

## Article

# Agricultural Land Concentration in Estonia and Its Containment Possibilities

Marii Rasva and Evelin Jürgenson \* 

Forest and Land Management and Wood Processing Technologies, Institute of Forestry and Engineering, Estonian University of Life Sciences, 51006 Tartu, Estonia

\* Correspondence: evelin.jyrgenson@emu.ee

**Abstract:** Land is essential to livelihoods, so it is hard to overstate its strategic significance for well-being and prosperity. It has been detected that farm size greatly influences agricultural sustainability from the viewpoints of the economy, environment, and society. Land concentration is negatively affecting the development of rural communities. Similar to other European countries, Estonia is undergoing agricultural land concentration. One way to stop the further concentration of agricultural land is to set an upper limit to land acquisition (similar to that in Latvia and Lithuania). This paper aimed to determine what kind of regulations concerning agricultural land use and ownership Estonia needs to restrain land concentration. Four sources of data were used for this research: statistical data from Statistics Estonia, the data for the land holdings of agricultural producers from the Estonian Agricultural Registers and Information Board, data from the Land Registry and available literature. The outcome of the study confirmed that Estonia requires policy direction and regulations for the agricultural land market, that would help to lighten the impact of land concentration in rural areas in the long run, similar to several other European countries.



**Citation:** Rasva, M.; Jürgenson, E. Agricultural Land Concentration in Estonia and Its Containment Possibilities. *Land* **2022**, *11*, 2270. <https://doi.org/10.3390/land11122270>

Academic Editors: Kleomenis Kalogeropoulos, Andreas Tsatsaris, Nikolaos Stathopoulos, Demetrios E. Tsemelis, Nilanchal Patel and Xiao Huang

Received: 18 November 2022

Accepted: 9 December 2022

Published: 12 December 2022

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

**Keywords:** land concentration; sustainable land management; policy directions; acquisition of agricultural land

## 1. Introduction

Land is fundamental to prosperity and well-being and, due to this, it is hard to overstate its strategic importance for existence. Large-scale land acquisitions transform land use and food systems in targeted districts worldwide [1–6]. The outcome of these large-scale land acquisitions is that agricultural land becomes concentrated. It has been found that large-scale land purchases are causing socio-economic destruction. [7–11].

Agricultural land concentration is a topic of discussion in different countries, but particularly current in post-Soviet countries. Land concentration is an activity by which large agricultural concerns increasingly buy, or lease, land from other agricultural producers [12–15]. Supporting small farmers remains essential for food security and to combat rural poverty. This phenomenon has affected countries like Slovakia [16], Hungary [5], Romania [17], Poland [18] and many other countries. These countries all experienced major land reforms after the Soviet Union collapsed. In the process of land reform, a lot of land came onto the market and it was possible for buyers to purchase as much land as they wanted. The prices of land are still low in these countries, compared with other European Union countries.

The process of agricultural land concentration started decades ago but has recently accelerated. It has been detected that farm size greatly influences agricultural sustainability in economic, environmental, and social aspects [19]. Small agricultural producers are vanishing rapidly, and places of employment in rural areas are decreasing [20–24]. The rural living situation is worsened by job losses, poor social infrastructure, and the fact the younger generation is moving away from rural areas. The process of land concentration is

generally not reversible [25,26]. Land concentration is negatively affecting the development of rural communities. Small agricultural producers are vital for rural communities as they conserve rural cultural heritage and rural life. They enliven rural social life, produce valuable products, use natural resources sustainably and assure a range of landowners in rural regions [25,27–29]. Sustainable land use that ensures a fair and balanced distribution of land, water, biodiversity and other environmental resources between various competing claims, is necessary to secure human needs now and in the future [30].

Division of land ownership to cover a wide range is the foundation of the social market economy and social cohesion [31]. It also ensures job creation in rural areas, adds significant value to agricultural production, and is essential for ensuring peace in society. The future of the agricultural sector depends on a new generation of farmers. The will to innovate and invest in young people is vital for rural areas. The ageing of the agricultural sector can be stopped, and the continuity of rural life can be secured through this.

Estonia has undergone, over its history, considerable structural changes, affecting its agriculture. Through various streaks of occupation and simultaneous reforms, Estonia became independent in 1991 and launched the most recent, still incomplete, land reform. The laws of land reform, and agricultural reform, are inclined towards agriculture based on small farms. In the early years of the reforms, between 1993 and 2001, the number of farms in Estonia grew, and many small farms were involved [32]. However, over the period of 2001–2020, the number of small farms decreased and is continuing its downward trend.

Agricultural development is not favouring small-scale farming. The only choice for small- and medium-sized farms is to grow or go. If farms are not able to grow in size and acquire more land (move to larger sized farming groups), they are not able to survive. Larger and more competitive agricultural producers push small farmers out of business, and agricultural land becomes even further concentrated. Small farms struggle to survive in the existing market situation, where large producers have a clear advantage. Thus, the State should step in and regulate the agricultural land market so that small, medium and large producers can coexist and operate under similar conditions.

The agricultural land market cannot be regulated only by means of market principles because land genesis does not respond to prices in the same way as regular goods [33]. Several EU countries have laws with various objectives, from preserving agricultural land for agricultural use to curbing land concentration. Since 2013, Hungary, Slovakia, Latvia, Lithuania, Bulgaria, Romania and Poland have sanctioned land laws targeting unwanted developments in their land markets [34].

Agricultural land concentration can be a threat to soil use as well. Previous studies have shown that environmental damage from large-scale agricultural production includes the destruction of soil fertility, contamination of water sources, loss of biodiversity, and draining of wetlands [35,36]. Large-scale agricultural producers, whose primary purpose may be to earn as much profit as possible, might be the outcome of further agricultural land concentration. The cost of this kind of behaviour may result in severe and irreversible environmental damage and harm to the soil [17,35]. Industrialised agricultural producers are mainly interested in greater yields, which means soils are often harmed through more intensive agriculture. Healthy soils are vital to reverse biodiversity destruction, assure healthy food and guarantee everyday well-being. The European Union (EU) soil strategy for 2030 has a vision and objectives to achieve healthy soils by 2050 [37]. The EU soil strategy for 2030 supports the goals of the European Green Deal.

Besides the intensive use of agricultural land, there are several other environmental issues. One is the soil sealing that can happen through land use changes. Agricultural areas are replaced with development areas in the ongoing urban sprawl [38,39]. The consequences of this kind of land use change may be that agricultural land use becomes more complicated, as agricultural activities can disturb nearby land owners and users [40,41]. This situation emerges when there are no buffers between expanded urban areas and rural areas, or when people who are not farming move to rural areas [42]. Eventually, only a small number of agricultural producers survive near cities [43].

