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Agriculture–Environment Schemes Should Consider Farmers' Socio-Cultural Background: A Case Study of Estonian Beef Cattle Farmers

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Abstract: In Europe, intensive agriculture threatens species-rich semi-natural communities that have emerged from traditional agricultural activities. To protect these communities, subsidies are given to farmers through agri-environmental schemes (AESs). However, after nearly twenty years in operation, the uniform support system for farmers has not produced the expected results. Therefore, we conducted 15 semi-structured, in-depth qualitative interviews with beef cattle farmers in Estonia and identified the socio-ecological aspects of their activities. We found that small-scale farmers cannot compete with intensive farmers in the meat market because many breeds with slower weight gain and smaller body weights are grazed in semi-natural grasslands. Although two food quality schemes have been created in Estonia to value extensively grown meat, the permanent agricultural grasslands are under-supported, and the family farmers managing these areas feel the unfair distribution of subsidies. Moreover, family farms cannot compete with large farms, as the availability of pastures on family farms limits the number of livestock, and European Union animal welfare requirements and extreme weather conditions in 2023 have limited the number of herds. Since AESs have a large impact on farmers, we recommend that they be more flexible and consider the socio-cultural background of farmers and their impact on local communities when defining support.

Keywords: agriculture–environment schemes; subsidies; small farms; semi-natural grasslands; socio-cultural background of farmers; beef cattle

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1. Introduction

1.1. The Relationship Between Species-Rich Semi-Natural Communities and Long-Term Livestock Farming

Despite being located in a forest zone, temperate Europe has also harboured open vegetation for the last couple of million years as a result of wild megaherbivores [1]. This has facilitated the evolution, migration and sustenance of numerous grassland species in Europe until today [2]. Over the past thousands of years, the impact of wild ungulates has been replaced by that of domestic livestock grazing and hay production, which

currently underpin the continuity of grassland biodiversity. However, semi-natural communities, long-standing socio-ecological systems shaped by traditional land use, are now disappearing due to agricultural intensification [3].

The most influential farm animal shaping the agricultural landscape since domestication has been cattle. Humans started obtaining meat, milk, hides and animal traction from cattle [4]. In Europe, centuries of traditional lifestyles and livestock farming involving mowing and grazing (semi-)natural areas have resulted in agroecosystems and agricultural landscapes where culture and nature are closely intertwined [5]. Agricultural intensification has ultimately resulted in the homogenisation of European landscapes, where monocultures are grown over large areas. Natural and semi-natural areas have decreased in size and become increasingly fragmented. Failure to preserve and protect Europe's regional differences and characteristic semi-natural areas will ultimately lead to biodiversity loss in cultural landscapes [6]. Semi-natural communities are the most species-rich parts of agricultural landscapes.

Burton and Riley [7] concluded that traditional knowledge of grassland management is largely similar across pre-industrial Europe. Molnar et al. [8] noted that although traditional management methods are now acknowledged in conservation, the knowledge holders themselves are often undervalued or overlooked by conservationists and policy makers, leading to social injustice. Tackling social injustice is strategically important for ensuring Europe's long-term socio-ecological resilience [8]. Šūmane et al. [9] also stressed the importance of farmers' knowledge, arguing that the transition to sustainable agriculture is only possible within knowledge networks that genuinely incorporate farmers' perspectives.

1.2. Territorial Approach and Dynamic Analysis of Rurality in Europe

At present, a large portion of EU agri-environmental schemes (AESs) intended for farmers are specifically designed to implement the objectives of environmental protection and green policy. While the factors that motivate farmers to join these AES have already been investigated [10,11], Wehn et al. [12] highlighted a new problem—the payment of subsidies has led to standardisation of management practices that overlook local specificities, ultimately contributing to long-term species loss in agricultural landscapes. As a solution, they offer an adaptive approach that incorporates traditional ecological knowledge; however, this approach is a short-term solution as the greatest challenge in modern agriculture is the declining number of rural residents who can manage the region's grasslands in the future [13,14].

Lastra-Bravo et al. [11] argued that although extensive quantitative research has been conducted on farmers' attitudes towards AESs, qualitative research is also very important to understand farmers' motivations and to engage them better. Ultimately, the authors contend that all relevant policies that influence rural life and rural communities also affect farmers' participation in AESs [11]. Alavoine-Mornas and Girard [13] suggest that a survey of farmers in semi-natural areas should be based on a small sample and in-depth interviews. They also point out that financial incentives are necessary but often not sufficient to achieve conservation objectives. At the same time, recognising differences in farmer profiles is essential for achieving conservation objectives as a prerequisite for genuine integration of practices that promote the conservation and restoration of semi-natural areas [13]. Burton [15] reviewed existing research on farmers' motivations and found that researchers often do not consider the 'behavioural approach' in the context of more recent advances in social–psychological theory. However, as the dissonance between qualitative and quantitative research leads to inaccuracies, combining them provides the best results. Auffray and Clement [16] studied how environmental subsidies paid to cattle farmers have led to considerable criticism and tension among farmers. They also concluded

that subsidies affect farmers' attitudes towards their work. Moreover, they state that in today's political economy, it is difficult for farmers to achieve autonomy because they are so heavily dependent on state subsidies.

Agricultural subsidies, including AES subsidies, play a significant role in stabilising farm income in Estonia, particularly for smaller farms [17]. However, the effectiveness of these subsidies in promoting environmental conservation and biodiversity is debated. While some studies suggest that AES subsidies can lead to increased bird abundance on organic farms, others highlight the need for targeted subsidies to achieve distinct environmental effects [18]. Farmers in Estonia and Finland have expressed a high degree of willingness to enhance wildlife through AES management [19]. However, there is a call for the reshaping of AES subsidies to promote rewilding and the management of natural succession in less productive land and protected areas [20].

Moving from activity-based to result-based payment schemes, where farmers are paid based on how their activities have increased biodiversity, requires a completely new approach and poses its own challenges [21], such as how farmers can be encouraged to execute a task that is not directly related to their daily work and the production of agricultural products. Currently, there is only a financial incentive for persuading farmers to engage in different environmentally friendly activities, but there are also associated obstacles. Hauser et al. [22] questioned the case for more substantial interference in landscape planning in the management of green corridors in agricultural landscapes, as such interference undermines landowners' rights and freedoms. However, overregulation and stricter environmental protection requirements have the opposite effect. This was also shown by the pan-European farmers' protests that took place in 2023–2024, where one of the triggers was the stricter environmental protection standards for agricultural production, which would be too much for small farms in particular. Another trigger for these protests was the failure to take farmers into account in political decision-making (see [23] for more details).

