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# Evaluation of the European Green Deal Policy in the Context of Agricultural Support Payments in Latvia

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**Abstract:** The European Green Deal policy will significantly affect the resilience and development of agriculture, which will be determined by the 2021–2027 Common Agricultural Policy (CAP) reforms, entering into force in 2023. Therefore, the European Commission determines that at least 25% of the direct payments should be earmarked for eco-schemes, while 35% of the funding for rural development should be allocated to climate and environmental support measures. Support payments constitute a significant part of farmers' income and guide their decision-making for production development. Therefore, the goal of the research was set by analysing the existing CAP support payment system in 2019 to determine the possible impact of the reform envisaged for 2023 on farms of various specialisations and sizes in Latvia. The analysis revealed that in Latvia in 2019, 83% of the total number of farms received support, the amount of the support was EUR 5616 per year per farm on average, and within the Single Area Payment Scheme (SAPS), the support was higher by 24%. Among the funding recipient farms, the support accounted for 28% of the farms' income, calculated per 1 hectare. The detailed calculations carried out indicate that the possible base support payments as a result of the CAP 2023 reform are expected to be higher specifically in cattle breeding and dairy farming, which may contribute to even greater greenhouse gas (GHG) emissions in the future and thus reduce the likelihood of achieving the goals of the European Green Deal policy.

**Keywords:** common agricultural policy; agriculture; support payments; farms; specialisation



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## 1. Introduction

The European Commission (EC), based on the European Green Deal (2019) policy and the European Recovery Plan (2021), intends to invest 30% of the budget in climate-related programmes, projects and initiatives, which clearly demonstrates Europe's commitment to becoming the first climate-neutral region by 2050 [1–3]. The aim of the European Green Deal is to minimise the negative impact on the environment while maintaining the international competitiveness of the European Union (EU) and use effective instruments for decarbonisation of the economy in the EU Member States [1,4]. The green growth strategy defines five sectors of the national economy, most of which are related to energy development: industry, agriculture, transport, service, and other sectors [5]. This policy will also affect the development of agriculture, because in the EU Member States, in order to achieve safer and more sustainable and resilient agriculture within the framework of the European Green Deal policy, policymakers will have to use the legal framework of the new CAP to introduce new support measures at the national level [6]. However, two strategies will have the greatest impact on the agricultural sector: (1) Farm to Fork Strategy; that is, a system for creating fair, healthy, and environmentally friendly food; (2) Biodiversity Strategy for 2030, which provides for the protection and restoration of ecosystems [1,7]. Agriculture and rural areas thus play a central role in the Green Deal policy, and the CAP is intended to be a key element in achieving the transition from sustainability to environmental compliance [8]. Farmers across the EU have benefitted from the CAP since its establishment

in 1962. It is the longest-running EU policy—accounting for more than a third of its total budget—implemented in all Member States, and still amounts to almost EUR 60 billion per year [9,10]. The CAP has been subject to reforms several times. This demonstrates that the CAP is evolving to meet new economic, societal, and environmental needs [11,12]. It offers stable support to farmers, helping to provide them with a standard of living that is in line with other countries', and defines the conditions that allow the agricultural sector to fulfil its important functions in society [13,14]. Policymakers need to understand how current policies simultaneously affect agricultural productivity, growth, and environmental sustainability [15,16]. By 2030, the EU must introduce regulatory and other instruments that not only reduce greenhouse gas emissions from agriculture, but also increase carbon sequestration, increase the sustainability of agricultural production, improve biodiversity in rural areas, and help ensure quality food for the growing world population [17]. The EU 2021–2027 CAP has great potential to contribute to sustainable development, but changes are needed to unlock this potential [18–21]. In general, payments for environmental services are not a panacea, but should be part of a policy portfolio to choose from [22]. The new CAP provides Member States with a wide range of choices between different measures. The optimal policy mix will depend on income support and environmental balancing activities that reflect policy priorities [23]. In 2021–2027, for the first time, two pillars of the CAP will work together with a real, complementary approach according to one strategic framework, focusing on three general objectives, nine specific objectives, and one horizontal objective: agricultural knowledge and information systems [24]. Direct payments are the most heavily funded EU support scheme for agriculture, yet research on their impact on the resilience of the sector is limited. These payments have direct and strong indirect effects on resilience, mainly by changing and improving the financial capabilities of farms, as well as farmers' attitudes and behaviour. [25]. In addition, the European Commission foresees that 25% of direct payments in 2021–2027 will be directed to eco-schemes to provide stronger incentives for climate and environmentally friendly agricultural practices. Rural development, the so-called "second pillar" of the CAP, will devote most of its resources to measures related to climate and the environment [26]. In Pillar II, at least 35% of the budget will be allocated to climate support measures, environment, biodiversity, and animal welfare. In farms with arable land, at least 3% will have to be set aside for unproductive land, thus providing motivation to reach 7% of the managed area for biodiversity [9,27]. According to Chatellier V. et al. (2021), income of French farmers in 2010–2019 was different, which was determined by the type, size, and location of production. This illustrates the dependence of rural farms on different types of direct CAP support [28]. Pawłowska A. and Grochowska R. (2021) admit that the gradual development of priorities and, therefore, the CAP and its instruments to promote environmental issues have so far had a rather negative impact on the income of Polish farms. This support may have a low motivational function and did not lead to changes in farmers' decisions about production standards. Thus, it is necessary to continue looking for CAP instruments to more effectively implement the European Green Deal in terms of sustainable development (economic, social, and environmental) in EU agricultural development [29]. Maican S.S. et al. (2021) emphasise that the CAP direct payment scheme is designed to facilitate the sustainable management of natural resources and to combat climate change. Moreover, this effect is less significant at the regional level than the local level (at the level of the respective farm) [30].

Therefore, the background of this research is analyses of the significance and effect of CAP reforms, especially support payments, in ensuring and developing the resilience of farms in the future.

The goal of the research was set to determine the possible impact of the reform envisaged for 2023 on farms of various specialisations and sizes in Latvia by analysing the existing CAP support payment system in 2019. To achieve the goal, two research tasks were defined: (1) to evaluate the support payments of the 2015 CAP reform in Latvia in 2019 and (2) to analyse the possible impact of the CAP support payment reform on farms of various specialisations and sizes in Latvia in 2023. A hypothesis was put forward for

the research that in the application of the CAP reform which will be introduced from 2023, contradictions between support to small farms, employment promotion, GHG reduction, and efficiency promotion in agriculture could arise.