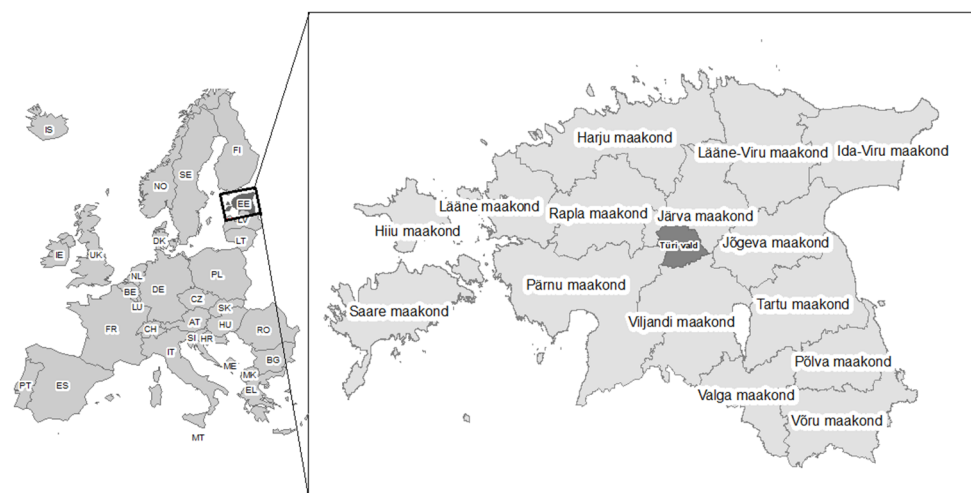
Agricultural land fragmentation is also not environmentally friendly, as farming is more expensive than it would be with compact land use. Extensive driving to get from one field to another field results in increased pollution [44–48]. Agricultural activity is complex and involves different aspects. Although land use changes and fragmentation are important topics it is not feasible to handle all the involved issues in one paper. Therefore, this study focused on agricultural land concentration and opportunities for restraining land concentration in Estonia. Similar to many other European countries, Estonia requires policy direction and regulations for the agricultural land market so as to relieve the influence of land concentration in rural areas for extended periods. This paper aimed to determine the kind of regulations, concerning agricultural land use and ownership, that Estonia needs to curb land concentration.

## 2. Materials and Methods

Four types of data sources were required for this research. Statistics Estonia was the resource for statistical data. The data on agricultural producers' land holdings were obtained from the Estonian Agricultural Registers and Information Board (ARIB). Land Registry data was used to analyse changes in land ownership of the 49 largest agricultural producers, according to 2020 ARIB data. Books, scientific papers, reports, acts of law, regulations and documents were researched.

Data from Statistics Estonia (PMS416, PMS422) was used to analyse changes in Estonian agricultural land use, including data on the number of agricultural households and agricultural land use area. This data was for the years 2001, 2003, 2005, 2007, 2010, 2013, 2016 and 2020.

To obtain an overview of changes in Estonian agricultural land users' land holdings, ARIB data for agricultural land area and number of farms in 2011 and 2020 were dissected. GIS software ArcGIS (version 10.4) was applied to summarise land users and land area per farm. Farms were divided into six groups according to the size of their land holdings: 0–<2 ha, 2–<40 ha, 40–<100 ha, 100–<400 ha, 400–<1000 ha and >1000 ha. This division (into six groups) was based on the method of the Farm Accountancy Data Network (FADN), in which agricultural land area is separated into four size groups (0–<40 ha, 40–<100 ha, 100–<400 ha, >400 ha). To obtain a better understanding of the smallest farmers, we divided the FADN size group 0–<40 ha into size groups of 0–<2 ha and 2–<40 ha. We divided FADN size group >400 ha into size groups of 400–<1000 and >1000 ha to define the largest agricultural producers. This means that two FADN size groups were changed for this study. Figure 1 presents the study area and its position in Europe.

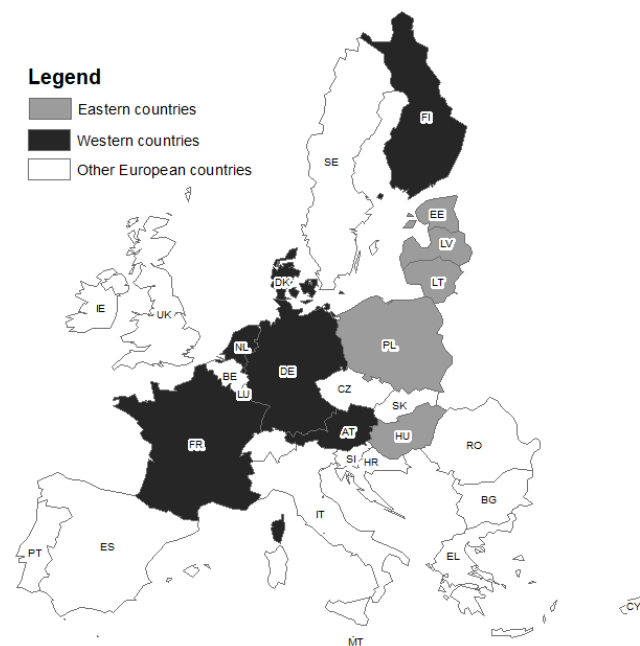


**Figure 1.** Position of Estonia (study area) in Europe.

Land Registry data were used to get an overview of land ownership changes among 49 land users. Land Registry data covered the years 2001, 2016 and 2021. In order to acquire data from the Land Registry, ARIB 2020 data was used to ascertain the 49 largest producers. After searching the ARIB 2020 data, an inquiry was sent to the Land Registry concerning the 49 largest agricultural producers.

The farmed land areas of the 49 largest agricultural land users were studied to compare land ownership and changes in land use area. Unfortunately, the earliest records from the ARIB concerning land use were only available from the year 2003. ARIB data from 2003, 2016 and 2021 were used to compare land ownership with land use in this study. Farms were grouped into six clusters according to the size of their land holdings: 0 ha, less than 100 ha, 101–200 ha, 201–400 ha, 401–1000 ha and more than 1000 ha. Data was applied based on these group sizes.

Available books, scientific papers, reports, acts of law, regulations and documents were studied to determine the restrictions EU countries have implemented to protect their agricultural land against concentration. Firstly, information from reports and scientific articles was used to find countries where such restrictions are implemented. Secondly, some legal acts (that were available online and in English) from these countries were studied to determine the exact regulations. Figure 2 illustrates the countries' division in the study regarding restrictions on agricultural land acquisitions.



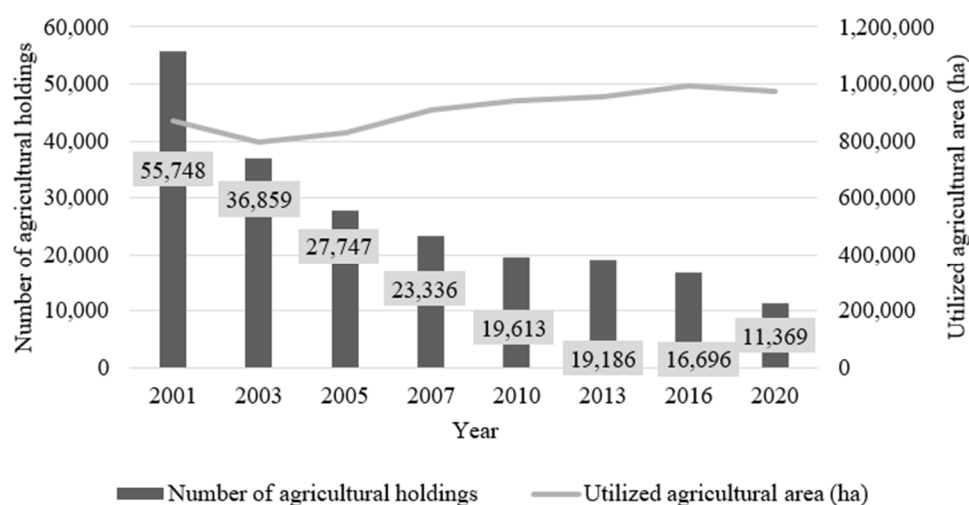
**Figure 2.** Division of the countries included in the study regarding restrictions on agricultural land acquisitions.