1.3. History and Background of Beef Cattle Breeding and Farming in Estonia

Beef cattle farming in Estonia has evolved over time, with a shift towards extensive beef production on abandoned farmland, which has been found to be economically viable and beneficial for carbon storage [24]. The introduction of longevity as a breeding goal trait has improved the efficiency of dairy systems within sustainable dairy farming [25]. Traditional cattle farming practices, including ethnoveterinary medicine, have been replaced by large farms, but the historical geography of Estonian cattle breeds still influences the industry [26,27]. Some of the ethnoveterinary aspects of dairy cattle farming in Estonia have been studied from a historical–traditional perspective, including on family farms until the 1940s [26] and during Soviet occupation (1940–1991), the collective farm period [28]. There are no native beef cattle breeds in Estonia; thus, there have been no studies on them from this perspective. Beef breed bulls were imported to Estonia for the first time in 1959 when one bull of the Kazakh white-headed breed and one bull of the Aberdeen–Angus breed were introduced. In 1968, 2 Charolais young bulls and 10 pregnant heifers were brought to the experimental farm. The first Hereford cattle were brought to Estonia in 1978 by train from Byelorussian SSR and Russian SFSR [29].

However, beef cattle farming was intensified after the end of Soviet occupation. In general, there was little knowledge of raising beef cattle, and the crosses with dairy cattle were all sent to meat processing plants [30]. Today, a total of 16 breeds of beef cattle are registered in Estonia and are being bred. Hereford (breeding activity started in Estonia in 1994), Limousin (since 1995), Aberdeen Angus (since 2000), Charolais (since 2000) and Simmental (since 2003) breeds are the most numerous on Estonian beef cattle farms [29]. In 2006, there were 9256 beef cattle of nine breeds, but by 2022, there were 35,646 animals

of 15 breeds registered in the beef performance recording system [31]. However, not all farmers are reporting data on their animals to the system. Since 2000, when the Estonian Beef Breeders' Association was established, cattle breeding started to gain popularity in Estonia. Thus far, 350 farms have joined the association. The introduction of subsidies for grazing and mowing in nature conservation areas in 2001 had a very significant impact on beef cattle farming. The state also started to support the purchase of animals for the management of nature reserves. The reason is that heritage meadows in nature reserves are of little economic value, and without subsidies management, they are not profitable. Beef cattle farms also arose because subsidies were given to farmers who switched from raising dairy cows to raising beef cattle.

1.4. Objectives of This Research

Herzon and Mikk [19] emphasised that in the Central and Eastern European regions, which joined the EU Common Agricultural Policy (CAP) in 2004, there is a need for biodiversity-focused research projects that actively involve farmers. Such projects would help to improve AES measures for current participants and encourage non-participating farmers to join. Roellig et al. [32] found that financial incentives are crucial for farmers in managing wood pastures in Estonia; however, the values related to farmers' traditions also have a significant influence; therefore, they recommend that in addition to financial incentives, attention should be directed to the role of farmers' traditions in the future.

In Estonia, the socio-ecological aspects of the keepers of one specific farm animal have not yet been studied in depth. However, research that takes local conditions into account is essential to prevent local-level conflicts—such as those between nature protection goals and farmers' interests—from escalating into general disagreements. Our main focus was on how AESs, or policies, have or have not influenced the socio-cultural aspects of local beef cattle farming. By this, we mean how subsidies have influenced farmers' life-changing decisions—to start, continue or abandon livestock farming. This means the continuation or disruption of livestock farming culture and related social phenomena.

Our study sought to answer the following three research questions: (a) what are the adaptations of Estonian beef cattle farmers to sustainability in the given climate and cultural conditions? (b) What are the motivations of these beef cattle farmers to keep cattle? and (c) how do they relate to maintaining semi-natural habitats (meadows, pastures) in their surroundings through their daily farm work?

2. Materials and Methods

During our fieldwork (in mid-summer of 2023), which occurred during the peak calving season, 82,468 beef cattle (including 31,764 lactating cows) belonging to 1809 farmers were registered in Estonia. On average, a beef cattle farmer has 45 animals [33] (data as of 30 June 2023), [34]. Organic beef cattle farming is one of the fastest growing farming practices in Estonia; in ten years (from 2013 to 2022) the number of organic cattle increased by 50%, from 30 thousand to almost 45 thousand animals [35]. Considering that there were nearly 75 thousand beef cattle in Estonia as of January 2023 [33], this means that 60% of animals are raised on organic farms. More detailed statistical traits of Estonian cattle and cattle herds can be found in the yearbooks of livestock performance published since 1993 [31].

The sampling criteria were either a family farm, an organic farm or, where possible, a farmer who sells the meat of their animals (or is associated with a particular food brand). A total of 13 farms in 6 counties were visited between July and August 2023. The smallest farm had 21 animals and the largest had 400 animals (1661 animals in total) in the herd. Two of the organic farms in the sample also used hired labour and had the highest number

of animals—350 and 400, respectively. For others, beef cattle farming was a family business, and they had a maximum of 200 animals during the summer (83 animals per family farm on average). Before winter, approximately a third of the herd is sold to buyers or to meat-processing plants. We interviewed 15 farmers (including 1 family interview: husband, wife and son), including 10 men and 5 women. The youngest farmer was born in 1989, and the oldest in 1960 (Supplementary File S1). In-depth interviews lasted 1.5 to 2.5 h. We conducted fieldwork in six counties of Estonia (Figure 1).