Primarily, the research presents an analysis of the direct payments in force in 2019 and the support system established by the Rural Development Programme for 2014–2020 for environmental improvement in Latvia. The information contained in the Integrated Administration and Control System of the Rural Support Service (RSS), which ensures the administration of all support payments for agriculture and rural development in Latvia, was used. On the other hand, based on the actual situation in the farms having received support payments in 2019, the impact of the direct payments envisaged in the draft strategic plan of Latvia's Common Agricultural Policy for 2023–2027 and of the environmental payments envisaged for rural development in 2023 in the four main specialisation groups of farms (cultivation of arable crops, dairy farming, cattle breeding, and vegetable cultivation, which in 2020 accounted for 75% of the total value of final production of agricultural goods (at base prices)) in Latvia [31] was modelled. In addition, detailed calculations were made for farms of different sizes in each farm specialisation group.

## 2. Materials and Methods

In order to be able to compare the support payments received by Latvian farms with those that could be granted in the period 2023–2027, based on the CAP reformed within the framework of the European Green Deal and the first offer for farmers developed by the Ministry of Agriculture of Latvia, extensive discussions were held with interested stakeholders in the spring of 2021 regarding the application of the EU vision, as contradictions arose between supporting small farms, promoting employment in rural areas, reducing GHG emissions, and promoting efficiency in agriculture.

The research used the database of the RSS Integrated Administration and Control System on the support payments actually received for each farm in 2019. When the study was conducted in 2021, newer data were not available, which constituted a limitation of the study. Thus, a database [32] containing information on 58,644 beneficiaries ($n_x$ = 58,644) (rows in a table) was received from the RSS. For each beneficiary, it was possible to analyse 210 variables arranged in columns ($n_y$ = 210). A total of 1954 farms that only received Natura 2000 support for forest areas were excluded from the total number of beneficiaries because they did not have agricultural land. Thus, in order to establish the support received by the participants of the two main support schemes—SAPS and the Small Farmers Scheme (SFS)—using the managed areas and other indicators, detailed analysis of 56,690 farms was carried out, assessing the indicators related to support payments in farms in Latvia (Task 1). In 2015, when the reform of direct payments for 2014–2020 was introduced, each farmer had to choose which support scheme to participate in. This occurred because, when applying for the SAPS, which is the basic and most comprehensive support payment for agricultural land managed in good agricultural condition, it was also possible to receive a Greening Payment (GP), support payment for Young Farmers (YFP), and production-related support (Voluntary Coupled Support, hereinafter referred to as "VCS"). In order to reduce the administrative costs related to the management and control of direct payments, a simple and special scheme for small farmers was introduced in Latvia from 2015. The payment of the SFS was a fixed payment of EUR 500 per year per farm and replaced all other direct payment schemes [33].

An in-depth analysis of the main indicators was performed by calculating various statistical indicators, namely, the mean, which refers to the arithmetic average; the median, which better represents typical data distribution, shows the sorted middle point in the data set, and removes extreme values from the dataset; and the standard deviation (Stdev), which determines how widely the data are distributed around the mean or how much a group's data deviate from the arithmetic mean. The distribution, expressed as a percentage, of the standard deviation and of the average arithmetic mean was determined, which characterises how closely or, on the contrary, widely the data are distributed around the

average. These statistical indicators were analysed because the mean and the median are the main indicators characterising development trends, and the standard deviation indicates the distribution of data around the average, which provides insight into the analysis of large data sets. A chi-square test was also performed to determine whether there were significant differences between two sets of data, alongside correlation analysis, which examines the strength of the relationship between two indicators.

For a further detailed analysis of possible changes in the CAP direct payments and environmental support for rural development under the influence of the European Green Deal (Task 2), data on farms in four main types of specialisation were used—cultivation of arable crops (wheat, rapeseed), dairy production, cattle breeding, and vegetable cultivation—because in 2020 these sectors contributed to 3/4 of the total value of the final production of agricultural goods (at base prices) [31].

The parameters characterising the farm, which had to be fulfilled simultaneously when selecting certain specialisation farms in the common database, are provided in Table 1. The purpose was to select highly specialized farms, to evaluate the impact on different sectors of agriculture in a straightforward way. In total, 997 arable crop farms, 699 dairy farms, 377 cattle breeding farms, and 36 highly specialised vegetable cultivation farms were selected for further detailed analysis. The total number of farms that corresponded to the specified direction of specialisation was 2109 or 3.7% of the total number of beneficiaries of direct payments in Latvia in 2019, which points towards a small number of narrowly specialised farms, and from this it can be concluded that farms in Latvia have chosen multi-sector diversified production.

**Table 1.** Criteria for the selection of farms necessary for detailed analysis in the main specialisation groups.

| Indicators/Specialisation Groups | Arable Crops | Dairy Production | Cattle Breeding | Vegetable Cultivation |
|---|---|---|---|---|
| The number of selected farms in the group | 997 | 699 | 377 | 36 |
| Revenue from agriculture, EUR | >0 | >0 | >0 | >0 |
| Permanent grassland of the total area of the farm, % | <5 | n.a. * | n.a. * | n.a. * |
| Relevance of arable crops to the total area of the farm | >70% | <0.7 ha per dairy cow | < 0.5 ha per livestock unit | <10 ha |
| VCS ** for vegetables, ha | =0 | =0 | =0 | >3 ha |
| VCS for starch potatoes and seed potatoes, ha | =0 | =0 | =0 | =0 |
| Organic farm support, ha | =0 | =0 | =0 | =0 |
| VCS for dairy cows, number | =0 | >10 | =0 | =0 |
| VCS for cattle, number | =0 | =0 | >10 | =0 |
| VCS for goats, sheep, number | =0 | =0 | =0 | =0 |

* N.a.—not applicable; ** VCS—Voluntary Coupled Support.

Table 1 shows that several indicators must be met in all specialisation groups of farms, because the farms' income from agricultural activity must be positive (>0); these are not organic farms, they do not grow potatoes or breed sheep and goats. On the other hand, the specific criteria are: arable crop farms are dominated by arable crop cultivation (>70%) of the total area and a minimum share of permanent grassland (<5%), dairy farms should have at least 10 cows with the area of arable crops not exceeding 0.7 ha per cow, cattle breeding farms should have at least 10 cattle with the area of arable crops not exceeding 0.5 ha per cattle, and vegetable farms should have at least 3 ha of vegetables with the area of arable crops not exceeding 10 ha. GHG emissions in various agricultural sectors were calculated using the Intergovernmental Panel on Climate Change methodology used for GHG emissions inventories (National Inventory Report) [34].

To assess the impact of the CAP direct payment system reformed as a result of the European Green Deal on farms of different specialisation groups, actual types of support payments for 2014–2022 and rates per unit in 2019 were compared to possible support payments for 2023–2027 in 2023 (information as of 1 May 2021) both from Pillar I of the CAP (EAGF funding) and agri-environment payments intended for rural development (EAFRD funding).

