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Changes of agricultural producers in Estonia according to the size of land use

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Abstract. The purpose of this paper is to give an overview of the changes in Estonian agricultural producers according to the size of the land use. Data from the Estonian Agricultural Registers and Information Board (ARIB) data from 2011 and 2016 is used. This data shows that agricultural land use area per producer has increased and most of the agricultural land is used by agricultural producers in size groups 400–< 1,000 ha and > 1,000 ha. This means that a small number of agricultural producers are using a large area of agricultural land. For example, in 2016, the largest agricultural producer was using 27% of agricultural land located in Türi municipality. The outcome of the study shows a trend of farm size growth in Estonia; there is a need to find out if this model of agricultural production guarantees us food and a future of sustainability.

Key words: agricultural producer, Estonia, land use, sustainable agriculture.

INTRODUCTION

Motivation

It is estimated that by 2050 another 2.5 billion people will be added to the current population of 7 billion (United Nations, n.d.; GIZ, 2012). This means that there is also a growing need for food and feed, which puts more pressure on agricultural production (Põldaru et al., 2018). Hence there has been a long ongoing debate on the effect of farm size on productivity. Are the family farms the ones that will lead us to a future of sustainable agriculture while feeding the population, or should we rely on large corporate agricultural businesses or mega-farms? What kind of balance should there be between them?

Agriculture is a significant user of natural resources (Bruinsma, 2003), although in different ways and to different extents depending on the farming system. Farming is also a major source of greenhouse gases, and as the world's greenhouse gas levels continue to rise, climate change is occurring much faster than anticipated (United Nations, 2019).

The number of people suffering from hunger has been on the rise since 2014 (Bruinsma, 2003; United Nations, 2019). To ensure that future agricultural production guarantees food security for the world's growing population, we need productive yet sustainable agriculture. Which agricultural model is best for sustainable growth in agricultural production? Opinions differ; some sources (Sheng & Chancellor, 2018; Rada & Fuglie, 2019; Ren et al., 2019) support intensive, industry-based production

models; others (Monbiot et al., 2018; Ricciardi et al., 2018; Glenn et al., 2019) are in favour of farming based on smallholders. Some studies show that small family farms are more diversified than large ones, but they are also less likely to conserve structural elements, they leave a higher share of their soils bare during winter, and use more of their fields for monoculture (Wuepper et al., 2020). The Sustainable Development Goals report (United Nations, 2019) states that small-scale food producers are a big part of the solution to world hunger. For example, in the European Union, 50% of farms are smaller than 2 hectares but operate on only about 2.4% of agricultural land (Graeub et al., 2016; Lowder et al., 2016). The share of agricultural land controlled by larger farms is higher in countries with larger average incomes (Lowder et al., 2016).

In many parts of the world, there is an ongoing process of farm size growth (Viira, 2014; Põder, 2017; Hubert, 2018; Sheng & Chancellor, 2018). While the number of farms is decreasing, the average area of agricultural land use per farm is growing (Sheng & Chancellor, 2018; Wuepper et al., 2020). Mega-farms of up to 500,000 hectares appear in the countries of the former Soviet Union, Latin America, North America, Australia, and even Central Europe (IAMO, 2017). Large-scale agricultural producers are evolving because of the abundance of land resources in some parts of the world. Improved access to outside capital is one reason why large size farms attract investors that do not have experience in primary agriculture (Constantin et al., 2017). It is also believed that given the introduction of modern production technologies, large farms can achieve the expected returns much faster than small ones. Some studies (Ren et al., 2019) show that large-scale farming has no direct negative impact on the environment and lead to a positive environmental impact.

However, the question of whether large-scale farming is more efficient and profitable than the small or medium-size farms, remains. It is believed that small ones are diversified and contribute more to environmental sustainability, preservation of traditional values, and economic resilience than large farms (Graeub et al., 2016; van der Sluis et al., 2016; Rada & Fuglie, 2019). It is known that the smallest two farm size classes (0–1 ha and 1–2 ha) are the most significant contributors to global food production compared to all other classes (Graeub et al., 2016). Farms less than 2 ha produce 28–31% of total crop production and 30–34% of the global food supply (Ricciardi et al., 2018).

