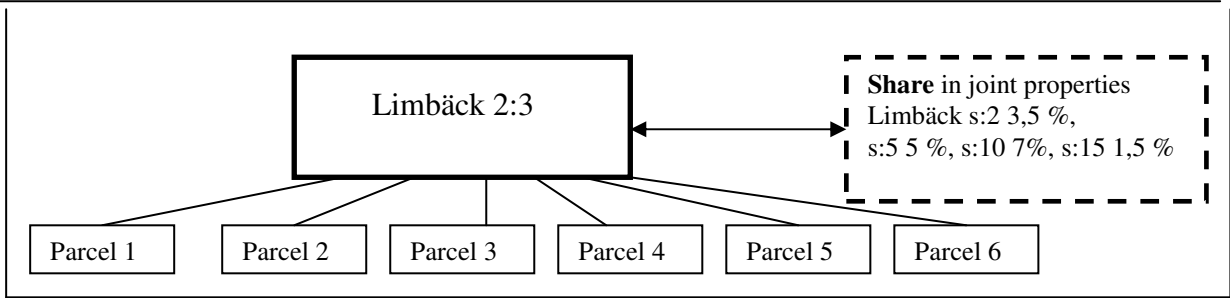


Figure 4.1. Cadastral situation for real property Limbäck 2.3.

It should also be mentioned that in some cases the size and the value of a joint property can be very big. Beside the bad cadastral situation the ownership situation for many land owners is very complicated due to co-ownership with several/many other persons in a number of owner-

ship groups (constellations). In such cases the bad ownership situation is even worse from a management point of view than the bad cadastral situation. A practical example for Mrs Arkeberg see Figure 4.2.

- Area 35 hectares
- Distributed in 9 villages
- Ownership in 71 real properties (separate designations)
- Shares in 189 joint properties
- Properties and joint properties distributed in 532 parcels
- 100 % ownership in only one property (her building site)

Under such circumstances the area of the management unit becomes very small which causes high costs per cubic metre solid wood. The big number of parcels also causes higher

Figure 4.2. Situation for Mrs Arkeberg before Land Consolidation

costs to keep the boundaries well cleared. Such boundary work is one of the main costs for the landowner in fragmented forest areas. The typical design of forest parcels is long narrow parcels which are not adjusted to achieve low logging costs. Figure 3.3 shows the pattern of forest parcels clearly. Every activity of logging or silviculture requires reconnaissance, planning and calculations by supervisors. Contacts have to be taken with several forest owners, labourers and entrepreneurs. Every assignment which is executed by an entrepreneur involves a certain fixed cost regardless of the size of the assignment. The distance between the different



parcels causes also extra costs for moving the logging machines and personnel compared if the logging and silvicultural operations could be concentrated to large treatment areas. Most of the logging operations today are executed by machines. To use an effective machine on small logging areas is often an expensive combination. Manual logging with chain saws has today been replaced by mechanical logging with effective

Figure 4.3. Mr Johnson's fragmented holding before LC

machinery systems. Heavy work in the forest are executed by machines and less work-demanding jobs e.g. cleaning, planting and cleaning of boundaries are often executed by the forest owner himself. Transports and movements of machinery between logging areas involve costs for the machinery systems. Frequent movements result in unproductive work. The Forest research foundation, Skogsarbeten, has found that the costs per cubic metre rise dramatically for logging areas with less than 200 cubic metres. See an example Figure 4.3.

5. BENEFITS OF LAND CONSOLIDATION FROM THE VIEWPOINT OF A LANDOWNER

Land Consolidation in the county of Dalarna has been implemented during the last 80 years in large projects with sizes of 2 000 – 54 000 hectares. Normally 200 – 2 000 landowners and 3 000 – 15 000 parcels are concerned in these projects. Land Consolidation has normally been implemented in forest areas with very high Land Fragmentation by the use of the compulsory rules according to The Swedish Property Formation Act. It should however be mentioned that in areas with moderate Land Fragmentation voluntary Land Consolidation is the normal procedure.