EU countries that were included in the study were divided into two groups. The first group included countries from the western part of the EU (Germany, The Netherlands, Denmark, France, Austria and Finland). The second group included post-Soviet EU countries (Estonia, Hungary, Poland, Latvia and Lithuania).

### 3. Results

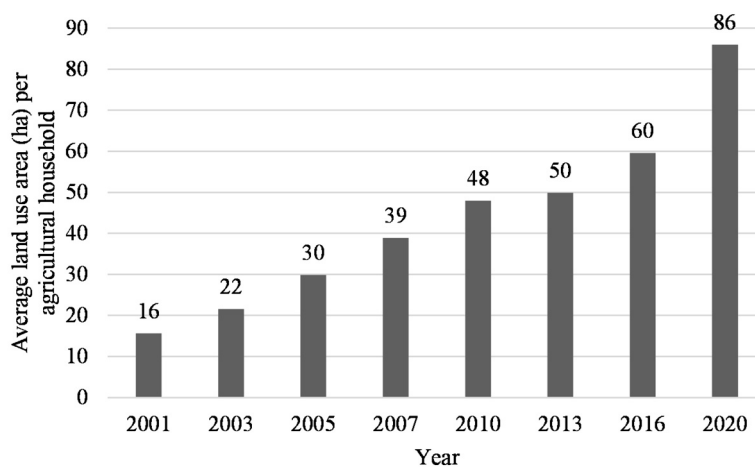
#### 3.1. Agricultural Land Use Changes in Estonia

The number of agricultural households has diminished year-to-year (Figure 3). In 2020, there were 11,369 farms in Estonia, a considerable decrease from that in 2001 when there were 55,748 farms in Estonia. Meanwhile, the agricultural land area has stayed nearly the same. The utilised agricultural land area was 871,213 ha and 975,323 ha in Estonia in 2001 and 2020, respectively (Figure 3).



**Figure 3.** The number of farms and area of agricultural land in Estonia between 2001 and 2020 (Statistics Estonia).

The average land use per farm in Estonia has grown due to the decrease in the number of farms and the almost consistent farming area (Figure 4). In 2001, the area of agricultural land use per farm was 16 ha. It had grown to 86 ha by 2020. The average agricultural land use area per farm grew from 2 to 26 ha per year.



**Figure 4.** Average utilised land per farm in Estonia between 2001 and 2020 (Statistics Estonia).

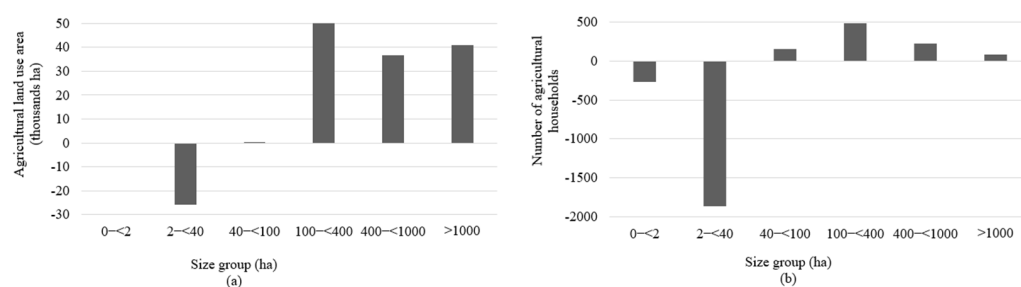
The number of farms in the three smallest land user groups (0–2 ha, 2–<40 ha and 40–<100 ha) diminished over the years 2011 to 2020. The number of farms in the three largest (100–<400 ha, 400–<1000 ha and >1000 ha) groups grew (Table 1).

An analysis of farmers, according to the six farm size groups showed that between 2011 and 2020, area farmed by land users in the size groups 100–<400 ha and >1000 ha increased the most. Meanwhile, the area farmed by land users in the size groups 0–<2 ha and 2–<40 ha diminished. The agricultural land area used by size group 40–<100 ha stayed almost similar for the period considered.

**Table 1.** Data for land user groups, according to the area of farms for the years 2011 and 2020 (ARIB).

Groups (ha)	2011			2020		
	Number	Area (ha)	Area (%)	Number	Area (ha)	Area (%)
<2	1475	2140	0	1211	1778	0
2–<40	11,654	132,888	15	9785	107,119	11
40–<100	1460	91,563	10	1615	91,578	9
100–<400	1174	225,708	26	1660	275,696	28
400–<1000	337	207,844	24	556	244,574	25
>1000	126	216,893	25	212	257,964	26
<b>Total</b>	<b>16,226</b>	<b>877,036</b>	<b>100</b>	<b>15,039</b>	<b>978,711</b>	<b>100</b>

There were 768 farmers in Estonia, with land holdings above 400 ha in 2020, who utilised 502,539 ha, or 51%, of the agricultural land. In 2011, 463 farmers with land holdings above 400 ha utilised 424,736 ha, or 48%, of the farmed area. The agricultural land area used by larger farms increased, while that used by smaller ones diminished (Figure 5a). The number of farms in size groups 0–<2 ha and 2–<40 ha diminished (Figure 5b).

**Figure 5.** (a) The difference in the area of agricultural land use, and (b) the difference in the number of farms in size groups between 2011 and 2020 (ARIB).

In 2011, 1475 farms in size group 0–<2 ha used 2139.72 ha of agricultural land. In size group 2–<40 ha, 11,654 farms used 132,888.41 ha. In 2020, there were 264 fewer farms in size group 0–<2 ha using 361.57 ha less land. In size group 2–<40 ha, there were 1869 fewer farms, using 25,769.19 ha less land than in 2011.

Farms in size groups 40–<100 ha, 100–<400 ha, 400–<1000 ha and >1000 ha increased in number. In 2011 in size group 400–<1000 ha, 337 farms used 207,843.80 ha of farmed land. In size group >1000 ha, 126 farms used 216,892.61 ha. By 2020, there were 219 more farms in size group 400–<1000 ha and 86 more in size group >1000 ha. The farmed area increased by 36,730.39 ha in size group 400–<1000 ha and by 41,071.78 ha in size group >1000 ha.

In 2020, there were 275 legal persons and 936 self-employed in size group 0–<2 ha (Figure 6). In size group 2–<40 ha there were 4203 legal persons and 5582 self-employed. The self-employed formed the majority in these two size groups. There were no self-employed in size groups 400–<1000 ha and >1000 ha. In size group 400–<1000 ha, there were 556 legal persons, and 212 in size group >1000 ha.

The number of farms in size group 0–<2 ha formed 8.1% of the total number of farms in Estonia (Figure 7a), utilising 0.2% of the total land area (Figure 7b) in 2020. The number of farms in size group 2–<40 ha accounted for 65.1% of all Estonian land users, using 10.9% of all agricultural land areas.



Figure 6. Percentage of legal entities and self-employed in size groups in 2020 (ARIB).