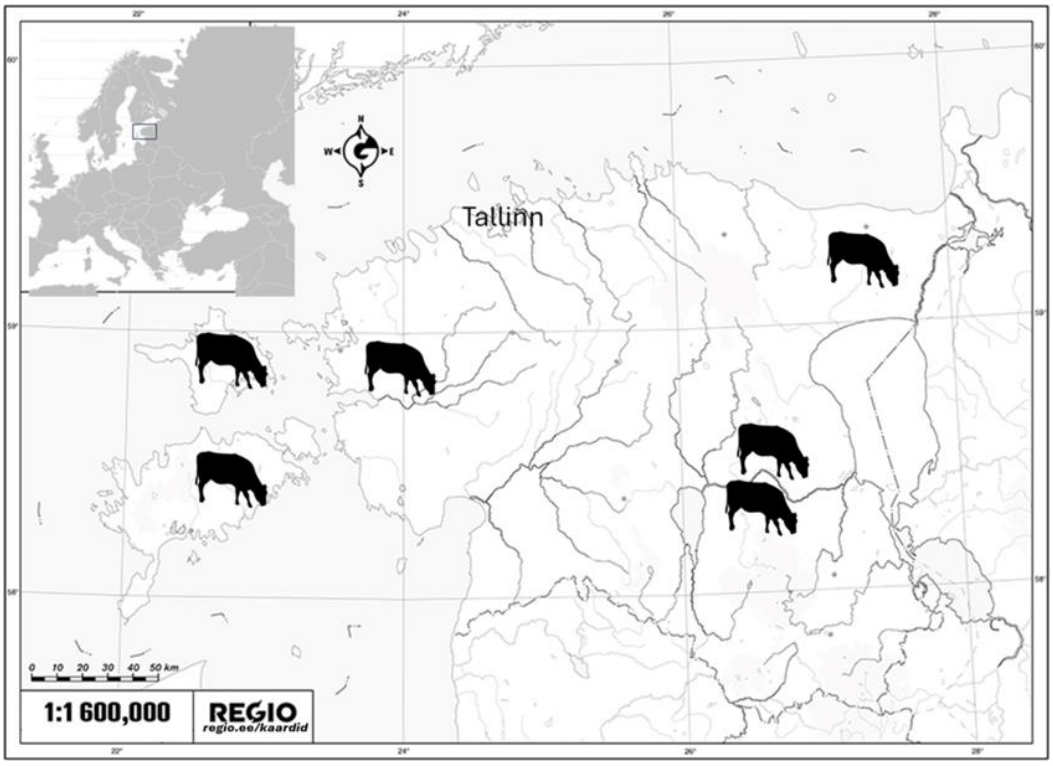

Figure 1. Research areas; cow symbols indicate the approximate positions of the studied farms.

We based our research on the EU General Data Protection Regulation (2016/679) and the long-standing tradition of Estonian ethnography in conducting such studies. All participants voluntarily agreed to participate in this study, being able to refuse at any time. All respondents were informed of the purposes for which they were being surveyed and given a leaflet introducing the project. The participants were asked to sign their consent to the recording of the interview (the recordings were deleted after transcription). A signature was also requested for consent to the storage of the interview transcripts in the archives of the Estonian Literary Museum. The anonymity of the interviewees was guaranteed, and they will not be disclosed in research papers.

The survey plan initially included the same questions for everyone, as follows:

(a) Knowledge of natural conditions: The types of pastures and meadows that they have; how they manage different types of pastures–meadows; the (conservation) activities that they utilize to improve their surroundings; which natural species are favoured/repelled and why and the kinds of changes they have observed in their pastures after starting beef cattle farming.

(b) Economic and social background: The problems that arise in connection with beef cattle farming; what motivations have influenced them in continuing with beef cattle farming; how they raise the animals and how they process the beef themselves.

(c) Farm background: The breeds of cattle raised and how these cattle are cared for; the motives that have influenced them in continuing with beef cattle farming; how the cattle are treated and the problems that arise in relation to beef cattle farming.

(d) Farmer background: Motivations for starting beef cattle farming and when they started; their educational and agricultural background and where new information about cattle farming is obtained.

Berkes and Folke [36] p. 4 state, "we hold the view that social and ecological systems are in fact linked, and that the delineation between social and natural systems is artificial and arbitrary". Knowing that social systems are based on culture and traditions and that cattle, as domestic animals, require human care during breeding, we also asked the farmers about so-called soft topics, particularly the folk traditions that they observe in beef cattle farming.

After general questions, in-depth interviews were continued (based on the previous responses of each respondent), and if possible, participatory observation was carried out in the farmers' pastures/meadows and in animal winter feedlots and buildings (hay/silage storage, barns). Interview data were analysed using the context analysis method. The abundance of questions was due to the fact that the aim of the fieldwork was not to collect basic material for just one manuscript but to provide data for several studies.

3. Results

3.1. Motivation for Beef Farming and Being an Organic Producer

All of the 13 farms surveyed classified themselves as organic, which leads to higher subsidies. At the same time, only a few slaughterhouses consider whether an animal comes from an organic farm when buying meat. Intermediaries (who are wholesalers) buy cattle by weight; therefore, farms selling fattened cattle have an advantage. The second problem is that organic farmers have higher liabilities and financial costs. One farmer no longer applied for organic labelling because of this. In general, AESs have become so complex that some farmers no longer know how to apply without the help of specially trained consultants (see Supplementary File S1, texts 1–3).

In our sample, there were 10 farmers with up to 20 years of experience raising beef cattle, while 5 farmers had less than 10 years of experience raising these animals (see Supplementary File S2). Farmers' motivations for starting a new livestock farming business can be divided into five categories.

(a) Those with previous cattle farming experience. Three family farms had dairy cows before beef cattle. These were farmers born in the 1960s (V02, V06 and families V10 and V11). At the beginning of the 2000s, when dairies in Estonia stopped buying milk from small farmers (in Saaremaa as one of the last, in 2008), farmers lost their income, and the milk was therefore useless. In order to continue farming, one alternative was to take on beef cattle. The transition to cereal farming required large investments. Regarding the keeping of sheep, it was said that it has become unprofitable because of the large number of wolves and jackals, as these predators kill countless sheep in the fall. The rest of the farmers had no previous experience in keeping cattle.

(b) For the purpose of nature conservation subsidies. Five farmers adopted beef cattle to start tending nature conservation areas (V01, V04, V07, V13 and V15, see Supplementary File S1, text 4). They were motivated both by nature conservation subsidies and by creating beautiful views in their immediate surroundings. However, they continued to work in their non-agricultural workplaces (as a teacher in a school, state office, forestry company, etc.). The three producers had also joined the new pilot project, a result-based payment scheme [10], during which support is given for monitoring plants, animals and birds on nature conservation meadows.

(c) Those with previous horse farming experience. Three farmers had kept horses before taking on beef cattle (V04, V05 and V08). Since there is not such a great demand for riding services, beef cattle were acquired later to provide their own income. Two farmers started grazing beef cattle in nature conservation areas on semi-natural grasslands. Two farms continued to keep horses even in 2023, and one farmer (V14) had purchased a retired riding horse, which was kept as a family horse.

(d) Young farmers who took over a herd from their parents. Two of the farmers (V03 and V12), both born in the 1980s, took over the beef herd from their parents. One of them started to graze livestock in nature conservation areas. In addition, one farmer (V04) born in 1965 said that he would leave his farm to his children and two of his daughters already performed most of the work on the farm.

(e) A farmer who, when he started, set himself the goal of beef cattle farming. This farmer, born in the 1970s (V14), started with beef cattle without any previous experience in livestock production. He justified this by the fact that starting a dairy cow farm, as well as grain production, requires very large investments.