Table 2 describes the main changes in CAP policy. From 2023, SAPS support will be replaced by sustainability-promoting income support (Income Support) and redistributive income payment; in addition, a payment will be received if the farm is in a parish where the duration of the vegetation period is shorter than 195 days and the quality rating of agricultural land is less than 38 points (average indicator in Latvia). Greening Payments will be replaced by six eco-schemes. Member States may choose to implement one or more eco-schemes, but farmers will have the option to participate in the schemes or not. The conditions for granting payment participation in the eco-scheme depend on the implementation of the relevant practice on the farm [1]. VCS will be replaced by Coupled Income Support; SFS and YFP support will be continued, only the conditions for their receipt will be slightly changed. Funding for rural development in the field of agri-environment will be expanded.

**Table 2.** Types of support used in the calculations, their rates in Latvia in 2019, and forecast for 2023 (as of 20 May 2021).

| Types of Support | Source of Financing | Rate in 2019 | Rate in 2023 |
|---|---|---|---|
| SAPS support/Income Support, EUR ha$^{-1}$ | EAGF * | 83.73 | 82.00 |
| Redistributive Income Support Payment, EUR ha$^{-1}$ | EAGF | x | 50.00 |
| Greening Payment, EUR ha$^{-1}$ | EAGF | 48.12 | x |
| Eco-schemes: | | | |
| - nitrogen-fixing crops, EUR ha$^{-1}$ | EAGF | x | 112.00 |
| - preservation of permanent grassland, EUR ha$^{-1}$ | EAGF | x | 50.00 |
| - undersown grassland, EUR ha$^{-1}$ | EAGF | x | 59.00 |
| - stubble field in the winter period, EUR ha$^{-1}$ | EAGF | x | 28.00 |
| - minimum tillage, EUR ha$^{-1}$ | EAGF | x | 10.00–20.00 |
| - precision fertilisation and use of plant protection products, EUR ha$^{-1}$ | EAGF | x | 16.00 |
| Young Farmers Support, EUR ha$^{-1}$ | EAGF | 49.45 | 30.00 |
| Small Farmers Support, EUR farm$^{-1}$ | EAGF | 500.00 | 500.00 |
| VCS/Coupled Income Support for protein crops, EUR ha$^{-1}$ | EAGF | 75.83 | 82.00 |
| VCS/Coupled Income Support for vegetables, EUR ha$^{-1}$ | EAGF | 502.40 | 575.00 |
| VCS/Coupled Income Support for barley, EUR ha$^{-1}$ | EAGF | 45.56 | 38.00 |
| VCS/Coupled Income Support for fruits and berries, EUR ha$^{-1}$ | EAGF | 141.41 | 232.00 |
| VCS/Coupled Income Support for dairy cows, EUR ha$^{-1}$ | EAGF | 210.24 | 241.00 |
| VCS/Coupled Income Support for cattle, EUR ha$^{-1}$ | EAGF | 108.80 | 120.00 |
| Stubble Field during the Winter Period, EUR ha$^{-1}$ | EAFRD ** | 87.00 | x |
| Application of Environmentally Friendly Methods in horticulture (vegetables), EUR ha$^{-1}$ | EAFRD | 74.00 | 105.00 |
| Application of Environmentally Friendly Methods in horticulture (apple trees, pear trees, etc.), EUR ha$^{-1}$ | EAFRD | 364.00 | 364.00 |
| Ensuring Welfare Requirements for cattle, EUR piece$^{-1}$ | EAFRD | x | 86.00 |

* European Agricultural Guarantee Fund; ** European Agricultural Fund for Rural Development.

When conducting a case study at the level of individual farms (by randomly selecting at least four farms of different sizes in each selected specialisation group, Table 3), the possible conditions for receiving the new support in the relevant support area in 2023 were considered. Breakdown of farms in the particular sizes is based on the fact that this type of division is commonly used in policy discussions.

**Table 3.** Criteria for determining the size of farms in different specialisation groups.

| Farm Size | Arable Crops, ha | Dairy Production Dairy Cows, Number | Cattle Breeding Number of Cattle | Vegetable Cultivation, ha |
|---|---|---|---|---|
| Small | <50 | <20 | <20 | <20 |
| Average small | 51–100 | 21–80 | 21–80 * | 21–80 |
| Average large | 101–300 | 81–200 | 21–80 ** | 81–110 |
| Large | >301 | >201 | >81 | >111 |

* Narrowly specialised farm in cattle breeding; ** in addition to cattle breeding, the farm has a diversified crop structure.

## 3. Results

This chapter will reflect the results of the research at two levels according to the set tasks: (1) the general description of support and farms in Latvia (Section 3.1) and (2) the results of the detailed case study analysis for support payments in 2019 and the forecast for 2023 in four main farm specialisation types and size groups (Sections 3.2–3.6).

### *3.1. Description of Farms and Support in Latvia*

According to the data of the Central Statistical Bureau on the agricultural census in 2020 (the previous one was carried out in 2010), in Latvia there were 69,000 active farms that managed 1.97 million ha of agricultural land, or 28.5 ha per farm on average [35], which means that almost 57,000 farms (83% of the total number) that managed 1.74 million ha (88% of the total used agricultural land; the average area applied for by the beneficiaries was 31 ha, or 2.5 ha more than the average in Latvia) had applied for support in 2019. Thus, a significant number of farms that manage a slightly larger area of agricultural land than the average in Latvia apply for different support payments (Table 4).

Of the total number of beneficiaries in 2019, 79% had applied for the SAPS (Table 4), which includes several types of support payments, such as YFS, GS, and VCS, which are CAP Pillar I support payments, while simultaneously applying for environmental payments of the Rural Development Programme for 2014–2020. The area applied for support by the beneficiaries of the SAPS was 38 ha on average per farm, which is 23% higher than the national average and is 19 times more than that of SFS beneficiaries, which comprised 21% of the total number of beneficiaries. Of the total number of beneficiaries, only 20% were legal entities (an established farm registered in the Register of Enterprises) and 80% operated as natural persons (without registering a farm). Moreover, among SFS beneficiaries, only 3% of farms were registered as legal entities. Out of the total area that support was applied for, 98% was managed by farms of the beneficiaries of the SAPS, and the support received corresponds to the area (98% of the total support paid out), while in the SFS support scheme, 2% of the area has been paid corresponding funding (2%) of the total support funding in 2019. However, when calculating the intensity of the support per 1 ha, it is higher in the farms receiving SFS support, as these have received 11% more for each ha than the farms that applied for the SAPS.