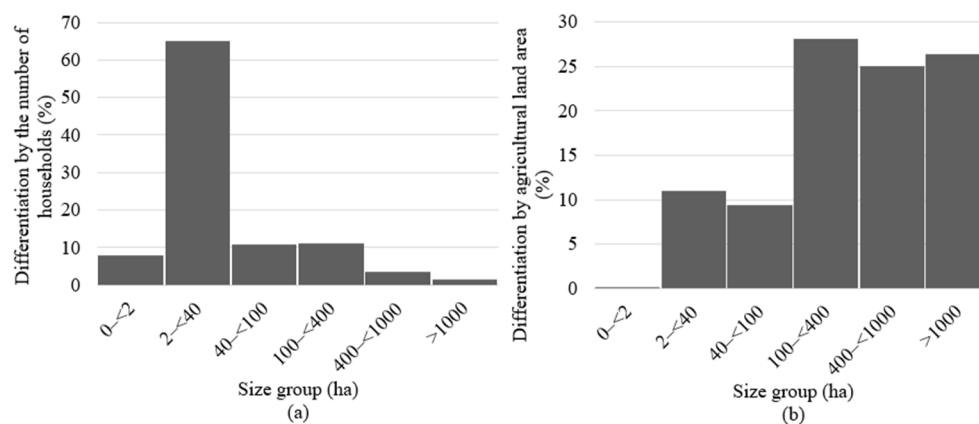


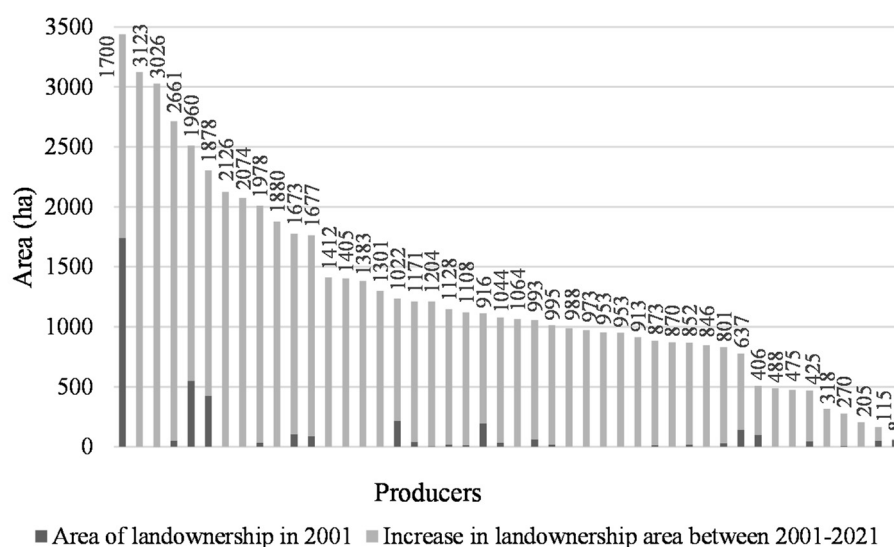
Figure 7. (a) Distribution of size groups by the number of farms, and (b) differentiation of size groups by agricultural land area in 2020 (ARIB).

Simultaneously, the number of farms in size group 400–<1000 ha accounted for 3.7% of the whole number, utilising 25% of all agricultural land in Estonia. The number of farms in size group >1000 ha accounted for 1.4% of the whole, utilising 26.4% of all used agricultural land in Estonia.

### 3.2. Agricultural Landownership Changes in Estonia in 2001–2021

The area of properties owned by the 47 largest farms increased between 2001 and 2021. Two producers' land ownership area decreased in the same period but increased between 2001 and 2016. One producer owned 96.04 ha of land in 2001, and 2164.94 ha in 2016. The second producer owned 76.01 ha of land in 2001, and 1116.18 ha in 2016.

In 2001, 41 producers had no land ownership or owned fewer than 100 ha of land (Figure 8 and Table 2). In 2021, all producers were landowners and only four owned less than 100 ha of land. In 2001, 20 producers owned fewer than 100 ha of land, and their average landownership area was 38 ha. In 2021, it was 53 ha.



**Figure 8.** Area of landownership (Land Registry) of 47 agricultural producers in 2001 and 2021 (Land Registry).

**Table 2.** Changes in the 49 largest producers’ landownership area (Land Registry) between 2001 and 2021 (Land Registry).

Groups (ha)	2001				2021	
	Number	Average Area		Number	Average Area	
		ha	%		ha	%
0	21	0	0	0	0	0
<100	20	38	1	4	53	2
101–200	4	136	5	1	164	5
201–400	1	215	8	3	267	9
401–1000	2	488	19	15	787	26
>1000	1	1741	67	26	1750	58
<b>Total</b>	<b>49</b>	<b>2618</b>	<b>100</b>	<b>49</b>	<b>3021</b>	<b>100</b>

The larger sized groups grew over the years (Table 2). In 2001, there were two farms in size group 401–1000 ha, and their average landownership area was 488 ha. In 2021, there were 15 producers in this size group, and their average landownership area was 787 ha. Massive changes occurred in size group >1000 ha. In 2001, one producer owned 1747 ha. In 2021, there were 26 producers with landownership larger than 1000 ha, and their average landownership area was 1750 ha.

The average landownership area of these 49 producers was 86.48 ha in 2001. In 2016, this area was 1135.80 ha, and in 2021, it was 1193.62 ha. The average landownership area of the 49 largest producers grew by an average of 1107.17 ha between 2001 and 2021. The most enormous land ownership area was 1700.14 ha, and the smallest was five hectares (Figure 8). The average growth area was 1280.96 ha. Sixteen producers’ landownership area grew by more than the average. Ten producers’ landownership area grew by more than 100,000%, and the most significant growth was 312,347%.

Analysing the changes in the 49 largest producers’ land use area by dividing them into size groups, it was found that the number of farms in the largest size group grew between 2003 and 2021 (Table 3). Most of the producers grew in size and moved into size group >1000 ha. In 2001, there were 40 farms in size group >1000 ha, five farms in size group 401–1000 ha, two producers in size group 201–400 ha, and in size groups 101–200 ha and



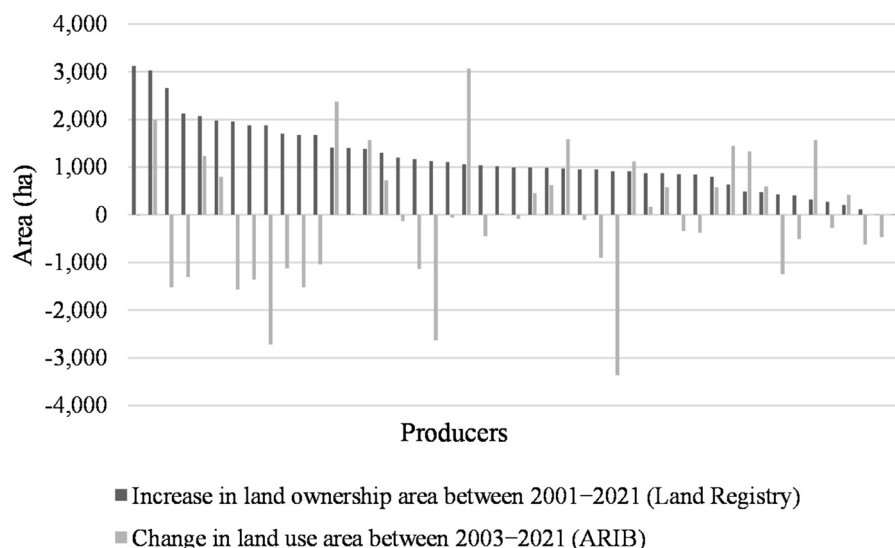
<100 ha, there was one producer. In 2021, there was one producer in size group 401–1000 ha and 48 in size group >1000 ha.