3.2. Where Do Farmers Obtain Their Knowledge and How Do They Promote Their Products?

The young farmers (V03 and V12) and the farmer who took beef cattle farming as his direction right at the beginning (V14) had higher education in agricultural production. One man born in 1960 (V02) had vocational education in agriculture. The rest of the farmers did not have previous agricultural education, but most of them had been exposed to raising farm animals in their childhood, either at their parents' home or at their grandparents' home. One man, born in 1971, had no special education; he only had a background in animal husbandry learned at his parents' homestead where he worked as hired labour, so he continued there without further study (V06) (see Supplementary File S2).

Today, the main place to gain knowledge about farming is the Internet. But knowledge transfer of practical experience with beef cattle was first obtained from foreign professional associations. As an example, the first breeders of Scottish Highland Cattle obtained information from Finnish breed societies (https://www.highlandcattle.fi/ accessed on 29 March 2025, https://www.laitumeltalautaselle.fi/ accessed on 29 March 2025). Nowadays, study trips are carried out abroad, for example, to the Groundswell Festival in England (https://groundswellag.com/ accessed on 29 March 2025), or foreign lecturers are invited to attend trainings in order for farmers to acquire skills on maintaining and improving the quality of grasslands. It was also mentioned that organic farmers are required to attend training sessions regularly. When the regime of collective farms collapsed in the early 1990s and (family) farms were re-established, regional farmers' associations were initiated immediately, and they are still active and continuing the transfer of knowledge among members. Since the 2000s, as the number of cattle breeders has increased [37], dozens of larger and smaller cattle breeders' associations, federations and NGOs have been formed. Most of the interviewed farmers contributed to one of these professional associations. However, two farmers (V05, V15) stressed that they were not involved in any such associations because "the associations are dominated by larger producers" and the views and objectives of these organisations are not representative of organic or family farming.

As the tradition of cattle rearing is relatively new in Estonia, we were repeatedly told in the interviews that the local consumer is not used to eating beef. Consumers know how to cook minced meat, but they need to be taught how to cook beef. Therefore, beef cattle breeders' associations have started to conduct trainings on making food from beef and publishing literature on gastronomy. The Highland Cattle Association (https://magiveis.ee/ accessed on 29 March 2025) was pioneering, which, in addition to training, also created a separate food quality scheme ("Highland Premium Beef from Estonian

Grasslands"—HPB Est). It is also popular for cattle farms to present themselves and their products as part of the *Avatud Talude Päev* ("Open Farm Day", https://www.avatudtalud.ee accessed on 29 March 2025). Some farms have also joined food quality schemes, the best known of which is *Rohumaaveise Toidukvaliteedikava* ("Grassland-Raised Beef Food Quality Scheme" https://liivimaalihaveis.ee/qualityplan/ accessed on 29 March 2025). The farmers also often join food networks like *Otse Tootjalt Tarbijale* ("Direct From Producer to Consumer", http://www.eestiott.ee/ accessed on 29 March 2025).

While beef products under the *Liivimaa Lihaveis* brand are available in all major food store chains across Estonia, we noticed (in the year 2023) Hiiumaa Beef (from the second largest island) packaged by the local meat industry in the COOP store in Hiiumaa, and local beef was served in two Hiiumaa home restaurants. In our sample, only one producer (from Saaremaa, V13) provided meals made with beef from his farm in a catering facility owned by his company.

All studied farmers had their livestock made into meat products for their own consumption in small meat-processing facilities. However, as mentioned, it is very expensive in small-scale meat industries to process a small amount and later store the meat in domestic settings. Therefore, meat products are now mostly made for personal consumption only from emergency slaughtered animals (which cannot be taken to the slaughterhouse due to their condition). Three producers currently offered canned meat for sale—one of them produced smoked sausage and ham, another one packaged meat, and the third one packaged ground steak. Since the quantities are small, they were sold directly from home. Only two producers sold their meat products in farm shops.

3.3. Types of Pastures and Meadows and Their Special Requirements

The types of meadows and pastures that farmers managed, varied greatly, affecting the incomes of the farmers as well as animal husbandry methods and mowing techniques. A common issue for all farmers was the destruction of electric fences by wild animals. Pasture and meadow types can be divided into five main groups.

3.3.1. Semi-Natural Grasslands in Nature Conservation Areas

The management (cattle grazing and haymaking) of semi-natural grasslands is mainly undertaken for conservation purposes and has higher subsidies compared to agricultural grasslands. These semi-natural areas are nature conservation areas, and the purpose of their protection is to ensure habitats for natural species and to preserve traditional landscape types. To operate in these areas, the state enters into a contract with a farmer for five years. Therefore, a relatively limited number of farmers have permission to operate in such areas, as new farmers can get contracts only if the former operator renounces their agreement. Farmers operating in a protected area are also required to undergo training on protected land management. Each nature reserve may have specific restrictions regarding the start date for mowing and grazing, whether mowing or grazing should take place and if can they be combined, the number of trees on the grassland, which mowing techniques can be used, the number of animals per hectare, etc. As we were told, there were much stricter requirements in the past (before 2023) than now (the new rules were published in 29 December 2022 [38]). However, the subjectivity of the inspecting officials in assessing whether the farmer is eligible for receiving subsidies—depending on how well the grasslands have been managed—was cited as a drawback. What was a suitable result for the farmer may not have been suitable for the assessing officer. As we were told, in the past, farmers often had to protect their rights in court to prove that they still grazed or mowed the grasslands. Since the vegetation in these areas does not grow as intensively as in cultivated grasslands, the weight gain of animals is also slower. Semi-natural grasslands

in protected areas have the highest subsidies for farmers; from 2023, they will total 185 €/ha for grazing, 100 €/ha for mowing before 15 July, 150 €/ha for mowing after 15 July and 600 €/ha for mowing a wooded meadow. It is also possible to apply for quite a lot of additional subsidies (see [38]).

The habitat types managed by our questioned farmers in western Estonia and on the islands of the Baltic Sea include the following:

(a) Coastal meadows (Natura 2000 habitat type 1630* Boreal Baltic coastal meadows (see Figure 2)). Since these areas are rocky, uneven and have little grass growth, they can be largely grazed or mown in some more fertile areas. During previous CAP periods, coastal meadows had to be open, without shrubs, but now juniper bushes are allowed, although big trees are not permitted.

Figure 2. Coastal meadows in Läänemaa. Photo by Renata Sõukand, 6 August 2023.

(b) Floodplain meadows (6450 Northern boreal alluvial meadows) are located along riverbanks and are temporarily flooded. Hay is made in drier riverside areas, and grazing is common in wetter areas. The low-quality hay (sedge *Carex* sp.) produced in these areas is not eaten by livestock, but it can be utilised as bedding material in barns or as input to produce biofuel for a heat-producing boiler. During earlier CAP periods, it was a requirement that maintained floodplain meadows must not have bushes, but now (during the ongoing CAP period) an area of up to 0.5 hectares with trees and bushes is allowed.