The Swedish Property Formation Act requires that the benefit condition is fulfilled, which means that the benefits and advantages must exceed the net costs after subsidies and disadvantages of the Land Consolidation procedure. It should be emphasized that sentimental values must not be considered. Normally the benefit condition has not been questioned by the landowners but recently the benefit condition in a rather large Land Consolidation project was trialled judicially. Subsidies to Land Consolidation have since several years been decided to 50 % of the gross cost of the procedure. That means that the subsidies in this project amounted to 154 USD/hectare and consequently the net cost is 154 USD/hectare. The benefits have in this project been calculated to approximately 660 USD/hectare. A real rate of interest of 3 % was used in these calculations to be on the “safe” side. The real rate of interest for long-term investments has during a long sequence of years been relatively low 1,4 – 3 %. Therefore there are good arguments to use a lower real rate of interest if the market values of forest properties are considered. The capitalized benefit would increase by 50 % if 2 % real rate of interest would be used.

The case was trialled by the Court of Appeals in Stockholm in June 2009. The appellants with support of the National Land Survey argued that the benefits were more than four times larger than the costs of the procedure. The court accepted the arguments from the appellants and approved the appeals. The Supreme Court finally in February 2010 settled the decision by the court of appeals. In this calculation the drawbacks of complex ownership conditions, uncertain boundaries, ignorance among the proprietors regarding rights and location of boundaries causing disputes and conflicts and decision problems in co-owned properties have not been considered.

The drawbacks and disadvantages of Land Fragmentation from the viewpoint of a land owner disappear after concluded Land Consolidation. The number of parcels, joint properties and the length of boundaries are reduced by approximately 90 %. The new consolidated parcels are well suited for forestry. The size of the parcels has increased 15 – 20 times compared with the situation before Land Consolidation. The parcels have good access to truck roads and the boundaries are well adjusted to wet areas and topography in order to facilitate logging and silviculture as much as possible. Depending on size of land fund or land bank a number of holdings will be expanded which will result in additional benefits. Simultaneously the ownership situation has improved dramatically and a great majority of the consolidated properties

are owned by one single person. Forest companies in Dalarna therefore consider that the conditions for forest management after the implemented Land Consolidation projects match the requirements of modern forestry.

Besides these mentioned benefits the yield or timber production and timber prices will increase thanks to Land Consolidation. The improved access to forest land thanks to construction of new roads should also be recognized.

6. MAIN COSTS FOR A LAND CONSOLIDATION PROJECT

Normally the Land Consolidation projects in Dalarna involve hundreds of participating landowners and thousands of parcels. We strive to apply an integrated, participatory and “*bottom-up*” approach in order to facilitate the mediation/negotiation with the participants and achieve as high degree of acceptance as possible before the main decisions will be taken. The main costs of a Land Consolidation procedure are shown in Figure 6.1.

- Investigation of the composition and size of every owner's holding
- Individual talks at meetings where the land owners can express their wishes and interests, so called “*days of wishes*”
- Investigation of infrastructural measures - optional
- Valuation of all properties
- Elaboration of the re-allotment design
- Mediation and negotiation
- Surveying of the new boundaries
- Decision making

Figure 6.1. Main costs for Land Consolidation

Before the “*days of wishes*” are carried out with each landowner it is necessary to investigate the composition and size of his/her holding. After these individual talks with the landowners the procedure continues with investigation of possible infrastructural measures, mainly roads, and valuation of all properties. Valuation is the basis for the compensation order and therefore very important for the landowners. Valuation records are therefore sent to all landowners to enable them to check if the valuation can be accepted or not. In cases of complaints the cadastral authority will carry out a thorough control. If inaccuracies are discovered the valuation will be adjusted. Then it is time to elaborate the new re-allotment design - the most spectacular and interesting activity during the procedure. The draft design is sent to all landowners who are requested to respond to the proposal. GIS technique has been used with good success since fifteen years. Several landowners are normally not satisfied with the first draft and require changes of size and location of the new consolidated property. Possible approvals of complaints will cause side effects on other landowners which will result in numerous mediations and negotiations in order to satisfy as many landowners as possible. It is time-

consuming and a difficult task to satisfy hundreds of wills. The land surveyor in charge of the Land Consolidation project has to be very skilled in mediation/negotiation in order to achieve trust among the landowners and success in the procedure. When the adjusted re-allotment design has been accepted by a great majority of the landowners the surveying of the boundaries of the new consolidated properties can start. Valuation and surveying of the new boundaries of the new consolidated properties are the most time-consuming and expensive activities in the Land Consolidation procedure. After the completed surveying and the preparation of the cadastral documents a final meeting with the participating landowners takes place when the main orders are taken e.g. property formation order, compensation order, possession order, order of distribution of costs and conclusion order.