**Table 4.** Description of farms and main types of support in Latvia in 2019 (as of 20 May 2021).

| Indicators, Unit of Measurement | All Beneficiaries | SAPS | | SFS | |
|---|---|---|---|---|---|
| | | Beneficiaries | % to Total | Beneficiaries | % to Total |
| Number of farms | 56,690 | 45,007 | 79 | 11,683 | 21 |
| Incl. legal entities | 11,459 | 11,129 | 97 | 330 | 3 |
| Incl. natural persons | 45,231 | 33,878 | 75 | 11,353 | 25 |
| Area applied for support, ha | 1,740,076 | 1,711,426 | 98 | 28,650 | 2 |
| Average area applied per farm (mean), ha | 31 | 38 | 123 | 2 | 6 |
| Support payments received in total, thousand EUR | 318,361 | 312,527 | 98 | 5834 | 2 |
| Received support payments on average per farm (mean), EUR | 5616 | 6941 | 124 | 499 | 9 |
| Support payments received per ha, EUR | 183 | 183 | 100 | 204 | 111 |
| Allocated diesel fuel *, number of farms | 16,912 | 16,653 | 98 | 259 | 2 |
| Allocated diesel fuel *, thousand litres | 146,528 | 146,460 | 100 | 68 | 0 |
| Allocated diesel fuel* on average per farm (mean), litres | 8664 | 8795 | 102 | 263 | 3 |
| Allocated diesel fuel, ha | 1,465,428 | 1,464,721 | 100 | 707 | 0 |
| Allocated diesel fuel * on average per farm (mean), ha | 100 | 100 | 100 | 96 | 96 |
| Farms with income from agriculture, number | 16,542 | 16,290 | 98 | 252 | 2 |
| Total revenue from agriculture, thousand EUR | 955,285 | 954,504 | 100 | 781 | 0 |
| Average income from agriculture per farm (mean), EUR | 57,749 | 58,594 | 101 | 3100 | 5 |
| Agricultural income of farms that received diesel fuel *, average per ha, EUR $ha^{-1}$ | 648 | 648 | 100 | 1069 | 165 |

* Marked diesel fuel with a reduced excise duty rate.

To assess the importance of farms producing and operating on the market, it is necessary to analyse the farms receiving diesel fuel, because when applying for support, farmers can receive marked diesel fuel with a reduced excise duty rate, which is used to produce agricultural products, according to the area of agricultural land they managed and declared for support payments [36]. Thus, it can be concluded that agricultural products are produced and sold by only 30% of the total number of beneficiaries, of which only 2% are small farms that apply for SFS support. Thus, a total of 146,500 tonnes of diesel fuel with a minimum excise tax rate was allocated in 2019, and for this, farmers have received EUR 46.3 million as excise tax relief in addition to support payments, because in 2019 the standard excise tax rate for diesel fuel in Latvia was EUR 372 per 1000 litres, but farmers only had to pay EUR 55.80 for 1000 litres [37]. All the beneficiaries were allocated marked diesel fuel with a reduced excise duty rate for 84% of the total number of declared ha, and on average one farm received 8664 litres, or 100 litres per ha of declared area.

In order for farmers to receive marked diesel fuel with a reduced excise tax rate, they had to ensure a certain level of income per ha—at least EUR 210 in organic farms and at least EUR 350 in other farms [36]. Thus, conclusions can be drawn about the income level of the farms that received marked diesel fuel for the production of agricultural products. The average income of all beneficiaries per farm was EUR 57,749, or EUR 648 per hectare declared for aid.

In Latvia, in 2019, the most significant payments for the beneficiaries of the SAPS were SAPS payments, which totalled 45%, greening support constituted 26% for SAPS recipients, VCS in livestock farming constituted 8%, VCS in crop cultivation constituted 6% (not reflected in the table), YFP constituted 2% (which are CAP Pillar I support payments), and 13% were for organic farm and agri-environment support from CAP Pillar II (Table 5).

If SAPS support per ha was EUR 83, organic farms received in addition EUR 99 $ha^{-1}$, while beneficiaries of agri-environment support received EUR 89 $ha^{-1}$. In livestock farming, VCS for dairy cows is of significant importance, as it gives the opportunity to receive an additional EUR 206 per animal, which was received for 69% of the total number of cows in the country, while VCS for cattle was EUR 106 per animal, which was received for 73% of the number of beef cattle. An amount of 3656 farms, at an average of 30 ha, have received YFP support. However, studies show that there is a need to recommend that sector policies provide additional support for young people to continue working in agriculture and develop this business. Investments are also needed to increase human and social capital [38].

**Table 5.** Description of SAPS-participant farms and types of support received in Latvia in 2019 (as of 20 May 2021).

| Indicators, Unit of Measurement | SAPS Beneficiaries | | | |
|---|---|---|---|---|
| | Total | On Average per Farm (Mean) | On Average per ha/Animal (Mean) | % of the Total |
| SAPS support, EUR | 141,374,509 | 3141 | 183 | 45 |
| Greening Payments, number of farms | 44,998 | x | x | 100 |
| Greening Payments, EUR | 80,924,389 | 1798 | 47 | 26 |
| Greening Payments, ha | 1,706,930 | 38 | x | 100 |
| YFP support payments, number of farms | 3656 | x | x | 8 |
| YFP support payments, EUR | 5,354,620 | 1465 | 49 | 2 |
| YFP support payments, ha | 110,363 | 30 | x | 1 |
| VCS for dairy cows, number of farms | 3884 | x | x | 8 |
| VCS for dairy cows, EUR | 19,745,058 | 5084 | 206 | 6 |
| VCS for dairy cows, number | 95,831 | 25 | x | 69 * |
| VCS for cattle, number of farms | 4163 | x | x | 9 |
| VCS for cattle, EUR | 6,475,766 | 1556 | 106 | 2 |
| VCS for cattle, number | 61,162 | 15 | x | 73 * |
| VCS for ewes, number of farms | 734 | x | x | 2 |
| VCS for ewes, EUR | 617,994 | 842 | 27 | 0 |
| VCS for ewes, number | 22,584 | 31 | x | 36 * |
| VCS for female goats, number of farms | 184 | x | x | 0 |
| VCS for female goats, EUR | 119,191 | 648 | 46 | 0 |
| VCS for female goats, number | 2612 | 14 | x | 32 * |
| Organic farms, number | 4219 | x | x | 9 |
| Organic farm support, EUR | 27,848,887 | 6601 | 99 | 9 |
| Organic farm land, ha | 281,844 | 67 | x | 16 |
| Agri-environment payments, number of farms | 7831 | x | x | 17 |
| Agri-environment payments, EUR | 13,982,862 | 1786 | 89 | 4 |
| Agri-environment payments, ha | 156,538 | 20 | x | 9 |

* At the end of 2019 in Latvia—dairy cows, 138,400; beef cattle, 84,200; ewes, 61,900; female goats, 8200 [39].

Calculating on average per farm, organic farms received the most support—EUR 6601—which was 2.2 times more than for SAPS beneficiaries on average; farms specialising in dairy farming received EUR 5083, while sheep and goat breeding farms received the least, considering the small number of relevant animals.

An in-depth analysis of the main indicators was performed (Table 6).