**Table 3.** Changes in the 49 largest producers’ land use area between 2003–2021 (ARIB) and proportion of their landownership (2001–2021) area (Land Registry) to land use area (ARIB).

Groups (ha)	2003		Proportion of 2001 Land Ownership Area to 2003 Land Use Area (%)	2021		Proportion of 2021 Land Ownership Area to 2021 Land Use Area (%)
	Number	Average Area (ha)		Number	Average Area (ha)	
0	0	0	0	0	0	0
<100	1	58.51	0	0	0	0
101–200	1	145.54	0	0	0	0
201–400	2	283.48	25	0	0	0
401–1000	5	764.08	0	1	847.44	103
>1000	40	3040.48	3	48	2538.01	47

Producers in size group 201–400 ha utilised the largest share (25%) of owned land in 2001. In 2021, there were no producers in size groups smaller than 401–1000 ha. All these producers had moved into larger size groups. In size group 401–1000 ha, producers had almost no owned land in 2001. In 2021, the share of owned land in this size group had grown to 103% of the total land use. Farms in size group >1000 ha owned 3% of the utilised land area in 2001. In 2021, the share of owned land in this size group was 47% of the utilised land area.

Comparing the increase in land ownership area between 2001–2021 (Land Registry) to the changes taking place in utilised land area (owned land and rented land, from ARIB) of the 49 largest land users, it was found that many producers’ land use area had decreased, while the area of land ownership had increased (Figure 9).



**Figure 9.** Increase in landownership area between 2001–2021 (Land Registry) and change in land use area between 2003–2021 (ARIB).

In 2001, the average share of landownership area from the utilised land area (2003) was 1.02%. In 2016, the average share of landownership area from utilised land area was 46%, and in 2021 it was 47%. Consequently, the share of owned land increased in the case of the largest land users.

### 3.3. Restrictions to Agricultural Land Purchase in European Union

The agricultural land market is subject to different regulations in the countries of the world. The importance of a well-functioning agricultural land market is difficult to over-emphasise.

Restrictions on the acquisition of agricultural land vary in different EU countries. The member states decide on adopting and implementing agricultural land market regulations, as certain land market regulations are missing at the EU level. However, EU treaties disallow restrictions on the movement of capital [49].

In Germany, the legislation concerning the ownership of agricultural land favours people engaged in farming. The approach aims to protect agricultural land from being turned into development areas, to protect nature and the environment, and to assure food security [50]. There is a permit obligation before any agricultural land transaction. Local municipalities also possess a pre-emptive right to purchase agricultural land, and the magistrate can appoint inheritable agricultural land to one particular heir in the case of inheritance. In Germany, there is also a minimum area of agricultural land that is subject to permit obligation.

In the Netherlands and Finland, there are no restrictions on acquiring agricultural land based on the buyer's legal form or citizenship [49]. However, there is a permit obligation in Finland for persons from certain third countries. In Denmark, there are no longer any specific restrictions on acquiring agricultural land.

There is a need to apply for a specific permit if persons from third countries wish to acquire land in France. An obligation has to be approved by *Sociétés d'Aménagement Foncier et d'Etablissement Rural* to purchase agricultural land [49]. In Austria, there is also an obligation for approval from the *Grundverkehrskommission*. However, in Austria, there are exceptions to this rule.

In Hungary, there is an obligation to qualify as a farmer to purchase more than one hectare of agricultural land [49]. To qualify as a farmer, a person has to be a citizen of Hungary or another EU country [51]. A person who does not have the qualification mentioned earlier must first be able to prove that they have been engaged in agriculture for at least the previous three years. Secondly, this person must prove that they received an income from agriculture over the previous three years.

In Hungary, there is a restriction on third persons using acquired agricultural land. The owner must use this land only for agricultural purposes for at least five years from the purchase [49]. The agricultural land area that one person can purchase in Hungary is limited to 300 ha [20], and a maximum of 1200 ha of agricultural land can be in the ownership of one farmer [49,52]. Corporations have no right to own land in Hungary, but there are exceptions to this rule. It is not easy for a third-world person to obtain a farmer's qualification in Hungary.

In Poland, there is an obligation for a person from Poland or the EU to qualify as a private farmer when purchasing agricultural land. A private farmer is a subject who owns or uses a maximum of 300 ha of agricultural land and is registered to live in the local municipality [49]. Purchasable agricultural land and already-owned land cannot exceed 300 hectares in Poland; although exceptions exist to this rule [49,53]. Persons not qualified as private farmers must acquire approval from the National Support Centre for Agriculture to purchase agricultural land in Poland.

A person from Latvia or another EU country must be registered to conduct business there to acquire agricultural land in Latvia. A self-employed person must confirm in writing that they will start agricultural activity there within one year of purchasing the land [49]. From 2017, a person cannot acquire more than 2000 hectares of land, and related persons cannot acquire more than a further 4000 hectares of land [49,54]. A corporate body must also prove that agricultural activities will commence on the purchased land and indicate the actual profit recipients. Persons from third countries are not permitted to purchase land in Latvia; although exceptions exist.

In Lithuania, there are also restrictions on how much agricultural land can be acquired and by whom. Similar to restrictions in Latvia, these are important to prevent further agricultural land concentration [20]. In Lithuania, in the case of agricultural land purchase, it is mandatory to prove that the person will use the land only for agricultural purposes for at least the next five years [49]. A person cannot own more than 500 hectares of total agricultural land in Lithuania [55]. Persons from third countries cannot acquire land in Lithuania.

Estonia has no specific restrictions on acquiring agricultural land for citizens of Estonia or the EU [56]. Corporate bodies from EU countries must be involved in agriculture in the EU for at least three years prior to purchasing land in Estonia that exceeds 10 ha. Corporate bodies must also be involved in agriculture to purchase agricultural land, and its affiliate has to be registered in Estonia. Persons from third countries have the right to purchase agricultural land in Estonia only with permission from the local government and provided the person has lived in Estonia for at least six months [56].

#### 4. Discussion

A growing population and an aim to decarbonise the economy mean that agricultural land is in demand for a broader range of uses than ever before [57–59]. Agricultural land is a unique asset exposed to pressure from non-agricultural uses, increasing demand for food, energy and biomass. Agriculture is a significant source of greenhouse gases, and as the world's greenhouse gas levels continue to heighten, climate change is appearing much quicker than foreseen [60,61]. There is a need for productive, yet sustainable, agriculture to ensure future food security for the world's increasing population [32,62]. The European Green Deal and Sustainable Development Goals set some of the goals needed to move towards sustainability [12,39,63,64]. Land is a finite resource, and more cannot be produced. Growth in farm size is connected with a statistically significant decrease in fertilizer and pesticide use per hectare, showing clear gains for environmental conservation [19]. Small agricultural producers are the core of European agriculture, and increasing concentration makes it harder for family farmers to access land.

The phenomenon of land concentration in the EU and many parts of the world is one of the most severe land matters. This phenomenon started to emerge decades ago and has recently accelerated. The ongoing agricultural land concentration affects Europe's small farms and hinterlands. Some EU countries have taken steps to prevent and reverse agricultural land concentration. For example, Hungary, Poland, Latvia, and Lithuania have adopted regulations against excessive land concentration and other undesirable patterns in their land markets.