Figure 6.2. Forest valuation

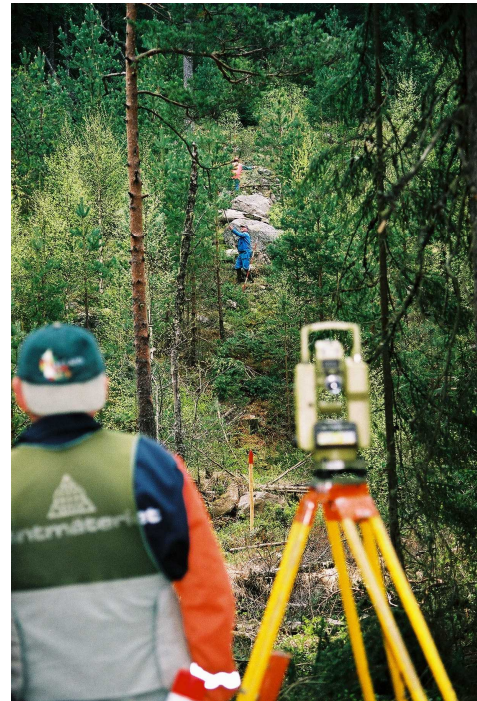


Figure 6.3. Surveying of “new” boundaries

7. COSTS FOR LAND CONSOLIDATION – INFLUENCING FACTORS

Land Consolidation projects are implemented in very fragmented areas. In order to achieve trust and a good communication with the landowners several committees of landowners are elected to assist the land surveyor in discussions of principal issues and preparations of the various decisions. The costs of the Land Consolidation procedure are affected by several factors, see Figure 7.1. Of course the degree of fragmentation can vary which influences work and the costs for the procedure. The total number of real properties/parcels is related to the degree of fragmentation and influences the surveying work.

- Degree of fragmentation
- Number of real properties/parcels
- Number of landowners and their attitude
- Size of the consolidation area
- The length of all boundaries

The number of real properties/parcels has a strong correlation to the number of landowners involved and affect the time needed for discussions with every individual landowner at the “*days of wishes*” and for mediation and negotiation. Espe

Figure 7.1. Costs for the Land Consolidation procedure influencing factors

cially the “*days of wishes*” are a very important occasion for the land surveyor to give thorough information for the landowner in those issues which have bothered him/her.



The number of participating landowners is less than the number of properties, because normally a landowner owns 5 - 6 properties or parts of properties. Normally individual discussions will occur at three occasions during the Land Consolidation procedure.

1. “*days of wishes*”
2. Discussion for the valuation
3. Discussion of the reallotment design

The attitude among the landowners regarding Land Consolidation has also a strong influence on the

Figure 7.2. Discussion at the “*days of wishes*”

costs and affects the work with mediation and negotiation with the landowners considerably. The size of the Land Consolidation area and the composition of the forests affect the costs of valuation because the valuation includes laser scanning, photo interpretation and field inventory of the whole area concerned. Indirectly the degree of fragmentation and the size of the Land Consolidation area influence the total length of the “*old*” boundaries but also the length of the “*new*” boundaries and simultaneously the costs of surveying. The topography and density of the forests have a strong impact on the time consumption for surveying.

8. NON-MEASURABLE ADVANTAGES OF LAND CONSOLIDATION

8.1. Improved rural conditions

There are a number of benefits or advantages created by Land Consolidation which are more or less impossible to calculate, see Figure 8.1.1.