In the case of small farms, much of the labour comes from the household: family members are self-supervising, motivated to work with care, and flexible to accommodate the unpredictable timing of some farm operations (Llambí, 2010; Graeub et al., 2016). Large farms, on the other hand, often depend heavily on hired labour that needs to be recruited and supervised, thereby raising transaction costs and, thus, the implicit cost of labour (Llambí, 2010). Agriculture is the single largest employer in the world, providing livelihoods for 40% of today's global population (United Nations, n.d.) and small farms typically apply more labour per land unit than larger farms (Llambí, 2010; Rada & Fuglie, 2019). Thus, it is essential to maintain small farms (Constantin et al., 2017; Dell'Angelo et al., 2017) to support the livelihoods of rural populations.

By number, there are more than 570 million farms in the world; more than 475 million farms are smaller than 2 ha, and more than 500 million are family farms (Lowder et al., 2016). Accordingly, investing in small farms is a crucial way to increase food security and nutrition for the poorest, as well as food production for local and global markets.

The ongoing debate on the effect of farm size on productivity remains; however, the structural adjustment has seen resources shift from smaller and less productive farms to the larger ones. This, in turn, raises the question: is the large-scale model for agricultural production sustainable?

In 2015, countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals. Of these 17 goals, three are linked directly to agriculture and its sustainability. Goal 2 leads our attention to people suffering from hunger; this number has been on the rise since 2014. The purpose of this goal is to end hunger, achieve security and improved nutrition, and to promote sustainable agriculture. The United Nations, 2019 report on sustainable development goals states that special attention needs to be given to increasing the agricultural productivity and incomes of small-scale food producers. Small-scale food producers are a big part of the solution to world hunger.

The purpose of goal 13 is to take urgent action to combat climate change and its impacts. The purpose of goal 15 is to protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and to halt and reverse land degradation and halt biodiversity loss. One of the primary drivers of biodiversity loss is habitat loss from unsustainable agriculture.

Therefore, it is essential to determine what is sustainable agriculture. Does this model include small-scale or large-scale farms or both, and in what proportions? To do so, there is a need to map the present situation. Therefore the purpose of this paper is to give an overview of the changes in Estonian agricultural producers according to the size of the land use. The paper is organized as follows: first, to clarify the changes that have taken place in Estonian agriculture, we present a historical overview based on literature and document analysis; second, an introduction of data and method used; third, presentation of the results of the case study of Estonia according to data from ARIB; fourth, discussion of the results and conclusions are given.

Historical overview of changes in Estonian agriculture

Agriculture in Estonia has been through significant structural changes. From 1919 till today, there have been five major land reforms, each influencing Estonian agriculture. After the independence of Estonia in 1918, an extensive area of agricultural land was owned and used by large farms (owned mostly by Baltic Germans) (Grubbström, 2011; Grubbström & Sooväli-Sepping, 2012; Jürgenson, 2017). At the same time, the peasants had a strong desire for land ownership. These circumstances created a suitable environment for the 1919 land reform, the purpose of which was to create more landowners (Grubbström, 2011; Jürgenson, 2016). As a result, there evolved more than 40,000 landowners, while more than 20,000 land users were in the process of acquiring land (Rosenberg, 2019). The average area of one farm was 23 ha (Rosenberg, 2019). The number of small farms rose more than two times; however, the reform also created some bottlenecks. For example, there emerged many tiny and economically not-profit farms, and there were no longer enough workers in large farms (Jürgenson, 2017; Rosenberg, 2019).

In 1940 the Soviet Union occupied Estonia and started new land reform. Private ownership was abolished, and the land was included in state property (Grubbström, 2011; Jürgenson, 2016, 2017). The previous landowner became a land user, and the ceiling of the land-use area was supposed to be 30 ha (Jürgenson, 2017; Rosenberg,

2019). The area of state land fund was over 758,000 ha (Rosenberg, 2019). The outcome was that successful farms were weakened, and lots of small, economically not efficient farms were created. These were steps towards later agricultural collectivization.

In 1941 Germany occupied Estonia, and reform made by the Soviet Union was cancelled. The land was partly returned to the use of its earlier/rightful owners; however, the state still owned the land. Three years later, the Soviet Union occupied Estonia again and picked up with its land reform where it left off. All changes made during the German occupation were cancelled (Jürgenson, 2017). This time land reform comprised 42,274 landowners and equitable owners and 972,000 ha of land (Rosenberg, 2019). By this time, there were only 136,000 farms left in ESSR and living conditions in rural areas were getting worse (Rosenberg, 2019). The next step was compulsory collectivization, resulting in the creation of large collective farms and the disappearance of small farms.