Utilised agricultural land area in Estonia has remained almost the same over 20 years (871,213 to 975,323 ha) or grown a little. The number of farms diminished by almost five times (from 55,748 to 11,369) within 20 years, while the area of agricultural land use per farm grew five times (from 16 ha to 86 ha). While average land use per farm in Estonia has grown, the agricultural land in Estonia has become progressively concentrated in legal entities' hands.

The whole number of farms in Estonia has diminished, and farms that have shut down their activities are primarily in size groups 0–<2 ha (–264 producers) and 2–<40 ha (–1869 producers). The most extensive increase in the number of farms between 2011 and 2020 appeared in the size group 100–<400 ha (486 producers).

Most of the self-employed were farming in size groups 0–<2 ha (77%) and 2–<40 ha (57%) in 2020. Legal entities dominated in size groups over 40 ha. Some self-employed farmed in size group 40–<100 ha (4%) and a few in 100–<400 ha (1%). Farmers in size groups over 400 ha (100%) were legal entities. The largest portion of agricultural land is concentrated in the usage of large corporate users in Estonia in Lääne-Viru and Järva counties [32,65], in which the most fertile soils in Estonia are located. Therefore, the largest concentration of agricultural land occurs in regions where soils are most fertile. This phenomenon has also been seen elsewhere in the world.

Agricultural development in Estonia is not favouring small-scale farming. Yet small agricultural producers are preferable for environmental sustainability, protection of traditional values and economic flexibility [23]. One reason for the decline of small-scale producers is that the CAP does not cater to the needs of small-scale farmers. Land users with enormous domains receive more significant subsidies, which means they can obtain more land. Secondly, large agricultural businesses are deluging markets with cheap food and agricultural products. A situation has been created wherein small-scale agricultural producers cannot compete in the marketplace.

It is indicated [66–70] that agricultural producers' holdings will grow in the future, with small farms disappearing. If small farms are not able to grow in size and acquire more land (move to larger sized groups), they will not be able to survive. Larger and more compatible agricultural producers will push them out of business, and agricultural land will become even further concentrated. Small farms struggle to survive in the existing market situation where large producers have a clear advantage. Thus, the State should step in and regulate the agricultural land market so that small, medium and large producers can coexist and operate under similar conditions.

The results of this paper indicate that the area of land ownership of large land users is growing alongside the increase in land use area. This conclusion was made by analysing the land ownership of the 49 largest land users. Further research on changes in landownership is needed to make firm conclusions. Nonetheless, this paper indicates that land ownership is concentrated beside land use, and this is a dangerous sign. Control over land is concentrated increasingly in the hands of a small number of large corporations, and there is a need to take action against this development in Estonia.

Like many other European countries, Estonia requires policy direction, strategy and regulations for handling the agricultural land market to relieve the impact of land concentration in remote areas in the long run [20]. Restrictions on acquiring agricultural land in Estonia are necessary to stop further concentration and reverse the current situation, where small and medium farms cannot compete with large corporate bodies. Small and medium farms require more support from the State. The State should also create conditions for newcomers entering the sector. Farmers have pointed out that they need support from the State to acquire agricultural land [71].

An upper limit should be set on how much agricultural land one person, or related persons, can own in Estonia to prevent further agricultural land concentration. To restrain agricultural land from ending up in the possession of large business with no relation to agriculture, a portfolio obligation to have a particular qualification for purchasing agricultural land is also necessary in Estonia. A prior right of purchasing agricultural land should be enacted to guarantee that newcomers and small farms can acquire the necessary land. The possibility of fair market competition for all farming types should be assured.

Before setting restrictions on obtaining agricultural land, there is also a need to create a clear structure of enterprises in Estonia to determine how much land one enterprise owns or rents. Without this, grounds for the circumvention of restrictions are possible.

## 5. Conclusions

Circumstances regarding agricultural land concentration are similar in Estonia to other post-socialist EU countries. The number of farms has dropped, and the agricultural land area per farm has increased. Surviving farms are growing in size. The size of agricultural holding plays an essential role in the environment, including in agricultural sustainability. Small farms are disappearing, although these producers are believed to contribute more to environmental sustainability, preservation of traditional values, and economic resilience than large ones.

The Estonian case study showed that agricultural land use concentration is happening along with land ownership concentration. A large area of land is already concentrated in the ownership of a small number of large farms. Restrictions on acquiring agricultural land

in Estonia are needed to restrain further concentration and reverse the current situation, where small and medium farms cannot compete with large corporate bodies.

There is a need to regulate how much agricultural land one person or related persons can own in Estonia. Agricultural land should be owned only by those who have a particular qualification. A prior right of purchasing agricultural land should be enacted to guarantee that newcomers and small farms can acquire the necessary land.

The direction of agricultural land use and ownership in Estonia is a topic for studies and disputes over relevant regulations, potential limitations for possession and the usage of pre-emptive rights. Measures concerning agricultural land concentration in Estonia should be implemented in an interplay between agricultural producers and the government to encourage green development. The balance between large agricultural producers and small farms in Estonia must ensure that both farming types remain in fair market competition. There is undoubtedly a need for transparency in the structure of enterprises in Estonia.

**Author Contributions:** Conceptualization, M.R. and E.J.; methodology, M.R. and E.J.; software, M.R.; validation, M.R. and E.J.; writing—original draft preparation, M.R.; writing—review and editing, E.J.; visualization, M.R.; supervision, E.J. All authors have read and agreed to the published version of the manuscript.

**Funding:** This work was supported by the European Union, European Regional Development Fund (Estonian University of Life Sciences ASTRA project “Value-chain based bio-economy”. Funding number: 2014-2020.4.01.16-0036) and “Public sector (Estonia)” project P210157MIMP (Governing land take and agricultural land use in Estonia and providing implementation of the European Green Deal).