**Table 6.** Description of the main types of support and farms according to their legal status in Latvia in 2019.

| Indicators | General Profile | Legal Entities | Natural Persons | SAPS | SFS | YFP | GP |
|---|---|---|---|---|---|---|---|
| Support payments received, thousand EUR | 318,361 | 240,206 | 78,155 | 141,375 | 5834 | 27,580 | 227,643 |
| Median, EUR | 984 | 7098 | 738 | 523 | 500 | 2730 | 1240 |
| Stdev, EUR | 22,043 | 45,384 | 3520 | 10,185 | 6 | 14,099 | 18,222 |
| Stdev/mean, % | 393 | 217 | 204 | 422 | 1 | 187 | 360 |
| Max, EUR | 1,104,788 | 1,104,788 | 124,846 | 617,953 | 500 | 286,950 | 973,057 |
| Area declared for support, ha | 1,740,076 | 1,298,551 | 441,525 | 1,711,426 | 28,650 | 171,401 | 1,711,285 |
| Median, ha | 7 | 37 | 5 | 6 | 2 | 15 | 9 |
| Stdev, ha | 125 | 261 | 17 | 124 | 1 | 101 | 140 |
| Stdev/mean, % | 403 | 231 | 170 | 423 | 50 | 215 | 368 |
| Max, ha | 7487 | 7487 | 757 | 7487 | 10 | 2174 | 7487 |
| Diesel fuel *, thousand litres | 146,528 | 126,307 | 20,220 | 146,459 | 68 | 15,148 | 146,453 |
| Median, litres | 2593 | 5049 | 1608 | 2667 | 222 | 3885 | 2668 |
| Stdev, litres | 22,041 | 29,066 | 3199 | 22,194 | 168 | 13,288 | 22,196 |
| Stdev/mean, % | 260 | 211 | 128 | 257 | 68 | 171 | 257 |
| Max, litres | 777,163 | 777,163 | 75,300 | 777,163 | 1389 | 213,869 | 777,163 |
| Revenue from agriculture, thousand EUR | 955,285 | 885,118 | 70,167 | 954,504 | 781 | 66,081 | 954,403 |
| Median, EUR | 8156 | 16,510 | 4921 | 8357 | 2013 | 8631 | 8356 |
| Stdev, EUR | 451,108 | 615,423 | 15,003 | 454,709 | 3313 | 126,785 | 454,749 |
| Stdev/mean, % | 815 | 638 | 173 | 809 | 117 | 374 | 809 |
| Max, thousand EUR | 48,669 | 48,669 | 526 | 48,669 | 28 | 3269 | 48,669 |

* Marked diesel fuel with a reduced excise duty rate.

The minimum values were 0 in all indicators, while the maximum values differed significantly (Table 6). The total amount of support was from EUR 500 for SFS beneficiaries to EUR 618,000 for SAPS beneficiaries and up to EUR 1.1 million for total support beneficiaries. There have been significant differences in the total support between the farms of legal entities and natural persons—it differed by 8.8 times, which was determined by the maximum area of managed land; for SFS beneficiaries it was 10 ha, while for SAPS beneficiaries it was 7487 ha, so the difference between the managed areas of farms of legal entities and natural persons is 9.9 times. Thus, the maximum income from agriculture for SFS beneficiaries was EUR 28,000; for SAPS beneficiaries, greening payment beneficiaries, and legal entities it was EUR 49 million, and the difference between the farms of legal entities and natural persons was more than 1700 times. A similar trend was also observed as regards the amount of diesel fuel received. Therefore, these indicators point to significant differences in the description of farms in Latvia.

The standard deviations of the analysed indicators indicate a significant distribution of data around the average in support payments, areas applied for, the amount of diesel fuel received and revenues from agriculture for all support beneficiaries, legal entities, and for SAPS and GP beneficiaries. Minimal data distribution was observed for SFS beneficiaries, indicating that this group of beneficiaries is similar, with average differences existing between natural persons and YFP beneficiaries in all indicators analysed. Similar conclusions can be drawn about the differences between the standard deviation and the arithmetic mean.

A chi-square test was also performed, which allows one to compare whether there are any significant differences between two sets of data (beneficiaries include natural persons and legal entities). The null hypothesis (H0) states that there is no significant difference between the observed data sets, while H1 states that there is a significant difference between the data sets. The calculation results are as follows:

(1) **H01:** *there is no statistically significant difference between the support areas applied for by natural persons and legal entities*. Since $\chi 2 = 2.03$ is less than the critical value of $\chi 2^{0.05}$, which is 5.99, the null hypothesis is not rejected, which means that the differences between the support areas of natural persons and legal entities are not statistically significant;

(2) **H02:** *there is no statistically significant difference between support payments received by natural persons and legal entities*. Since $\chi 2 = 002048.07$ is greater than the critical value of $\chi 2^{0.05}$, which is 5.99, the null hypothesis can be rejected and it can be concluded that the support payments received are statistically significantly different between natural persons and legal entities;

(3) **H03:** *there is no statistically significant difference between the amount of diesel fuel with a reduced excise tax rate received by natural persons and legal entities*. Since $\chi 2 = 1066.31$ is greater than the critical value of $\chi 2^{0.05}$, which is 5.99, the null hypothesis can be rejected, and it can be concluded that the amount of diesel fuel with a reduced excise tax rate received by natural persons and legal entities is statistically significantly different;

(4) **H04:** *there is no statistically significant difference between the income from agriculture of natural persons and legal entities*. Since $\chi 2 = 30894.30$ is greater than the critical value of $\chi 2^{0.05}$, which is 5.99, the null hypothesis can be rejected and it can be concluded that the income from agriculture is statistically significantly different between natural persons and legal entities.

In order to find out the closeness of the relationship between the different indicators analysed, correlation analysis was used, which examines the closeness of the relationship between two indicators. Thus, the following close relationships between the analysed indicators were found ($p < 0.05$):

(1) *absolutely close positive correlation* (r = 1): the area applied for support with the SAPS area; received SAPS payments with the area applied for; the area applied for greening and the GS received with the area declared for support, the SAPS area, the SAPS support received; the area applied for greening, the greening support received; as well as the area applied for YFP support and the received YFP support;

(2) *very close positive correlation* (r = 0.96): total support payments with the area applied for support, SAPS area, the area applied for greening, the received SAPS and greening support;

(3) *close positive correlation* (r = 0.89): SFS support area with SFS support received;

(4) *moderately close positive correlation* (r = 0.63–0.67): area of VCS for protein crops and the support received, with the total support and total area applied for support, SAPS area and support, greening area and support.