(c) Dry calcareous grasslands (6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates) and alvar grasslands (6280* Nordic alvar and Precambrian calcareous flatrocks) are widespread on Estonian islands where mainly grazing is carried out.

(d) To some extent, the interviewees also used wooded meadows and wood pastures—grassland types that used to be very abundant in western Estonia [39] but have decreased drastically in area. In wooded meadows (6530* Fennoscandian wooded meadows), only mowing is allowed, while in wood pastures (9070 Fennoscandian wooded pastures (see Figure 3)), grazing is the desired management practice.

Figure 3. Fennoscandian wooded pastures in Saaremaa. Photo by Renata Sõukand, 8 August 2023.

In summer, livestock in seaside areas drink sea water (salinity is a maximum of 1–2% in the shallow coastal area), while livestock in pastures along riverbanks drink water from the river. Strict predetermined management rules and short-term perspectives (five-year contracts), however, have taken away the motivation of farmers to be creative in land management in these areas. The new system of result-oriented subsidies aims to change this such that the farmers themselves find the most suitable methods of how to operate on these protected grasslands. However, the unified support system, which has been in place for 20 years, has already left its mark on farmers' attitudes (see Supplementary File S1, text 5).

In order to protect the high diversity of flora and fauna in the traditionally relatively nutrient poor semi-natural grasslands, the use of fertilisers to increase grass growth and additional feeding of livestock is prohibited in grasslands in nature conservation areas. Therefore, when there is nothing left to eat in the pasture, the farm animals must be driven away from nature conservation areas to smaller feeding pens near farms. On three farms that were located far from nature conservation areas, they used animal carts to transport livestock. Since this is expensive, one farmer (V07) from Hiiumaa walked 15 km with his herd between the pasture and his farm in spring and autumn. During the winter, the cattle are fed with silage or hay. Farmers who have joined various national food quality schemes did not give grain to their cattle, because these meat quality schemes are only intended for grass-eating animals. In the spring, around May, the livestock are returned to the pastures under nature conservation.

3.3.2. Permanent Grasslands on Farmland

The next type of meadow and pasture is permanent agricultural grassland (see Figure 4). These areas receive the least amount of support from subsidies today. Therefore, farmers managing permanent grasslands told us that they are in the most disadvantaged

financial situation. These areas were mostly around farmers' homes, and this makes them particularly vulnerable, as they cannot choose where they live. In addition, ploughing and establishing fields in these areas is prohibited (afforestation is also prohibited). The reason is that according to EU regulation, 5% of agricultural land must be permanent grassland. These are grasslands mostly located outside nature conservation areas. It is also a condition of the subsidy that the grazing pressure is one livestock unit (one cow) per five hectares of grassland. Fertilisation of permanent grassland on an organic farm is not allowed. Still, in order to keep the grass growth stable and to provide livestock with a constant feed supply, rotational grazing has been started in these areas. This means that a large area is divided into small paddocks, and one paddock is grazed three to seven times during the year (see Supplementary File S1, text 6).

Figure 4. Permanent grasslands on farmland in Jõgevamaa. Photo by Renata Sõukand, 19 August 2023.

3.3.3. Short-Term Cultivated Grasslands on Farmland

Today, livestock are grazed the least on short-term cultivated grasslands (see Figure 5). The subsidies in these areas are more than twice as large as in permanent grasslands. However, the condition is that these areas must be ploughed at least once every three years and used (see Supplementary File S1, text 7), for example, as crop fields. In connection with controlled seed mixtures of grasses, these areas have the most stable and the highest hay yields. Drinking water for livestock grazed on cultivated and permanent grasslands is taken to the pasture in drinking units.

Figure 5. Short-term cultivated grasslands on farmland with a cattle pasture drinking tank in Ida-Virumaa. Photo by Raivo Kalle, 21 July 2023.

3.3.4. Pastures Located in Forest Areas

The last category of pasture is sparse forest, which is outside protected areas. According to the land categorisation, it is considered forest land (see Figure 6), not the 9070-category listed as a habitat type. The farmers in our sample, who own a sparse forest area next to a pasture, have also built a pasture garden in the forest and their cattle can go there. In Estonia, grazing in privately owned forests has a long tradition. Grazing in state-owned forest lands has been restricted by law throughout history. The Forest Act in force in Estonia until 2008 stated that the grazing of livestock was permitted in (private) forests. The Estonian Forest Act in force currently no longer states that grazing is permitted. According to the Forest Act, forests are divided into protection forests, conservation forests and managed forests. In protected private forests, whether grazing is permitted or not must be based on a specific conservation management plan. In our sample, there was a case where beef cattle were grazed in a private forest protected by the EU Natura 2000 network. We were told that since the protection rules for a specific forest do not prohibit grazing, this activity is allowed. In addition, cattle are grazed in forest areas next to leased pastures whenever possible. Agricultural subsidies are not available for these areas. However, small-scale farmers in Estonia have continuously grazed their farm animals in sparse forests (see Supplementary File S1, texts 8, 9). At the same time, farmers registered as owning organic farms must also pay to the State an "organic tax" for their forest land, although they do not receive agricultural support for this land. Since 2020, individual trees and small brush areas have been included in the pasture area, which previously was considered a forest; those areas were not covered before in subsidy plans.

Figure 6. Pastures located in forest areas in Saaremaa. Photo by Renata Sõukand, 6 August 2023.

3.4. Cattle Housing for Winter

Only two farms, one in Läänemaa (V03) and one on the island of Hiiumaa (V09), had recently built winter barns for beef cattle. The reason for constructing winter housing was the introduction of new stricter cattle husbandry requirements in 2020. When beef cattle farming became more widespread in Estonia, in the 2000s, it was fairly unregulated. Perhaps the most striking example is from Saaremaa, where a herd of Scottish Highland Cattle was taken to a small island under nature protection (islet Loonalaid) in 2015 and left unintended for years [40]. Recently, rewilding using large wild ungulates is considered a conservation measure in several European countries [41] and the islet of Loonalaid may, therefore, be referred to as an Estonian unintentional rewilding experiment. Also, the winter feeding of livestock was not regulated before; thus, large concentrations of manure formed near the animals' winter-feeding grounds, which started to pollute surface water. Another reason why farmers constructed winter barns is that with a more uniform temperature and under controlled conditions, the weight gain of cattle is improved. Lastly, –animals sheltered in a barn have greater contact with stockpersons.