In the Soviet Union planned economy, there was only one suitable form of agriculture: state farms - kolkhozes and sovkhozes (Jürgenson, 2017; Põder, 2017). Because of that, the number of people living in rural areas and working in agriculture shrank quickly. A further result was the shrinking number of villages and peripheries that arose.

There was a large shortage in the peoples' food supply and it didn't get any better. In the middle of 1980, the Soviet regime decided to allow family farms, small co-operatives and by the year 1986, there were 206 collective farms in Estonia (Jürgenson, 2017; Rosenberg, 2019). Socialistic agriculture was in a jam, and one way to snap out of it was seen in establishing rental farms in the peripheries. A bit later, talk about proper farms and self-sufficiency were put on the table. By the end of 1988, there were about 100 farms in Estonia; only a year later, at the end of 1989, there were over 1,000 farms (Rosenberg, 2019).

The demise of the large socialistic farms had started already in December 1989. A single farm of up to 50 ha was permitted (Rosenberg, 2019). After the regaining of Estonian independence in 1991, restitution of farmlands based on the pre-Second World War ownership and privatisation of collective farms took place (Grubbström, 2011; Grubbström & Sooväli-Sepping, 2012; Viira, 2014; Jürgenson, 2017; Põder, 2017). The land reform law and then the agriculture reform law both favoured agriculture based on small farms (Kasepalu, 1991; Lillak, 2003; van Dijk, 2007; Põder, 2017). In the first ten years of regaining independence, the number of farms in Estonia increased from 7.4 thousand in 1991 to 55.7 thousand in 2001 (Viira, 2014). Many small agricultural users arose (Viira, 2014; Põder, 2017) but in the following years this number decreased (Grubbström & Sooväli-Sepping, 2012; OECD, 2018; Jürgenson & Rasva, 2020).

Today, small-scale farms are family farms that were established due to the restitution of land, the disintegration of former collective farms, or the expansion of household plots (Viira, 2014; Jürgenson, 2017). Large-scale producers are mostly corporate or co-operative farms, with a few exceptions in individual farms that have grown and will continue to expand (Viira, 2014). Although the number of agricultural holdings has decreased, the number of final consumers of their production is steadily increasing – there are 7.5 billion inhabitants in the world, and they all need food (Viira, 2014).

DATA AND METHODS

To introduce a more detailed overview of the recent changes in the pattern of agricultural landholdings in Estonia, ARIB[2] Field Register data from 2011 and 2016 is used. The Field Register is one of three registers in charge of ARIB, and area support is one of the subsidies that ARIB delivers. The digitalised database of agricultural plots is required for payment of area supports from the budget of the EU. In the process of delivering national and EU subsidies, ARIB collects information about the applicant (every applicant receives an ID number) and land that is filed for area support.

ARIB data about the agricultural land area and the number of producers were analysed to get an overview of changes in Estonian agricultural land users' land holdings in 2011 and 2016. Agricultural land users and land area per producer were summarized using GIS software ArcGIS for Desktop 10.4. As information about the producers' location was also included, it gave us information seen in Figs 2 and 3.

Using GIS software, producers were divided into six groups according to the size of their landholdings: 0–< 2 ha, 2–< 40 ha, 40–< 100 ha, 100–< 400 ha, 400–< 1,000 ha and >1,000 ha; data was taken on the basis of these size groups. The basis for this division comes from Farm Accountancy Data Network[3] (FADN), where the agricultural land area is divided into four size groups (0–< 40 ha, 40–< 100 ha, 100–< 400 ha, > 400 ha). To get a closer look at the smallest agricultural land users, FADN size group 0–< 40 ha was divided into size groups 0–< 2 ha and 2–< 40 ha. FADN size group > 400 ha was divided into size groups 400–< 1,000 ha and > 1,000 ha to characterise the largest agricultural land users. These size groups are presented in Tables 2 and 3. More detailed information about three producers are presented in Figs 4 and 5.

Figure 1. Location of Estonia (study area) in Europe and its administrative division (Jürgenson & Rasva, 2020).