### *3.2. Description of Agricultural Specialisation Farms and Assessment of Support*

The average profile of specialised arable crop farms in Latvia (n = 997) in 2019 was as follows: these were average large farms that managed 141 ha of arable crops, of which 73% was wheat and 16% was rapeseed, their income from agricultural activity was EUR 90,000; in addition, support payments of around EUR 20,000 were received, which constituted 22% of agricultural income, calculated per ha of managed land (Table 7).

**Table 7.** Indicators of specialised arable crop farms and support payments in Latvia in 2019 and the potential forecast for 2023.

| Indicators/Farm Size | Small | Average Small | Average Large | Large | Average for a Farm |
|---|---|---|---|---|---|
| Revenue from agriculture, thousand EUR | 2 | 15 | 120 | 392 | 90 |
| Income per ha of land, EUR | 90 | 209 | 675 | 659 | 641 |
| Declared managed area, ha | 23.9 | 73.7 | 178.2 | 595.6 | 140.8 |
| Incl. wheat | 18.0 | 59.9 | 127.8 | 462.6 | 102.8 |
| rapeseed | - | - | 45.1 | 106.5 | 22.0 |
| barley | 4.1 | 1.2 | - | 1.0 | 2.9 |
| fallow land | 1.8 | 7.4 | 2.2 | 13.9 | 4.9 |
| broad beans | - | 5.0 | - | 5.7 | 3.2 |
| potatoes | - | 0.2 | - | - | 0.2 |
| fodder plants | - | - | 3.1 | - | 2.7 |
| vegetables | - | - | - | 1.0 | 0.1 |
| fruit trees | - | - | - | 4.9 | 0.1 |
| Support received in 2019, EUR | 3288 | 13,989 | 23,388 | 79,095 | 20,122 |
| Received support per ha of land in 2019, EUR | 137 | 190 | 131 | 171 | 143 |
| Received support in 2019 against revenue per ha of land, % | 152 | 91 | 19 | 11 | 22 |
| Potential support in 2023, EUR | 4263 | 16,393 | 28,105 | 96,118 | x |
| Incl. base payments *, EUR | 3136 | 11,436 | 24,497 | 82,419 | x |
| for additional activities **, EUR | 1127 | 4957 | 3608 | 13,699 | x |
| Can be received for being located in a specific parish ***, % | 0–22 | 0–16 | 0–23 | 0–23 | x |
| Potential support in 2023 vs. support received in 2019, % | 130 | 117 | 120 | 122 | x |
| Incl. base payments, % | 95 | 82 | 101 | 102 | x |
| for additional activities, % | 34 | 35 | 20 | 19 | x |

* Base payments include: for all farms—income support and equalised farm payment; for average small farms, in addition—rye field during the winter period and VCS for protein plants and for barley; for large farms, in addition—VCS for fruits and berries, for vegetables, for protein plants, for barley; ** payments for additional activities include: for small farms—intermediate crops, spring crops (28%), and green fallow land (6%); for average small farms—intermediate crops, spring crops (20%), green fallow land (6%), precision fertilisation (8%), and minimum tillage for 30% of the area (2%); for average large farms—precision fertilisation (12%), minimum tillage for 30% of the area (3%), intermediate crops, spring crops (3%), and nitrogen-fixing crops (1%); for large farms–precision fertilisation (12%), minimum tillage for 30% of the area (3%), intermediate crops, spring crops (2%) and environmentally friendly horticulture (2%); *** supplement to income support of EUR 20 or EUR 30 $ha^{-1}$ depending on the location of the farm in the specific parish, where farming conditions are more complicated.

From the case study on specialised arable crop farms it can be established that they are significantly different (Table 7). In 2019, a small farm in Latvia managed 24 ha, a large farm managed 596 ha (a difference of 25 times), and an average farm managed from 74 to 178 ha. The income of farms from agricultural activity also changes in proportion to the managed area—from EUR 2000 to EUR 392,000 (a difference of 196 times). The amount of support received by farms is from EUR 3000 to EUR 79,000 (a difference of 26 times, which is close to the difference of managed areas). Thus, the received support payments are significant in small farms, as these payments exceeded the income from agriculture by 1.5 times, but for average small farms they constituted 91% of the income. This shows the minimal activity of these farms on the market, contributing more to the preservation of the rural environment and landscape. On the other hand, the dependence of large and average large farms on support payments is significantly lower, constituting only 11–19% compared to agricultural income.

When evaluating the possible situation in support payments in 2023 in farms specialising in arable crops in Latvia (Table 7), it can be concluded that, compared to 2019, these payments could increase most significantly for small farms—by 30%—and for other farms by 17–22%; thus, the support payments of the new period could contribute to the shift of specialised arable crop farms towards environmental and rural landscape conservation goals.

### *3.3. Description of Dairy Specialisation Farms and Assessment of Support*

Indicators for dairy farms are arranged in Table 8. The average profile of specialised dairy farms in Latvia (n = 699) in 2019 was as follows: these are average small farms with 55 cows, their average area is 132 ha, of which 43% is used to grow fodder plants sown on arable land and 33% is permanent grasslands; thus, green areas occupied 76% of their area. The income of specialised dairy farms from agricultural activity was on average EUR 165,000; in addition, support payments of EUR 30,000 were received, which constituted 18% of agricultural income, calculated per ha of managed land. Therefore, on average, although the area of dairy farms is 6% smaller than that of arable crop farms, dairy farms generated 83% more revenue than arable crop farms on average, and their dependence on support payments is lower.

From the case study on specialised dairy farms, significant differences can be established (Table 8). In 2019, a small farm in Latvia kept seven dairy cows and managed 24 ha of green areas. A large farm had 303 dairy cows (43 times more than a small farm) and managed 698 ha of land (29 times more than a small farm). The larger the number of dairy cows in the farm, the smaller the area per animal is needed. On average, 3.4 ha of green area was needed for keeping one cow on a small farm, while for an average small farm this number was 1.7 ha, and for a large farm–0.6 ha, and arable crops for sale are additionally grown. This means that the small farms have used the land extensively, while the large farms have used it intensively, which in the future, when the price of land increases, can significantly slow down the development of small farms. The income of farms from agricultural activity also changes in proportion to the number of cows kept, from EUR 18,000 to EUR 1.398 million (a difference of 78 times, which is less than in arable crop farms). The amount of support received by farms ranges from EUR 6800 to EUR 157,900 (a difference of 23 times, which is similar to arable crop farms). In the small farms in the field of dairy specialisation, the received support payments are of significant importance, which comprise 65% of the agricultural income, calculated per ha, while in the other groups of farms the support payments made up 11–21% of the agricultural income, which indicates a much lower dependence on support payments than for arable crop specialisation farms. Since livestock farms managed a significant share of green areas (from 100% in small and average small farms to 26% in large farms), it can be considered that dairy farms contribute to the achievement of green policy goals.