3.5. Differences Between Beef Cattle and Dairy Cow Farming, Cattle Breeds and Attitude Towards Herd Animals

3.5.1. Differences Between Beef Cattle and Dairy Cow Farming

We also asked the farmers who previously had dairy cows about the differences from beef cattle farming. Apparently, dairy cows are more delicate and need more care, both in feeding management and in preventing and treating diseases. Beef cattle are resilient and do not require as much care. On organic farms, antibiotics are now used quite rarely, only when valuable lactating suckler cows get sick. As a rule, however, if a beef cattle individual is ill or has injured itself, it is either taken to a meat processing plant or it is killed in an emergency in a pasture and then processed in a meat factory. Beef cattle are kept outdoors

all year round in most cases, while dairy cows are kept in barns during winter. Bulls are not let loose in herds of dairy cows but are kept separate.

Since dairy cows need more high-quality feed, they rarely graze on semi-natural grasslands. Modern breeds of dairy cow cannot fulfil their energy requirements with the low-quality fodder of semi-natural grasslands. Heifers were grazed in semi-natural areas earlier. It was definitely noted that the keeping of dairy cows was more profitable; income was generated as soon as the first calf was born, whereas it takes at least three years of raising beef cattle before the farmer receives any income from meat. Another difference between dairy cows and beef cattle was that dairy cows on family farms all had names, while beef cattle, as a rule, did not have names, but rather ID numbers. Only a few beef cattle had a name based on some peculiarity in appearance or noticeable character trait.

3.5.2. Attitude Towards Livestock

Among the cattle farmers in our sample, no one followed folk customs when keeping livestock. The main factors that guided farmers are the weather and national regulations. However, there can be a difference in attitude towards livestock between farmers who graze their cattle only in nature conservation areas (where support is given for keeping the grassland open) and those who do not feed there. For farmers whose main aim is to manage nature reserves, livestock are like tools to achieve another goal (see Supplementary File S1, texts 10 and 11).

3.5.3. Breeds of Beef Cattle, Principles of Breed Selection and the Number of Bulls

The breed of beef cattle was chosen according to the type of pasture on the farm. Eight of the 13 farms had only one breed or its crossbreeds in the herd; five farms had two breeds and crosses; and one farm had five breeds in the herd. Breeds that are slow-growing and light in weight are suitable for semi-natural areas with relatively little grass growth. Therefore, Scottish Highland Cattle was one of the most popular breeds among the studied farms (See Supplementary File S2). Fast-growing and heavier cattle breeds are not suitable for soft, wet soil and areas with sparse grass, but rather for arable grasslands. One of the main factors that determines the selection of breed is how well cattle can survive outdoors during the winter in Estonia. Often, crossbreeds were preferred as the farmers claimed those animals were more durable.

People explained to us that for dairy cattle, bulls were kept apart from cows. Beef cattle breeding is different, as breeding bulls are let loose in herds. Farmers with smaller herds had only one bull in the herd. Owners of larger herds divided suckling cows into groups of 25 to 35 individuals—the larger the group, the longer the bull was kept in the herd. During the winter period, bulls were separated into a paddock. Breeding bulls are brought from all over Europe—Scotland, Germany, Finland, etc. They are selected from breeding bull registers so that they are unrelated to the other farm animals. Owners of larger herds of pedigree bulls can keep them for up to 10 years. Non-breed bulls are kept in separate herds for one summer period and one winter period before being sold to a buyer. Castrated bulls (oxen) are raised as meat animals for two years.

3.6. Economic Profitability and Sustainability

Interviews revealed that wholesale buyers pay by weight when purchasing animals. In this regard, farmers must continuously calculate the break-even point; if a farmer sells an animal that is too young, they receive little money, but if the animal is fattened for another year, production costs increase, and profit remains low once again. As we were repeatedly told, cattle that eat only grass in the pasture and hay/silage in the winter gain weight more slowly compared to beef cattle fed with grain. Therefore, Estonia now has two national food quality plans for beef cattle meat, which are intended only for animals

raised on pastures with hay. The food quality scheme allows the farmer to sell beef cattle at a higher price to relevant slaughterhouses.

Considering the current number of beef cattle in Estonia and the limited interest of local consumers in making food dishes from beef, the majority of beef cattle are exported, mainly to buyers in Poland and Lithuania. In the past, young breeding animals were also sold alive to Turkey or Middle East countries, where they were fattened.

The size and availability of meadows and pastures represent one of the main factors limiting herd size on farms. Farmers own only a limited area of the pastures and meadows they manage. Thus, they depend on the good will of owners of leased land and also on state contracts in state-owned nature reserve land. In the year 2023, there was an extreme drought in spring (some areas went without rain for 45 days), and, as it was said, only 10% of the amount of hay was obtained from some meadows compared to previous years. However, in the second half of the summer, the problem was that rainy weather prevented the harvesting of hay and silage from fields. Producers are now forced to make difficult choices and to reduce the number of their main herd (suckling cows). Also, herd size is now being limited by stricter animal husbandry regulations.

It was repeatedly said that if there were no subsidies, this work would not be done. This is especially true of managers in nature conservation areas, as only selling meat in such areas is not profitable. Most of the income for farmers today comes from subsidies that are paid at the end of the year. Keeping the mission or traditional ways of land management was more highlighted by family farmers (especially where the family had previously kept cows) than among farmers who only managed nature conservation areas. This may be because farmers operating in nature reserves mostly used leased land, while family farms managed more of their own farmland (see Supplementary File S1, text 12). However, there are several producers whose motivation extends beyond income (see Supplementary File S1, texts 13 to 15).

Another limiting factor is that family farms cannot compete with large corporate farms. Big companies, however, no longer have such a spiritual connection with the local land. Companies rent and exchange land across large areas while family farms depend on the availability of land in the immediate vicinity. On a small farm, it is not possible to go tens of kilometres away to mow or graze the land. The number of family farms where cattle are kept in rural areas has drastically decreased over the last 30 years. This is a food security risk and a danger to the biodiversity and ecosystem functioning of our traditionally managed landscapes, because if there are no more family farms in rural areas, then the tradition will disappear. The practice of doing farm work will disappear and, in the end, there will be no more local food producers (see Supplementary File S1, texts 16 and 17).

Inequality is also caused by the fact that large producers have better access to state authorities (as their representatives are members of farmer unions) to lobby for better conditions for themselves, which is one of reasons why subsidies currently favour intensive production on large farms. Considering the difference in the yields of meadows and pastures and the speed of weight gain of beef cattle breeds, the inequality is already quite large even among family farmers. At the same time, the state creates even more inequality with its various subsidies and restrictions, because it gives certain farmers an advantage over others with subsidies. Nature conservation subsidies do not currently consider socio-cultural backgrounds and do not encourage diversification. For example, if historically large areas of heritage meadows were used for grazing by dozens of livestock keepers from the neighbouring area, today it is convenient for the state to enter into a contract for the maintenance of a large area with only one farmer or an association. There are dozens of associations and NGOs in Estonia today, which were created and exist only as a result of

the money received from the maintenance of grasslands in nature conservation areas (see Supplementary File S1, texts 18 to 21).