There are currently 15 counties in Estonia, according to its administrative division (Fig. 1). This study is based on the division that existed before 01.01.2018. After administrative-territorial reform, the division was revised, and with it, the borders of counties also altered to some extent. The administrative division that existed before

[2] ARIB is responsible for the delivery of national and EU subsidies for agricultural activities.

[3] https://maainfo.ee/index.php?page=9&

01.01.2018 is used because the data from other sources precede the administrative-territorial reform as well.

Information about those 15 counties with their name, area (ha), agricultural land use area (ha) in 2016 and 2011 and the number of land users in 2011 and 2016 is presented in Table 1.

Table 1. Data concerning area (ha), agricultural land use area and the number of agricultural land users of the 15 counties in Estonia

County	Area (ha)[1]	Agricultural land use area (ha)		The number of agricultural land users	
		2016	2011	2016	2011
Harjumaa	432,669	71,098	61,417	1,232	1,023
Hiiumaa	103,244	13,957	12,188	364	352
Ida-Virumaa	297,158	36,384	31,028	570	606
Jõgevamaa	254,486	74,817	69,268	1,029	1,117
Järvamaa	267,415	80,544	76,776	785	785
Läänemaa	181,558	52,117	43,052	852	809
Lääne-Virumaa	369,572	109,356	101,711	1,129	1,133
Põlvamaa	182,335	53,310	48,377	1,102	1,212
Pärnumaa	541,873	85,783	78,622	1,535	1,556
Raplamaa	276,506	69,520	64,911	1,129	1,204
Saaremaa	293,765	53,637	46,822	1,200	1,116
Tartumaa	334,931	84,071	75,921	1,248	1,380
Valgamaa	191,709	45,265	41,333	1,144	1,220
Viljandimaa	342,003	85,601	77,829	1,156	1,254
Võrumaa	277,314	52,358	47,781	1,794	2,038
Estonia	4,346,538	967,816	877,036	15,456	16,226

[1] County area (ha) before 01.01.2018.

This study concentrates on agricultural land users' land holdings that cover all plots which are used for agricultural production in Estonia. No distinction is made between land in ownership and leasehold land. Also, no differentiation was made between different production groups.

RESULTS

According to ARIB data, agricultural land use area in Estonia has grown 11% between 2011 and 2016; the growth has taken place in all counties (Fig. 2). The largest growth of agricultural land use is in Läänemaa county (21%) and the smallest in the county of Järvamaa (5%).

The number of land users between 2011 and 2016 (Fig. 3) has dropped in nine counties (Ida-Viru, Jõgeva, Põlva, Pärnu, Rapla, Tartu, Valga, Viljandi, and Võru), representing a 5% drop. The number of land users has increased in four counties (Harju, Hiiu, Lääne, and Saare) and it is almost same in two counties (Järva and Lääne-Viru). The most significant drop in the number of agricultural land users took place in the county of Võrumaa (-12%); the largest increase in the number of agricultural land users took place in the county of Harjumaa (17%).

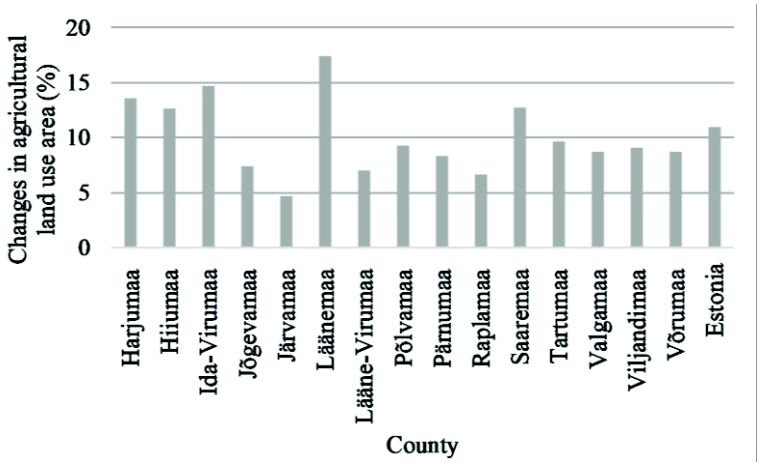

Figure 2. Changes (%) in agricultural land use area in counties between 2011 and 2016 (ARIB).