When evaluating the possible situation in support payments in 2023 in specialised dairy farms in Latvia (Table 8), it can be concluded that compared to 2019, the support payments could increase most significantly in small and average small farms—by 50–52%—and in other farms by 29–39%; thus, in the new period, dairy farms would benefit from support payments to a greater extent than arable crop farms.

**Table 8.** Indicators of specialised dairy farms and support payments in Latvia in 2019 and the potential forecast for 2023.

| Indicators/Farm Size | Small | Average Small | Average Large | Large | Average for a Farm |
|---|---|---|---|---|---|
| Revenue from agriculture, thousand EUR | 18 | 106 | 333 | 1 398 | 165 |
| Income per ha of land, EUR | 440 | 1910 | 1083 | 2004 | 1245 |
| Number of dairy cows, pcs | 7 | 33 | 114 | 303 | 55 |
| Declared managed area, ha | 23.9 | 55.8 | 307.0 | 697.8 | 132.2 |
| Incl. fodder plants sown on arable land | 10.7 | - | 221.0 | 124.5 | 57.5 |
| permanent grassland | 13.1 | 55.8 | - | 0.4 | 43.0 |
| wheat | - | - | 48.2 | 255.0 | 9.5 |
| barley | - | - | 13.2 | - | 6.1 |
| alfalfa | - | - | 24.4 | 59.2 | 2.0 |
| corn | - | - | - | 156.5 | 12.8 |
| rapeseed | - | - | - | 101.8 | 0.9 |
| miscellaneous | 0.1 | - | 0.2 | 0.4 | 0.4 |
| Support received in 2019, EUR | 6784 | 17,845 | 70,552 | 157,920 | 29,963 |
| Received support per ha of land in 2019, EUR | 284 | 320 | 230 | 226 | 226 |
| Received support in 2019 against revenue per ha of land, % | 65 | 13 | 21 | 11 | 18 |
| Potential support in 2023, EUR | 10,335 | 27,943 | 90,825 | 219,913 | x |
| Incl. base payments *, EUR | 10,335 | 27,943 | 84,465 | 191,217 | x |
| for additional activities **, EUR | 0 | 0 | 6360 | 28,696 | x |
| Can be received for being located in a specific parish ***, % | 0–18 | 0–9 | 0–13 | 0–13 | x |
| Potential support in 2023 vs. support received in 2019, % | 152 | 150 | 129 | 139 | x |
| Incl. base payments, % | 152 | 150 | 120 | 121 | x |
| for additional activities, % | 0 | 0 | 9 | 18 | x |

* Base payments include: for all farms—income support, redistributive income payment, coupled support for dairy cows, and ensuring welfare requirements/emission-reducing animal husbandry; additionally, for a small farm—preservation of permanent grassland and nitrogen-fixing crops; additionally, for an average small farm—preservation of permanent grassland; for an average large farm—support for young farmers and coupled support for protein crops and barley; ** payments for additional activities include: for an average large farm—nitrogen-fixing crops (4%) and intermediate crops, spring crops (5%); for a large farm—nitrogen-fixing crops (9%), intermediate crops, spring crops (2%), stubble field during the winter (3%), precision fertilisation (3%), and minimum tillage for 30% of the area (1%); *** supplement to income support of EUR 20 or EUR 30 $ha^{-1}$ depending on the location of the farm in the specific parish, where farming conditions are more complicated.

### *3.4. Description of Cattle Breeding Specialisation Farms and Assessment of Support*

The average profile of specialised cattle breeding (for meat) farms in Latvia (n = 337) in 2019 was as follows: these were small farms with 27 cattle on average, managing 65 ha, of which 63% were permanent grasslands and 28% were fodder plants sown on arable land. The average income of these farms from agriculture was only EUR 15,000, which is the lowest indicator among the analysed groups of specialised farms. Support payments in 2019 were EUR 12,657 on average per farm and made up 88% of the income, which is the highest indicator among the groups of farms analysed and indicates a significant importance in farm income (Table 9).

**Table 9.** Indicators of specialised cattle breeding farms and support payments in Latvia in 2019, and the potential forecast for 2023.

| Indicators/Farm Size | Small | Average Large | Average Large | Large | Average for a Farm |
|---|---|---|---|---|---|
| Revenue from agriculture, thousand EUR | 8 | 39 | 70 | 93 | 15 |
| Income per ha of land, EUR | 224 | 237 | 555 | 276 | 223 |
| Number of beef cattle, pcs | 11 | 61 | 65 | 106 | 27 |
| Declared managed area, ha | 36.4 | 164.9 | 126.8 | 336.2 | 64.8 |
| Incl. fodder plants sown on arable land | 0.4 | - | 51.5 | 18.5 | 18.1 |
| permanent grassland | 35.7 | 159.7 | 17.7 | 313.6 | 40.5 |
| wheat | - | - | 21.9 | - | 1.5 |
| oat | - | 5.2 | 17.2 | - | 2.4 |
| barley | - | - | 16.8 | - | 0.9 |
| miscellaneous | 0.3 | - | 1.7 | 4.1 | 1.4 |
| Support received in 2019, EUR | 5944 | 27,423 | 24,390 | 55,143 | 12,657 |
| Received support per ha of land in 2019, EUR | 163 | 166 | 192 | 164 | 195 |
| Received support in 2019 against revenue per ha of land, % | 73 | 70 | 35 | 59 | 88 |
| Potential support in 2023, EUR | 8862 | 42,309 | 35,086 | 81,929 | x |
| Incl. base payments *, EUR | 8862 | 42,309 | 33,079 | 81,929 | x |
| For additional activities **, EUR | 0 | 0 | 2 007 | 0 | x |
| Can be received for being located in a specific parish ***, % | 0–13 | 0–18 | 0–16 | 0–15 | x |
| Potential support in 2023 vs. support received in 2019, % | 149 | 154 | 144 | 149 | x |
| Incl. base payments, % | 149 | 154 | 136 | 149 | x |
| for additional activities, % | 0 | 0 | 8 | 0 | x |

* Coupled support for cattle and ensuring welfare requirements/emission-reducing animal husbandry; additionally, for an average large farm (with 65 cattle)—nitrogen fixing crops and coupled support for barley; ** payments for additional activities include: for an average large farm (with 65 cattle)—intermediate crops, spring crops (8%); *** supplement to income support of EUR 20 or EUR 30 ha−1 depending on the location of the farm in the specific parish, where farming conditions are more complicated.