4. Discussion

On the basis of indirect indicators, Heinsoo [42] studied how the subsidies for improving farm business performance and diversifying agricultural activities have had an effect. She concluded that, although there are many semi-natural grasslands suitable for beef cattle farming in Estonia, and this branch of agriculture has great potential, starting beef cattle farming is very expensive, and the payback period is long. Therefore, beef cattle are only a side venture for most agricultural enterprises. Combining beef cattle with dairy and grain production farms could increase income, but it does not increase a company's profitability [43]. From 2015, farmers receiving agricultural subsidies had to follow agricultural practices designed to improve the climate and environment, i.e., greening practices [33]. These criteria increased bureaucracy and production costs for farmers but tended to reduce yields and incomes. Põlma [43] concluded that further analysis of the economic impact of these measures on farmers is needed in the future.

Because of the long history of agriculture in Europe reaching back more than six millennia, European wildlife has adapted to traditional agricultural landscapes. While in other parts of the world, nature restoration is largely focused on restoring natural ecosystems, forests, and mire sand shrublands, in Europe traditional semi-natural agricultural landscapes offer habitat for a large part of its fauna and flora. Thus, in order to protect and restore natural ecosystems, the European focus is also on the management of semi-natural ecosystems. Therefore, AES are necessary for wildlife conservation, but this is an expensive measure [44]. Since people are the managers of agriculture land, it also has a strong social aspect.

The social paradigm has changed, as farmers are also expected to act as conservationists [45,46]. The system of European Union AESs should also change, from activity-based support to result-based support. However, this requires an entirely new approach from all parties. For example, farmers are expected to start monitoring nature on their land [21,47]. In 2023, a pilot project for result-based subsidies in agriculture was also launched in Estonia [48]. The project aimed to register species that farmers can find on their land based on pre-defined lists and to evaluate the condition of their pastures based on different criteria. The etic (science-based) perspective is thus covered, but the emic (people-based) perspective is lacking.

Our results show that farmers are very flexible and ready to take risks when beginning to keep new farm animals. Only three farmers (all born in the 1960s) had prior experience in keeping dairy cattle, the rest had no previous involvement in raising cattle. On the one hand, it can be concluded that farmers, especially those on family farms that have a personal connection to a given place, are trying to find an economically profitable direction for themselves in order to survive in rural areas. However, as our interviews revealed, the transition to beef cattle farming requires smaller investments. Therefore, keeping this particular farm animal is more suitable for both beginner and small-scale farmers to continue farming in rural areas at all.

New experiences were and are being gained outside of Estonia, in terms of both cattle breeds and how to improve the quality of grassland. Purebred bulls are also mostly brought from abroad. Although 16 breeds of beef cattle are bred in Estonia today, only half of them are used in the studied farms because both semi-natural areas and organic farms cannot use intensively growing and heavier beef cattle breeds. Since beef has not been popular in Estonian food culture before, beef cattle farming and breeding societies have started to introduce beef into the food culture and have created nationally recognised food quality

plans. Nevertheless, most of the beef cattle raised today are exported. New to the European Union farm animal welfare plan is a limit to the length of live animal transport. Estonia exported 60,000 beef cattle as live animals (e.g., to Turkey and Uzbekistan) in 2023, but with the new stricter requirements this can no longer be done (or it will be too expensive). However, this restriction calls into question the sustainability of beef cattle breeding in Estonia [49].

Our data showed that small farms find it difficult, if not impossible, to transition to more expensive agricultural activities, such as dairy farming and grain farming. Therefore, beef cattle farming is one of the few activities where small-scale family farming can still exist. However, given that small farms are more vulnerable to large market fluctuations, we believe that AES subsidies should be more differentiated. The larger the area of cultivated land and the larger the number of animals, the proportionally smaller the subsidies should be, and vice versa. A similar unit of support per hectare and animal for everyone favours owners of larger herds and land, because on a large farm the cost of production also becomes lower.

A substantial difference emerges in terms of the type of grassland that beef cattle are raised on. Grasslands can be divided into three groups: protected grasslands in the field of nature conservation, grasslands in agricultural lands and sparse forests. Just as in other parts of Europe, environmental subsidies create tension among farmers, affect their attitude towards their work, eliminate the autonomy of farms and make farmers highly dependent on the state (see [16]). Today, the largest subsidies in Estonia are given to farmers who farm in nature conservation areas compare to farmers who graze cattle in permanent grasslands on farmland. As we were told, farmers operating in protected areas, therefore, have a competitive advantage over neighbouring farms. However, there are many restrictions related to animal grazing and mowing in nature conservation areas, which makes it more difficult to operate in these areas, which is why the prevailing attitude was "If there were no subsidies, I wouldn't do it".

The subsidies for agricultural grasslands are divided into two types, including those for short-term grassland, which must be ploughed every three years, and those for permanent grassland, which must not be ploughed. Permanent grasslands are seen as the least profitable because the subsidies are half as much as for short-term grasslands. Although the majority of farmers who had a forest next to their pasture also grazed cattle (to a greater or lesser extent) in the forest, these areas (if they are not recognised as wood pastures in nature reserves) are not eligible for agricultural subsidies. Therefore, certain farmers gain a competitive advantage over others through higher subsidies. One of the limiting factors for herd size is the lack of suitable grassland and competition for land leases. More and more restrictive conditions are now imposed on keeping animals, which also limits the number of animals in herds. The size of herd on family farms was 20 to 200 animals, while on farms with permanent workers it was 350–400 animals. Increasingly, the weather is also becoming a limiting factor in terms of the number of farm animals. This was clearly demonstrated by the extreme weather in 2023: drought in the spring and heavy rains in the summer. Cattle farmers usually have large long-term financial obligations, and if two years with extreme weather events occur consecutively, it is not possible for farms to survive financially. The only solution is to shut down the entire farm and sell the cattle. Even one extreme year affects farm income for up to five years. The reason is that if there is no winter fodder, it immediately limits the number of suckling cows (main herd), which must then be reduced. If the number of suckling cows is reduced, there will be no more calves and no animals to sell in the future. The impact of drought on the decline in viability of family farms has also been observed elsewhere in Europe [50] and livestock herd sizes in Africa [51].