Earlier the rural development emphasized agricultural development. Today rural conditions can be improved by balancing the interests of agriculture/forestry, transportation, environ-

- Improved rural conditions
- Increased market values for consolidated properties
- Improved ownership conditions
- Improved infrastructure e.g. road network
- Accurate property registers and cadastral index maps
- Increased employment, activities and tax revenues
- Problems with supervision of the management of farms

ment, recreation, cultural heritage and tourism. In some Land Consolidation projects the environment issue was important because some rather large forest areas were considered very valuable and should be preserved. In several cases it was possible to establish such preserved areas with an integrated approach. Also the

Figure 8.1.1. Non-measurable benefits of Land Consolidation

cultural heritage nearby twelve valuable chalets could be preserved as joint properties inside and around the building areas in the chalets. The chalets as such were also attractive recreational and tourist areas that could be established by Land Consolidation.

In most Land Consolidation projects where it is a need to preserve valuable forest areas it has been possible to establish protected properties owned by the government. Some protected sites have an area of several thousand hectares. That would have been very difficult and expensive if Land Consolidation had not been implemented.

8.2. Increased market values for consolidated forest properties

Consolidated forest properties are much more demanded compared to fragmented forest properties. This statement is confirmed by the actors on the property market. The value of a forest property is constituted not only by the effect on the yield value by the Land Consolidation but also by the competition between the buyers of well consolidated properties. One circumstance that speaks for that the market value is higher than the yield value calculated in the usual way with a discounting at a real rate of interest of 3 % is also confirmed by the broad opinion in favour of the Land Consolidation.

8.3. Improvement of ownership

In section 3 in this paper the problems of complex ownership was highlighted for Mrs Arkeberg. Her ownership situation after Land Consolidation can be seen in Figure 8.3.1.

- Area 61 hectares (36 hectares her own prop. and 25 hectares in 2 joint properties)
- Allocated in 1 village
- 100 % ownership in 1 real property
- Shares in 2 joint properties (hunting and common use)
- Parcels (2 her own and 24 in joint properties)

Figure 8.3.1 Situation for Mrs Arkeberg after Land Consolidation

The improved situation for Mrs. Arkeberg is outstanding. Now she do not need to ask any co-owner regarding the management of her property e.g. timber sales, silvicultural measures. There will be no decision delays because Mrs Arkeberg has the sovereign decision capacity. Neither does Mrs Arkeberg need to ask a neighbouring landowner's permission to cross his property because her new consolidated property has direct access to a good truck road. The size and design of her forest parcel matches the demands of forestry today and she will be well paid for her timber. The length of the boundaries is less than 2 % of the length before Land Consolidation.

In this context another serious drawback of co-ownership should be noticed. If a co-owner is not satisfied with the management of a property then he/she is entitled to apply to the district court to appoint a trustworthy person to sell the property at a public auction. In such a case the person who gives the highest bid will buy the property. Therefore this possibility is a threat for landowners involved in co-ownership of real properties to lose their ownership. However, under certain circumstances such an auction is not allowed if it is possible to partition the property into shares for all co-owners. This exception is quite common during the implementation of Land Consolidation projects in Dalarna where co-ownership exists frequently. Problems with co-ownership and disputes among the co-owners are anyway very common and therefore most landowners want to own a real property by him/herself and get away from problems with co-owners.

8.4. Improved infrastructure

The road network in fragmented forest areas is normally insufficient and many parcels do not have access to truck roads. In the biggest Land Consolidation in Dalarna approximately 180 kms new truck roads were constructed and after Land Consolidation almost 100 % of the new parcels had access to truck roads. A complete road network increases the availability for the properties which facilitates the management and supervision of the properties but it also gives possibilities to a better prize for the timber. The costs for the reforestation will also decrease.

8.5. Accurate property registers and cadastral index maps

In fragmented forest areas the quality of information in property registers and accuracy in property index maps is inferior. Sometimes this inferior quality causes serious economic problems – losses for one landowner and profits for the neighbour, when timber has been cut on the wrong property. Under such circumstances it is not surprising that conflicts between neighbours appear. After Land Consolidation there is correct information in the property registers and the property index maps are extremely accurate. As a result there are no more conflicts and court trials.