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

- Oberlack, C.; Giger, M.; Anseeuw, W.; Adelle, C. Why do large-scale agricultural investments induce different socio economic, food security, and environmental impacts? Evidence from Kenya, Madagascar, and Mozambique. *Ecol. Soc.* **2021**, *4*, 18. [\[CrossRef\]](#)
- Cristina Rulli, M.; D’Odorico, P. Food appropriation through large scale land acquisitions. *Environ. Res. Lett.* **2014**, *9*, 064030. [\[CrossRef\]](#)
- Gironde, C.; Golay, C. Large-Scale Land Acquisitions, Livelihoods and Human Rights in South-East Asia. *Int. Dev. Policy* **2015**, *6*, 275–292. [\[CrossRef\]](#)
- Porsani, J.; Caretta, M.A.; Lehtilä, K. Large-scale land acquisitions aggravate the feminization of poverty: Findings from a case study in Mozambique. *GeoJournal* **2019**, *84*, 215–236. [\[CrossRef\]](#)
- Juhasz, J. Large-scale and small-scale farming in Hungarian agriculture: Present situation and future prospects. *Eur. Rev. Agric. Econ.* **1991**, *18*, 399–415. [\[CrossRef\]](#)
- Claeys, P.; Vanloqueren, G. The Minimum Human Rights Principles Applicable to Large-Scale Land Acquisitions or Leases. *Globalizations* **2013**, *10*, 193–198. [\[CrossRef\]](#)
- Chahongnao, S. Customary Tenure and Large-Scale Land Acquisitions in the Global South: Issues and Redressal Approaches in Governance Policy. *Acad. Lett.* **2021**, *12*, 850. [\[CrossRef\]](#)
- Moreda, T. Large-scale land acquisitions, state authority and indigenous local communities: Insights from Ethiopia. *Third World Q.* **2017**, *38*, 698–716. [\[CrossRef\]](#)
- Roudart, L.; Mazoyer, M. Large-Scale Land Acquisitions: A Historical Perspective. *Int. Dev. Policy* **2015**, *6*. [\[CrossRef\]](#)
- Roudart, L.; Dave, B. Land policy, family farms, food production and livelihoods in the Office du Niger area, Mali. *Land Use Policy* **2017**, *60*, 313–323. [\[CrossRef\]](#)
- Yengoh, G.T.; Steen, K.; Armah, F.A.; Ness, B. Factors of vulnerability: How large-scale land acquisitions take advantage of local and national weaknesses in Sierra Leone. *Land Use Policy* **2016**, *50*, 328–340. [\[CrossRef\]](#)
- Rasva, M.; Jürgenson, E. Europe’s Large-Scale Land Acquisitions and Bibliometric Analysis. *Agriculture* **2022**, *12*, 850. [\[CrossRef\]](#)
- De Schutter, O. *Large-Scale Land Acquisitions and Leases: A Set of Core Principles and Measures to Address the Human Rights Challenge*; United Nations: New York, NY, USA, 2009.
- Foreign land purchases for agriculture: What impact on sustainable development? *Sustain. Dev. Innov. Briefs* **2010**, *8*, 1–8.
- Liu, P. *Impacts of Foreign Agricultural Investment on Developing Countries: Evidence from Case Studies*; Food and Agriculture Organization: Rome, Italy, 2014.
- Palsova, L.; Bandlerova, A.; Machnicova, Z. Land Concentration and Land Grabbing Processes-Evidence from Slovakia. *Land* **2021**, *10*, 873. [\[CrossRef\]](#)

17. Constantin, C.; Luminița, C.; Vasile, A.J. Land grabbing: A review of extent and possible consequences in Romania. *Land Use Policy* **2017**, *62*, 143–150. [CrossRef]
18. Stacherzak, A.; Hełdak, M.; Hájek, L.; Przybyła, K. State interventionism in agricultural land turnover in Poland. *Sustainability* **2019**, *11*, 1534. [CrossRef]
19. Ren, C.; Liu, S.; van Grinsven, H.; Reis, S.; Jin, S.; Liu, H.; Gu, B. The impact of farm size on agricultural sustainability. *J. Clean. Prod.* **2019**, *220*, 357–367. [CrossRef]
20. Jürgenson, E.; Rasva, M. The changing structure and concentration of agricultural land holdings in Estonia and possible threat for rural areas. *Land* **2020**, *9*, 41. [CrossRef]
21. van Vliet, J.A.; Schut, A.G.T.; Reidsma, P.; Descheemaeker, K.; Slingerland, M.; van de Ven, G.W.J.; Giller, K.E. De-mystifying family farming: Features, diversity and trends across the globe. *Glob. Food Sec.* **2015**, *5*, 11–18. [CrossRef]
22. Bojnec, Š.; Latruffe, L. Farm size, agricultural subsidies and farm performance in Slovenia. *Land Use Policy* **2013**, *32*, 207–217. [CrossRef]
23. Wuepper, D.; Wimmer, S.; Sauer, J. Is small family farming more environmentally sustainable? Evidence from a spatial regression discontinuity design in Germany. *Land Use Policy* **2020**, *90*, 104360. [CrossRef]
24. von Braun, J.; Mirzabaev, A. *Small Farms: Changing Structures and Roles in Economic Development*; Zentrum für Entwicklungsforschung (ZEF), Center for Development Research: Bonn, Germany, 2015.
25. European Economic and Social Committee Land grabbing—A Warning for Europe and a Threat To Family Farming (Own-Initiative Opinion) 2015. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014IE0926&from=PL> (accessed on 8 December 2022).
26. Van Der Ploeg, J.D.; Franco, J.C.; Borrás, S.M. Land concentration and land grabbing in Europe: A preliminary analysis. *Can. J. Dev. Stud.* **2015**, *36*, 147–162. [CrossRef]
27. FAO. *Empowering Smallholders and Strengthening Family Farms for Improved Rural Livelihoods and Poverty Reduction*; FAO: Rome, Italy, 2016.
28. Llambí, L. The Future of Small Farms. *World Dev.* **2010**, *38*, 1341–1348. [CrossRef]
29. Graeub, B.E.; Chappell, M.J.; Wittman, H.; Ledermann, S.; Kerr, R.B.; Gemmill-Herren, B. The State of Family Farms in the World. *World Dev.* **2016**, *87*, 1–15. [CrossRef]
30. Schneider, F.; Feurer, M.; Lundsgaard-Hansen, L.M.; Myint, W.; Nuam, C.D.; Nydegger, K.; Oberlack, C.; Tun, N.N.; Zähringer, J.G.; Tun, A.M.; et al. Sustainable Development Under Competing Claims on Land: Three Pathways Between Land-Use Changes, Ecosystem Services and Human Well-Being. *Eur. J. Dev. Res.* **2020**, *32*, 316–337. [CrossRef]
31. European Parliament. *The State of Play of Farmland Concentration in the EU: How to Facilitate the Access to Land for Farmers*; European Parliament: Strasbourg, France, 2017.
32. Rasva, M.; Jürgenson, E. Changes of agricultural producers in Estonia according to the size of land use. *Agron. Res.* **2020**, *18*, 516–528.
33. Courleux, F. *Regulating Agricultural Land Markets: The Main Economic Arguments*; Agriculture Strategies: online, 2019.
34. EC Commission Interpretative Communication on the Acquisition of Farmland and European Union Law (2017/C 350/05). *Off. J. Eur. Union* **2017**. Available online: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017XC1018\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017XC1018(01)&from=EN) (accessed on 8 December 2022).
35. Grant, E.; Das, O. Land grabbing, sustainable development and human rights. *Transnatl. Environ. Law* **2015**, *4*, 289–317. [CrossRef]
36. Falkinger, J.; Grossmann, V. Oligarchic land ownership, entrepreneurship, and economic development. *J. Dev. Econ.* **2013**, *101*, 206–215. [CrossRef]
37. *Soil Strategy for 2030*; European commission: Brussels, Belgium. Available online: [https://environment.ec.europa.eu/topics/soil-and-land/soil-strategy\\_en](https://environment.ec.europa.eu/topics/soil-and-land/soil-strategy_en) (accessed on 8 December 2022).
38. Maasikamäe, S.; Jürgenson, E.; Mandel, M.; Veeroja, P. Determination of Valuable Agricultural Land in the Frame of Preparation of Countywide Spatial Plans: Estonian Experiences and Challenges. *Econ. Sci. Rural Dev. Int. Sci. Conf. Econ. Sci. Rural Dev. Locat.* **2014**, *36*, 77–85.
39. Marquard, E.; Bartke, S.; Gifreu i Font, J.; Humer, A.; Jonkman, A.; Jürgenson, E.; Marot, N.; Poelmans, L.; Repe, B.; Rybski, R.; et al. Land Consumption and Land Take: Enhancing Conceptual Clarity for Evaluating Spatial Governance in the EU Context. *Sustainability* **2020**, *12*, 8269. [CrossRef]
40. Jürgenson, E.; Maasikamäe, S.; Sikk, K.; Hass, H. Methodology for the Determination of Peri Urban Areas on the Basis of Data of Land Type and Use by Example of the Town of Tartu. *Econ. Sci. Rural Dev.* **2017**, *45*, 110–117.
41. Jürgenson, E.; Maasikamäe, S.; Hass, H. *Land Reform Implementation in Estonia: Comparison of Land Reform Activity and Land Stock Characteristics Between Municipalities*; Estonian University of Life Sciences: Tartu, Estonia, 2011; p. 5.
42. Tomalty, R. *Farmland at Risk: How Better Land Use Planning Could Help Ensure a Healthy Future for Agriculture in the Greater Golden Horseshoe*; FAO: Rome, Italy, 2015.
43. Hunter, M.; Sorensen, A.; Nogueira-McRae, T.; Beck, S.; Shutts, S.; Murphy, R. *Farms Under Threat 2040: Choosing an Abundant Future*; American Farmland Trust: Washington, DC, USA, 2022.
44. Arslan, F.; Değirmenci, H.; Rasva, M.; Jürgenson, E. Finding least fragmented holdings with factor analysis and a new methodology: A case study of kargılı land consolidation project from Turkey. *Agron. Res.* **2019**, *17*, 1556–1572. [CrossRef]