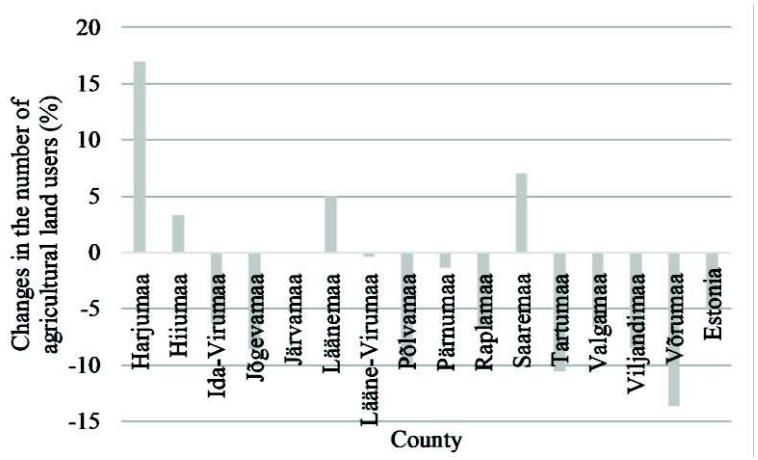

Figure 3. Changes (%) in the number of agricultural land users in counties between 2011 and 2016 (ARIB).

The majority of the producers in counties are in size group 2–< 40 ha (Table 2). The number of producers in size group 2–< 40 ha is the largest (1,338) in Võru county and smallest (249) in Hiiu county. The number of producers using land in size group >1,000 ha is the smallest in every county. The largest number (25) of producers in size group >1,000 ha is in Järva county. In Hiiu county, there are no producers using land over 1,000 ha. There are also very few producers in counties in size group 400–< 1,000 ha (in total 546). Producers division into size groups 0–< 2 ha, 40–< 100 ha and 100–< 400 ha is quite similar all over Estonia.

Table 2. Division of the agricultural users according to size groups in counties in 2016 (ARIB)

County	Number of agricultural land users in size groups					
	0–< 2	2–< 40	40–< 100	100–< 400	400–< 1,000	> 1,000
Harjumaa	79	845	119	129	47	14
Hiiumaa	33	249	43	32	7	0
Ida-Virumaa	52	375	52	63	21	8
Järvamaa	63	486	88	93	38	25
Jõgevamaa	92	691	93	97	39	23
Lääne-Virumaa	72	684	130	153	65	22
Läänemaa	48	568	91	105	34	8
Pärnumaa	115	1,058	152	152	44	13
Põlvamaa	153	691	104	111	44	11
Raplamaa	69	747	144	115	39	13
Saaremaa	110	850	121	93	18	8
Tartumaa	126	821	113	115	51	23
Valgamaa	81	831	104	87	30	11
Viljandimaa	80	766	125	124	43	19
Võrumaa	187	1,338	116	121	26	7
Estonia	1,360	11,000	1,595	1,590	546	205

The largest area of agricultural land is used by land users in size groups 400–< 1,000 ha (in total 237,671 ha) and 100–< 400 ha (in total 260,957 ha) (Table 3). In counties like Järva, Jõgeva, Viljandi, Lääne-Viru and Tartu, land users in size groups 400–< 1,000 ha and >1,000 ha are using over 50% of the agricultural land. Most of the agricultural land in Estonia is used by size groups 100–< 400 ha, 400–< 1,000 ha, and > 1,000 ha (in total 750,739 ha). A small part of the agricultural land in counties is used by those in size group 0–< 2 ha, 2–< 40 ha and 40–< 100 ha (in total 217,077 ha).

Table 3. Division of agricultural land use between the land users in different size groups in counties in 2016 (ARIB)

