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Agricultural impacts and profitability of land consolidations

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ABSTRACT

The study evaluates agricultural impacts and profitability of land consolidations. The study analyses how land consolidations improve the property structure and how much it reduces the farming costs. The study also calculates whether the ensuing benefits exceed the costs incurred. The study material included 12 land consolidation projects that were implemented in Finland. Standard statistical methods, production cost calculations and feasibility analyses were used to analyze the material. Overall the study showed that land consolidation is an effective and feasible land management tool for the improvement of property structure. The average production costs were discovered to decrease 15% due to the significant improvement of property structure.

1. Introduction

The aim of the rural policy in Finland is to ensure a viable and functioning countryside. The rural policy in Finland calls for strengthening the operational requirements for primary production in rural areas and ensuring that the viability of rural areas develops in a manner that attracts a next generations and retains a competition among alternative career opportunities. If the earnings of a farm is improved, either its incomes must be increased or production costs decreased. The farming subsidies concentrate mainly on the first option and land management strategies on the latter. (MAF, 2007; Hiironen et al., 2010).

The existence of fragmented landholdings can be a major obstacle to the viability of agriculture because it hinders agricultural mechanization, causes inefficiencies in production, and involves large cost to alleviate its effects (Najafi, 2003; Thomas, 2006b; Thapa, 2007; Tan et al., 2008). Scattered property structure is regarded as an important feature of less developed agricultural systems (Van Hung et al., 2007; Hristov, 2009). Therefore numerous land consolidation and land reform policies have been implemented to reduce fragmentation in most European countries (Sabates-Wheeler, 2002; Vitikainen, 2004; Sundqvist and Andersson, 2006). Formal and regulated land consolidation and land reform policies have been implemented in Finland, for example, for more than 500 years (Vitikainen, 2003).

Fragmentation of land holdings can have several meanings depending on the context involved. The fragmentation in Finland can be described as geographical dispersion of small land plots where as in Sweden land fragmentation is mainly a problem of land tenure (co-ownership). Various factors are responsible for land fragmentation. Fragmentation can happen rapidly (e.g. through land reforms) or slowly (e.g. through inheritance of land). Worldwide, there are several types of land management tools that are fixed to solve problems related to fragmentation. Land consolidation activities depend especially on the legal framework and the objectives of the land consolidation. The Food and Agriculture Organization of the United Nations (FAO) divides land consolidations into four main categories; virtual, market based, voluntary and comprehensive land consolidation. (FAO, 2003) Traditionally, the Western European countries have seen the land consolidation procedure as a mean to improve the production and working conditions in agriculture and forestry as well as to promote the general use of land and the development of rural areas by re-arrangement of agricultural land (Thomas, 2006a). The Finnish land consolidation can be categorized under comprehensive land consolidations in which land consolidation is a sovereign compulsory tool and based on a special law. According to FAO (2003) comprehensive land consolidation includes the re-allocation of parcels together with a broad range of other measures to promote rural development. Examples of such activities include village renewal, rehabilitation of irrigation and drainage systems and environmental protection.

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Table 1
Farm and property structure in the studied land consolidations.

Name of the Land Consolidation Project	Total Field Area (ha)	Farm Structure (line of production)			Parcel Structure		
		Cattle (%)	Vegetable (%)	Grain (%)	Average parcel size (ha)	Average distance (km)	Number of parcels
Järilä	720	2	43	55	1,82	2,80	396
Repuli	780	40	14	46	1,89	8,04	413
Puskankylä	1218	22	16	62	2,64	2,59	461
Alajoki	1794	15	9	76	2,62	6,95	685
Jaurinneva	813	19	4	77	2,94	2,55	276
Yli-Kannus	735	95	2	3	3,00	2,44	245
Kääntä-Hihnaperä	982	43	12	45	1,81	2,50	542
Kuurola	804	26	15	56	2,76	4,56	291
Hillilä	630	56	39	5	2,50	1,80	252
Raudaskylä	687	68	3	29	2,08	3,26	331
Parras	1221	18	37	45	3,86	2,85	316
Ala-ja Väliviirre	1296	66	24	10	2,35	2,32	551
Averages	973	39	18	42	2,52	3,56	397

Table 2
Financial information of the studied land consolidations.

Name of the Land Consolidation Project	Financial Information		
	Date of Financial Application (month/year)	Procedure Costs (€)	Capital Improvement Costs (€)
Repuli	5/2005	251.800	184.900
Puskankylä	5/2005	379.500	209.300
Alajoki	6/2005	504.000	430.000
Jaurinneva	8/2005	238.500	207.200
Yli-Kannus	8/2006	292.000	162.000
Kääntä-Hihnaperä	1/2007	441.000	75.000
Kuurola	6/2007	201.000	150.000
Hillilä	5/2008	237.000	71.440
Raudaskylä	572008	382.500	398.000
Parras	12/2008	571.500	100.500
Ala-ja Väliviirre	5/2009	506.800	268.200

Table 3
Cultivation costs (€/ha/year) in a function of parcel size in different production lines (Hiironen, 2012, p. 113, 116; NLS, 2012).

Production line	Parcel size (ha)								
	0,5	1	1,5	2	2,5	5	10	20	30
Cattle farm	383	325	300	289	280	260	248	239	236
Vegetable farm	1082	920	849	816	791	736	700	675	666
Grain farm	732	622	574	552	535	497	473	457	450

Table 4
Travelling costs (€/ha/year) for a cattle farm in a function of distance (between farm compound and land parcel) and parcel size (Hiironen, 2012, p. 120; NLS, 2012).

Distance (min)	Parcel size (ha)									
	0,5	1,0	1,5	2,0	2,5	3,0	5,0	10,0	20,0	30,0
1	24	14	11	10	9	8	7	7	6	6
2	47	29	22	19	17	16	15	13	13	13
3	71	43	34	29	26	24	22	20	19	19
4	94	58	45	39	34	33	29	27	26	26
5	118	72	56	48	43	41	37	34	32	32
6	141	86	67	58	52	49	44	40	39	38
7	165	101	78	68	60	57	51	47	45	45
8	188	115	90	78	69	65	59	54	52	51
9	212	129	101	87	78	73	66	61	58	58
10	235	144	112	97	86	81	73	67	65	64
15	353	216	168	145	129	122	110	101	97	96
20	470	288	224	194	172	163	147	135	129	128
30	706	431	336	291	258	244	220	202	194	192
40	941	575	448	388	344	326	293	269	258	256
60	1411	863	671	582	517	488	440	404	387	384

Finnish land consolidations are performed in agricultural areas since it is stated in recent land consolidation strategies (MAF, 2007; NLS, 2007) that resources shall be focused on improving the feasibility of farms. Land consolidations are performed in areas where the property structure is scattered and improvement possibilities are good. This has meant that almost every land consolidation area locates in the western part of Finland where there are wide field areas and a lot of farmers. Other measures typical for comprehensive land consolidation (e.g. environmental protection, village renewal, see FAO, 2003) are missing from the Finnish practices.

In Finland, the main objective of land consolidation is to improve the property structure and reduce farms' production costs (HE