45. Jürgenson, E. Land reform, land fragmentation and perspectives for future land consolidation in Estonia. *Land Use Policy* **2016**, *57*, 34–43. [CrossRef]
46. Looga, J.; Jürgenson, E.; Sikk, K.; Matveev, E.; Maasikamäe, S. Land Use Policy Land fragmentation and other determinants of agricultural farm productivity: The case of Estonia. *Land Use Policy* **2018**, *79*, 285–292. [CrossRef]
47. Hartvigsen, M. *Land Reform in Central and Eastern Europe after 1989 and its Outcome in the Form of Farm Structures and Land Fragmentation*; FAO Land Tenure Working Paper; FAO: Rome, Italy, 2013.
48. Viira, A.-H.; Ariva, J.; Kall, K.; Jürgenson, E.; Maasikamäe, S.; Põldaru, R. Restricting the eligible maintenance practices of permanent grassland—A realistic way towards more active farming? *Agron. Res.* **2020**, *18*. [CrossRef]
49. Vranken, L.; Tabeau, E.; Roebeling, P. *Agricultural Land Market Regulations in the EU Members*; Publications Office of the European Union: Luxembourg, 2021; ISBN 9789276419907.
50. Analüüs Euroopa Liidu Lepinguriikides Kehtestatud Põllumajandusmaa Kaitsemeetmetest Ja Põllumajandus-Ja Metsamaa Omandamise Kitsendustest. 2019. Available online: <https://docplayer.ee/178289012-Anal%C3%BC%C3%BCs-euroopa-liidu-lepinguriikides-kehtestatud-p%C3%B5llumajandusmaa-kaitsemeetmetest-ja-p%C3%B5llumajandus-ja-metsamaa-omandamise-kitsendustest.html> (accessed on 8 December 2022).
51. Balogh, T. Expanded Opportunities for EU Citizens to Acquire Agricultural Land. Available online: <http://roadmap2015.schoenherr.eu/expanded-opportunities-eu-citizens-acquire-agricultural-land/> (accessed on 8 December 2022).
52. Csák, C. The Regulation of Agricultural Land Ownership in Hungary After Land Moratorium. *Zb. Rad. Pravnog Fak. Novi Sad* **2017**, *51*, 1125–1135. [CrossRef]
53. Żróbek-Róźńska, A.; Zielińska-Szczepkowska, J. National Land Use Policy against the Misuse of the Agricultural Land—Causes and Effects. Evidence from Poland. *Sustainability* **2019**, *11*, 6403. [CrossRef]
54. Par Zemes Privatizāciju Lauku Apvidos. Available online: <https://likumi.lv/ta/id/74241-par-zemes-privatizaciju-lauku-apvidos> (accessed on 8 December 2022).
55. Republic of Lithuania Law on the Acquisition of Agricultural Land. Available online: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/d39d8f32a5b911e68987e8320e9a5185?jfwid=> (accessed on 8 December 2022).
56. Riigikogu Kinnisaja Omandamise Kitsendamise Seadus 2021. Available online: <https://www.riigiteataja.ee/akt/KAOKS> (accessed on 8 December 2022).
57. EC. *EU Agricultural Outlook for Markets, Income and Environment 2021–2031*; European Commission: Luxembourg, 2021.
58. Savills. *The Farmland Market*; Savills: London, UK, 2022.
59. Tschardtke, T.; Clough, Y.; Wanger, T.C.; Jackson, L.; Motzke, I.; Perfecto, I.; Vandermeer, J.; Whitbread, A. Global food security, biodiversity conservation and the future of agricultural intensification. *Biol. Conserv.* **2012**, *151*, 53–59. [CrossRef]
60. United Nations. *The Sustainable Development Goals Report*; United Nations: New York, NY, USA, 2019.
61. GIZ. *What Is Sustainable Agriculture*; GIZ: Bonn, Germany, 2012.
62. Ricciardi, V.; Ramankutty, N.; Mehrabi, Z.; Jarvis, L.; Chookolingo, B. How much of the world’s food do smallholders produce? *Glob. Food Sec.* **2018**, *17*, 64–72. [CrossRef]
63. Green Deal: Key to a Climate-Neutral and Sustainable EU. Available online: <https://www.europarl.europa.eu/news/en/headlines/society/20200618STO81513/green-deal-key-to-a-climate-neutral-and-sustainable-eu> (accessed on 8 December 2022).
64. Zoomers, A.; van Noorloos, F.; Otsuki, K.; Steel, G.; van Westen, G. The Rush for Land in an Urbanizing World: From Land Grabbing Toward Developing Safe, Resilient, and Sustainable Cities and Landscapes. *World Dev.* **2017**, *92*, 242–252. [CrossRef]
65. Rasva, M. *Land grabbing in Brazil and Africa, Chinese and European Participation in Land Grabbing and the Concentration of Estonian Agricultural Land Use*; Estonian University of Life Sciences: Tartu, Estonia, 2015.
66. Beckers, V.; Beckers, J.; Vanmaercke, M.; Van Hecke, E.; Van Rompaey, A.; Dendoncker, N. Modelling Farm Growth and Its Impact on Agricultural Land Use: A Country Scale Application of an Agent-Based Model. *Land* **2018**, *7*, 109. [CrossRef]
67. Lowder, S.K.; Skoet, J.; Raney, T. The Number, Size, and Distribution of Farms, Smallholder Farms, and Family Farms Worldwide. *World Dev.* **2016**, *87*, 16–29. [CrossRef]
68. Akimowicz, M.; Magrini, M.-B.; Ridier, A.; Bergez, J.-E.; Requier-Desjardins, D. What Influences Farm Size Growth? An Illustration in Southwestern France. *Appl. Econ. Perspect. Policy* **2013**, *35*, 242–269. [CrossRef]
69. FAO. *Global Agriculture towards 2050*; FAO: Rome, Italy, 2009.
70. Gollin, D. *Farm Size and Productivity. Lessons from Recent Literature*; CGIAR Independent Advisory and Evaluation Services (IAES): Rome, Italy, 2018.
71. Sammler, L. Põllumajandus on Kiires Uuenemises: Tulevikus Võiks Linnainimesel Olla Terve Digifarm. Available online: <https://www.delfi.ee/teema/96846556> (accessed on 8 December 2022).