County	Agricultural land use area in size groups (ha)					
	0–< 2	2–< 40	40–< 100	100–< 400	400–< 1,000	> 1,000
Harjumaa	112	9,790	6,403	21,507	22,745	10,540
Hiiumaa	51	2,696	2,662	5,652	2,896	0
Ida-Virumaa	77	3,741	3,133	9,859	9,257	10,334
Järvamaa	93	6,343	4,766	15,127	11,727	43,377
Jõgevamaa	135	7,511	5,083	16,158	14,551	31,471
Lääne-Virumaa	106	8,115	8,143	27,074	32,361	32,827
Läänemaa	71	6,787	5,196	18,040	14,402	7,832
Pärnumaa	175	12,286	9,136	25,180	20,362	18,380
Põlvamaa	228	6,884	5,600	13,470	16,773	10,649
Raplamaa	103	9,433	9,069	19,201	15,938	15,658
Saaremaa	166	9,491	7,353	16,172	11,001	9,454
Tartumaa	185	8,397	6,616	19,331	25,488	23,995
Valgamaa	125	8,886	5,565	12,689	10,563	7,170
Viljandimaa	120	9,331	7,696	23,333	19,478	25,646
Võrumaa	279	12,266	6,671	18,165	10,131	4,783
Estonia	2,026	121,959	93,092	260,957	237,671	252,111

The area of land holdings varies a lot. For example, there were land holdings from 0.1 ha up to 5,756 ha in the year 2011. In 2011 the largest agricultural landholding was in the county of Järvamaa; it used 5,756 ha of land. The smallest was in the county of Harjumaa, and it used 0.1 ha of land. In 2016 the largest landholding was still the same as in 2011 and it used 5,523 ha land in the county of Järvamaa. In Tartumaa county, the smallest agricultural landholding was 0.3 ha in 2016; a different land holder used 0.1 ha of land in 2011. Land users with the smallest landholdings in 2011, and 2016 are self-employed workers, and the largest user is the corporate body.

The largest agricultural landholding area was 5,523 ha in 2016, situated in the county of Järvamaa (Fig. 4). The land plots where scattered over the Türi municipality. The area of these land plots formed 27% of the Türi municipality total land-use area registered in ARIB.

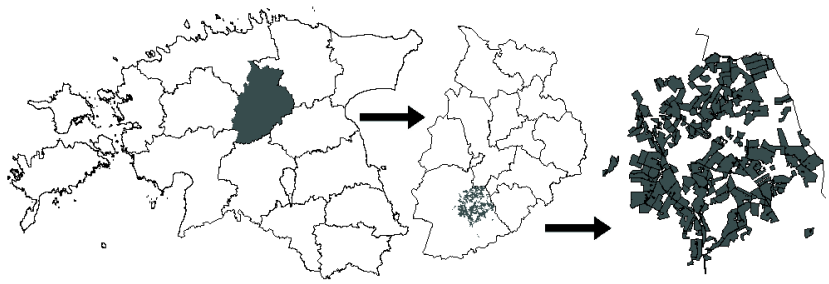

Figure 4. The location of the largest agricultural land user land plots in 2016 (ARIB).

While the largest land user in Estonia used land in only one municipality in 2016, some big producers used land throughout Estonia (Fig. 5). For example, land user ID 141094 used 1,341.37 ha of land, which was scattered over 147 plots. This user farmed land in eight different counties (Ida-Viru, Valga, Võru, Tartu, Viljandi, Põlva, Harju, and Lääne-Viru).

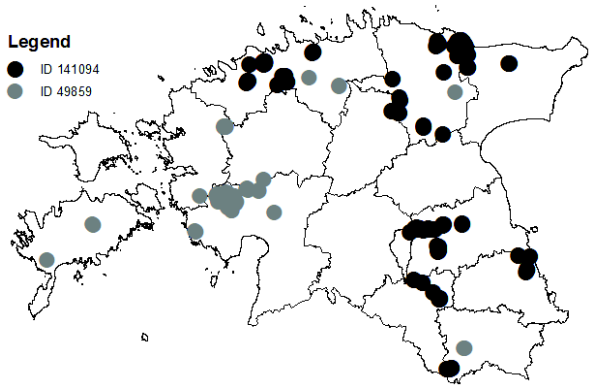

Figure 5. The location of two agricultural land user (ID 141094 and ID 49859) land plots in 2016 (ARIB).

Land user ID 49859 farmed 1,149.9 ha of land that was scattered over 90 plots. This user farmed land in six different counties (Pärnu, Saare, Võru, Harju, Lääne, and Lääne-Viru) and had land both on the island of Saaremaa and on continental Estonia.