Caviedes et al. [52] pointed out that today's rapid anthropogenic socio-ecological changes, which are particularly harmful to small-scale farmers, will ultimately have negative consequences for general and local food security. They conclude that small farmers have a good perception of socio-ecological changes and also their causes. Therefore, the knowledge of small farmers is crucial and must be included in policy making. We can also conclude that farmers experience changes and are well aware of their causes and solutions. The lives of farmers are most affected by social changes: the concentration of agriculture in the hands of large producers, little regard for small (organic) farmers, short-term farmland leases that do not create certainty, etc.

The results from our interviews are well in line with Lastra-Bravo et al. [11], who stated that if you want to motivate farmers to join AES, it is necessary to look comprehensively at the entire policy concerning rural life, and in the long term it is necessary to slow down the decline of the rural population (see also [12]). The agricultural landscape is no longer an aesthetic by-product of farmers' activities but rather a product of it; "farmers and their farming practices have thus come under political and moral scrutiny, both ideologically and practically, because of their role in safeguarding landscapes which are seen as both natural and cultural heritage" ([53] p. 68). Landscape presence is created by locals who cultivate and also live on the land. In a recent comparative investigation, in which an Estonian region (Lääne County) was one of the case study areas, agriculture-related stakeholders most often perceived market-based drivers, together with policies, as direct drivers affecting land use changes and the resultant production of landscape services, including food production [54]. However, in a complex social-ecological system, other drivers (e.g., climate change) played an important role as well (ibid.).

As Wheeler et al. [55] state, "Above all, we argue that there is a need to acknowledge farmers' respect for the environment and presume that their fundamental intentions are ones of care not harm. [. . .]. The emphasis thus has to be on promoting farmer engagement and working in partnership, rather than imposing top-down measures that do not allow for flexibility and innovation" (p. 679). Our data also showed that the goal of farmers is to be sustainable, and this required caring for nature, because it is the basis for the survival of farming. Farmers also expect more cooperation and better communication with conservation and agricultural officials. Wheeler et al. [55] concluded that "approaches to promoting environmental action should acknowledge farmers' positive intentions and build on conservationist aspects of the good farmer identity" (p. 681). Our data also showed that by directing farmers only with orders and prohibitions, their ability to be innovative disappears. Farmers also want to receive positive feedback on their work, because the diverse and species-rich agricultural landscape have been the result of hundreds of years of daily work by farmers.

Chang [56] points out that countries which are successful in agriculture are those that learn from the best solutions developed by other countries. Yet, one of the factors affecting the farm economy, namely the sale and lease of agricultural land, cannot be interfered in by the state. However, another major influence, agricultural subsidies, can be directed by the state. As European agricultural subsidies and AES increasingly determine the daily lives of farmers and provide them with a large income, their distribution must be flexible. The preservation of rural life must become an important goal, and this can only be ensured by a flexible model for the distribution of subsidies, in which family farms are preferred over large agricultural producers.

The Centre of Estonian Rural Research and Knowledge also regularly conducts surveys and publishes them as reports. The latest report revealed that the respondents believe that the marginalisation of rural life and the departure of people from rural areas is the reason semi-natural areas are no longer managed [57]. An intriguing conclusion was that 64% of

land managers of semi-natural areas do not want to offer any products or services in this area, while only 21% of producers offered to sell meat produced on semi-natural grasslands (ibid). We can conclude that the managers of semi-natural areas are not interested in the production of agricultural products, but only in receiving nature protection subsidies. Thus, nature conservation subsidies change a farmer's identity and attitude towards the ultimate goals of farm work—the goal is not their agricultural work and food security for people, but rather only nature conservation.

Nurmet and Omel [58] highlighted that the viability of Estonian family farms is decreasing, they are economically vulnerable, and their ability to survive is lower than that of large-scale producers. Therefore, we can conclude that family farms are essential for the preservation of both natural and cultural heritage. However, current agricultural subsidies in Estonia do not consider the social backgrounds of the beneficiaries and are the same for both family farms and large agricultural enterprises. Therefore, the amount of subsidies should be based on a long-term perspective and a comprehensive vision in order to preserve the lifestyle of the farmers who preserve species richness and cultural heritage through their activities. A study conducted in Poland also showed that the current AES system, which is supposed to preserve biodiversity and cultural heritage in nature reserves, has actually increased intensive agriculture in these areas, resulting in a decline in species numbers and the disappearance of traditional management. The authors argue that this current system urgently needs to be changed [59].

5. Conclusions

Our study showed that only 3 out of 15 farmers had experience raising dairy cows before raising beef cattle. Since beef cattle farming is relatively new in Estonia, experience is gained outside Estonia, especially in Finland. A third of the farmers in our sample started raising beef cattle in order to receive AES subsidies. This shows the very large impact of subsidies on farmers' life-changing decisions. The state provides subsidies along with requirements on which pastures farmers must keep their cattle and the meadows on which they must make hay. Management subsidies in these protected areas are twice as high as those for hayfields and pastures on arable land. This creates substantial inequality in income. The reason is that many restrictions have been imposed on permanent pastures on arable land, e.g., crop fields may no longer be established in these areas. Pastures and meadows, however, which are established on agricultural land, are subject to the condition that the area must be ploughed at least every five years.

Since most beef cattle farmers are small-scale farmers or run family farms, farm size is determined by the availability of pastures and meadows around their homes. They depend on their places of residence, where they have lived permanently. The sizes of family farms range from 20 to approximately 150 animals. Large producers with salaried employees do not depend on the locations of their homes because they have the opportunity to move their beef cattle to more distant pastures and make hay in more distant areas, which can be located tens of kilometres away. Therefore, their income is not limited by the lack of land around the farm, as is the case with family farms. Considering the setbacks in animal husbandry caused by adverse weather conditions (e.g., drought) and considering the new, stricter rules associated with keeping and selling animals, small farms are especially vulnerable. Based on our data, we can conclude that current AES subsidies should be more differentiated and consider the socio-cultural backgrounds of farmers. We believe that a farmer who is a permanent resident of a local area is not only a food producer but also a custodian of local culture. Therefore, they maintain the entire socio-ecological system through their activities. The natural, species-rich habitats created

through agricultural activities require human activity to exist, and this can only be provided by the local population supported by local culture.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/agriculture15070741/s1: File S1: Interview transcripts referenced in the study; File S2: Data on the backgrounds of farmers and their farms.

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Data Availability Statement: The original contributions presented in this study are included in the supplementary materials. Transcripts of the interviews (in Estonian) are stored in the public Folklore Archives of the Estonian Literary Museum, Vanemuise 42, 51,003 Tartu, Estonia https://www.folklore.ee/rl/fo/efita/ (accessed on 29 March 2024) archive number EFITA, F13-012.

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Abbreviations

The following abbreviations are used in this manuscript:

AES	Agri-environmental scheme
CAP	Common Agricultural Policy
EU	European Union
NGO	Non-Governmental organisation

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