8.6. Increased employment, activities and tax revenues

In section 2 has been mentioned that in fragmented forest areas employment, activities in forestry and tax revenues are retained. After the conclusion of a Land Consolidation project the possibilities for employment for the local people increase considerably as well as the activities e.g. logging and silvicultural measures. Under such circumstances the livelihood for the local population will be more sustainable and prosperous. It should also be underlined that the tax revenues after a Land Consolidation project increase considerably.

8.7. Improved supervision of the management of farms

To a forest owner with hundreds of parcels among which many are owned together with other persons the management and supervision of the parcels are very difficult because he does not know the location of all the parcels and their boundaries. After Land Consolidation the same landowner will get only one or two well shaped parcels with clear boundaries with access to a truck road.

8.8. Adequate income taxation of forest properties

In fragmented areas the taxation authority could hardly carry out its taxation duty very well – the authority did not have enough knowledge regarding the basic facts for a correct taxation. After concluded Land Consolidation projects we have seen that the tax revenues increase because of more accurate facts regarding the size and yield of the real properties and correct information about the landowner

9. IS LAND CONSOLIDATION A PROFITABLE INVESTMENT OR NOT?

After the description in section 3 and 4 it is obvious that Land Consolidation in the fragmented forest areas in Dalarna is a very profitable investment from both the viewpoint of society and the landowner. Some professional stakeholders consider that the pay-off time is very short for an investment in a Land Consolidation, normally less than three years. The non-measurable benefits have still not been considered.

10. ATTITUDE AMONG PARTICIPATING LANDOWNERS IN LAND CONSOLIDATION PROJECTS

In the previous sections it has been stated that Land Consolidation is very profitable from a landowner's point of view. Land Consolidation will however result in great changes for the landowners which might in several cases affect their attitude regarding Land Consolidation. The Swedish Property Formation Act requires that the opinion condition is fulfilled, which means that the resistance against Land Consolidation must not be too strong. The attitude among the landowners is therefore very important in a Land Consolidation procedure and is decisive for a successful procedure. Otherwise the project has to be cancelled. Normally the attitude against Land Consolidation is stronger during the early stages of the procedure because the landowners do not know what will happen to their properties. Stakeholders, either in favour or against Land Consolidation, play a very important role for influencing the public opinion. Therefore the Swedish experiences regarding the attitude issue should be discussed in this paper.

During the period 1972 – 2009 only one Land Consolidation project has been cancelled although the compulsory rules in the Property Formation Act has been used. According to our experience it is obvious that participants in Land Consolidation projects during the later stages in the procedure become very satisfied with the re-allotment plan and the compensation order. This has been accomplished by strong mediation and negotiation efforts. After conclusion of a project those landowners who are not satisfied with some orders have the opportunity to appeal to court. The number of appeals to court is however very low and the number of appeals mainly against re-allotment plan and compensation order is an indication of the satisfaction among the landowners. The frequency of appeals has been studied for Land Consolidation projects which were concluded during the period 1975 – 2007. These projects concerned approximately 10 500 landowners but only 33 landowners or 0,3 % appealed to court. During the trials only 20 % of the appeals were approved concerning 7 landowners. We therefore conclude that a very great majority is satisfied with Land Consolidation and do not think that the use of the compulsory rules is a threat. In areas with high fragmentation in Sweden we do not hesitate to apply the compulsory rules in our Property Formation Act.

11. CONCLUDING REMARKS

In a number of countries, especially the east European countries, there is an urgent need of Land Reforms because of the very high Land Fragmentation. From an economical point of view the benefits of a Land Consolidation are so obvious that a Land Reform should be implemented as soon as possible. Because Land Fragmentation in several of these countries is worse than in Dalarna such an investment would be very profitable according to the Swedish experiences both from the viewpoint of society and the landowners. It is also my conviction that compulsory rules should be used to achieve very good results and satisfy the participating landowners. A Land Reform in such countries is therefore an important challenge both for the politicians, who are the decision makers and the stakeholders.

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BIOGRAPHICAL NOTES



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