DISCUSSION AND CONCLUSIONS

While our population is growing, there is also a growing need for food and feed, which puts more pressure on agricultural production. At the same time, agriculture is a significant user of natural resources and greenhouse gas producers (Bruinsma, 2003). As the world's greenhouse gas level continues to rise, it has brought up questions about sustainability in agriculture and its production. The long ongoing debate on which farm structure could lead us to a future of sustainable agriculture and feeds our growing population remains. Some studies (Ren et al., 2019) show that farm size has a substantial influence on agricultural sustainability and supports the idea that large-scale farming has no direct negative impact on the environment. Are family farms the ones that lead us to the future of sustainable agriculture and feed the population, or should we rely on large corporate agricultural businesses or mega-farms? Additional and broader research is needed to formulate a direct answer to this question. In this paper, we aimed to provide ground for further discussions and studies.

As in many parts of the world, Estonia is in an ongoing process of farm size growth. The number of agricultural producers is decreasing, while the average area of agricultural land use per producer is increasing in size (Jürgenson & Rasva, 2020). The increasing competition among farmers has resulted in small and uncompetitive farmers being forced to end their activities; some are not able to find a successor after retirement (Beckers et al., 2018). According to ARIB data, agricultural land area in Estonia has grown 11% between 2011 and 2016, but the number of agricultural producers has dropped 5% in the same period. It shows that agricultural land use area per user has increased. According to OECD 2018 report, one reason is that CAP single area payments encouraged people to reclaim abandoned agricultural land.

From its history, we can see that Estonia has been through significant structural changes that have influenced the country's agriculture. Through different occupation periods and simultaneous reforms, Estonia has come to independence once again and has undertaken the most recent, still unfinished land reform. The land reform law and also the agriculture reform law both favoured agriculture based on small farms. At first, the number of farms in Estonia increased, and many small agricultural producers arose; however, as the years went by, this number has decreased and is still decreasing. According to ARIB data, the largest increase between 2011 and 2016 in the number of agricultural producers took place in Harjumaa (17%). At the same time, the land-use area grew there by 14%.

While the number of agricultural land users in Estonia has dropped, changes at the county level have been in different directions. As the number of land users dropped in nine counties, it increased in four counties and remained almost the same in two counties. The most significant drop in the number of agricultural land users took place in the county of Võrumaa (-12%), where the land area grew 10% at the same time. One possible reason for the change is Võrumaa's location in the southern part of Estonia, far from the capital.

Some studies (Beckers et al., 2018) indicate that farm size will continue to increase, with small farms disappearing. That structural shift to large, more effective agricultural producers is also seen in Estonia. The OECD report (2018) cited that farm consolidation in Estonia in the 2000s led to increase in average farm size and in the number of larger farms. However, analyses presented in this paper show that most producers in Estonian counties are in smaller size groups; most of the agricultural land is indeed used by agricultural producers in size groups 400–< 1,000 ha and >1,000 ha. In counties like Järva, Jõgeva, Viljandi, Lääne-Viru, and Tartu, these land users are using over 50% of the agricultural land. At the same time, the number of producers using land in these size groups is the smallest in every county. This indicates that a small group of agricultural producers is using a large area of agricultural land in Estonia. At the same time a small part of the agricultural land in counties is used by those in size group 0–< 2 ha, 2–< 40 ha and 40–< 100 ha; the number of agricultural land users in those small size groups is the biggest.

Some studies show that small agricultural producers are diversified and contribute more to environmental sustainability, preservation of traditional values, and economic resilience than large ones (Wuepper et al., 2020). It is also essential for rural livelihoods to maintain small farms because agriculture is the largest employer in the world, and small farms typically apply more labour per land unit than larger farms. However, still, today's structural adjustment in agriculture has seen resources shift from smaller and less productive farms to larger ones. This growth for survival will lead to larger farms, sometimes creating larger parcels, and this upscaling may lead to a decrease in landscape diversity and ecological value (Beckers et al., 2018). As in the case of Estonia, the largest agricultural producer in 2016 was using 27% of agricultural land located in the Türi municipality. While this user was using agricultural land within one municipality, some large agricultural producers are using land plots scattered throughout Estonia (some plots even on the island of Saaremaa).

History has shown us that from one point forward; large farms are no longer sustainable. As large state farms in the Soviet Union period collapsed, there is a need to think forward about what the future could hold for today's large agricultural producers. Future agricultural production must guarantee food security for the world's growing population. Productive yet sustainable agriculture is essential.

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