From the case study on specialised cattle breeding farms it can be established that these are rather similar (Table 9). In 2019, a small farm in Latvia kept 11 cattle, a large farm almost 10 times more, while average large farms kept 61–65 cattle. There is a similar proportion in the areas managed by cattle breeding farms—from 36 ha by a small farm to 336 ha by a large farm (a difference of 11 times)—and, similarly, in proportion to the managed area, a farm's income from agricultural activity also changes—from EUR 8000 to EUR 93,000 (a difference of 12 times). The amount of support received by farms is from EUR 6000 to EUR 55,000 (a difference of nine times, which is close to the difference of both the number of cattle and the managed areas). There is a difference between the indicators of average large farms because, despite the similar number of cattle (61 and 65), it can be established that the managed area differs by 23% and the structure of the used land is significantly different, since a farm with 65 cattle operated relatively intensively, as there was almost 2 ha per cattle, and 2.7 ha per cattle in a farm with 61 cattle. A large farm operated extensively, because it had 3.2 ha per cattle, while a small farm had 3.3 ha per cattle. In cattle specialisation farms, the support has played an important role in the formation of farm income, as the support comprised 59–73% of agricultural income in extensively operating farms and 35% in intensively operating average large farms.

Evaluating the possible situation in support payments in 2023 for cattle breeding farms in Latvia (Table 9), it can be concluded that compared to 2019, the possible amount

of support could increase relatively similarly in all groups of farms—by 44–54%—which is one of the highest indicators in all the four analysed farm specialisation groups.

### *3.5. Description of Vegetable Cultivation Specialisation Farms and Assessment of Support*

The average profile of specialised vegetable cultivation farms (n = 36) in Latvia in 2019 was as follows: these were average small farms that managed 23.7 hectares (Table 10).

**Table 10.** Indicators of specialised vegetable cultivation farms and support payments in Latvia in 2019 and the potential forecast for 2023.

| Indicators/Farm Size | Small | Average Small | Average Large | Large | Average for a Farm |
|---|---|---|---|---|---|
| Revenue from agriculture, thousand EUR | 9 | 40 | 307 | 868 | 104 |
| Income per ha of land, EUR | 815 | 1728 | 3034 | 5795 | 4388 |
| Declared managed area, ha | 11.0 | 23.0 | 101.0 | 149.7 | 23.7 |
| Incl. dill | 6.2 | 1.0 | 1.3 | - | 1.3 |
| cabbage | - | 4.7 | 17.8 | 119.9 | 6.3 |
| pumpkins, courgettes, marrows, squash | 2.1 | - | 0.9 | - | 0.9 |
| cucumbers and gherkins | 1.3 | - | - | - | 0.5 |
| turnips, kale, radish, black radish | - | 10.1 | 8.0 | - | 2.3 |
| red beetroot | - | 3.0 | 5.2 | - | 0.4 |
| carrots | - | - | 12.1 | - | 1.5 |
| fallow land | - | - | 24.2 | 3.0 | 1.3 |
| miscellaneous | 1.4 | 4.2 | 31.5 | 26.8 | 9.2 |
| Support received in 2019, EUR | 7572 | 15,654 | 46,407 | 81,640 | 11,972 |
| Received support per ha of land in 2019, EUR | 688 | 681 | 459 | 137 | 527 |
| Received support in 2019 against revenue per ha of land, % | 84 | 39 | 15 | 2 | 12 |
| Potential support in 2023, EUR | 9083 | 19,820 | 90,075 | 103,702 | x |
| Incl. base payments *, EUR | 9083 | 18,104 | 82,884 | 101,562 | x |
| for additional activities **, EUR | 0 | 1716 | 7191 | 2140 | x |
| Can be received for being located in a specific parish ***, % | 0–4 | 0–4 | 0–6 | 0–6 | x |
| Potential support in 2023 vs. support received in 2019, % | 120 | 127 | 194 | 127 | x |
| Incl. base payments, % | 120 | 116 | 178 | 124 | x |
| for additional activities, % | 0 | 11 | 16 | 3 | x |

* Base payments include: for all farms—income support, redistributive income payment, coupled support for vegetables, environmentally friendly horticulture; ** payments for additional activities include: for all farms—precision fertilisation (2% for small, average small, and large farms, 3% for average large farms), intermediate crops (9% for average small farms and 3% for average large farms); *** supplement to income support of EUR 20 or EUR 30 $ha^{-1}$ depending on the location of the farm in the specific parish, where farming conditions are more complicated.

The main crop, cabbage, occupies 28% of the area; the rest of the area is quite fragmented and there is no distinct dominance of any crop (Table 10). The revenue of vegetable farms from agricultural activity was almost EUR 104,000; in addition, support payments of around EUR 12,000 were received, which constituted only 12% of agricultural income, calculated on ha of managed land, and was the lowest indicator in all analysed groups of specialised farms, even though the income per ha was the highest, namely, EUR 4388. This means that vegetable farms are the least dependent on support payments, but their development is driven by the market.

From the case study on specialised vegetable cultivation farms, it can be established that these farms are significantly different (Table 10). In 2019, a small farm in Latvia managed 11 ha, a large farm managed 150 ha (a difference of 14 times), an average small farm managed 23 ha, and an average large farm managed 101 ha. The income of farms from agricultural activity also changes in proportion to the managed area—from EUR 9000 to EUR 868,000 (a difference of 96 times). The amount of support received by farms was from EUR 7600 to EUR 81,600 (a difference of 11 times, which is close to the difference of managed areas). Thus, the received support payments played a significant role in small farms, because in small farms they accounted for 84% of agricultural income and in average small farms they were 39%, while the dependence of large and average large farms on support payments is insignificant, making up only 2–15% of agricultural income.

Evaluating the possible situation of support payments in 2023 in horticulture specialisation farms in Latvia (Table 10), it can be concluded that compared to 2019, the support payments could increase similarly in all farm size groups (20–27%), the exception being the analysed average large farm group, where an increase in the amount of support by 94% can be expected, but this will happen thanks to the these farms being active not only in vegetable cultivation, but also in other sectors, which is evidenced by the dominance of various other crops in the structure of crops (32%).

### *3.6. Summary of Land Use Efficiency and Support Intensity in Specialised Farm Groups*

To summarise the results of the case study in groups of specialised farms in Latvia, a median (not arithmetic mean) was used for the land use efficiency of the relevant group of specialised farms, income and support payments per ha, and the GHG emissions generated in 2019, and these indicators were compared with the potential forecast amount of support in 2023 per ha (Table 11). Based on the results of the case study, vegetable farming and dairy farming can be considered the most efficient sectors in Latvia, as they are the least dependent on support payments, since support payments in 2019 made up 25-26% of agricultural income, while for arable crop cultivation it was 34%, and 92% for cattle breeding, calculated per ha of the area for which support was applied for (Table 11).

**Table 11.** Land use efficiency of specialised farm groups compared to the intensity of support in Latvia in 2019 and the potential forecast for 2023.

| Agricultural Sector | Sectors Footprint in 2019 | | | Recent Sector Development | Support Proposal | |
|---|---|---|---|---|---|---|
| | Incomes EUR per 1 ha (Median) | GHG Emissions $CO_2$ eq. per 1 EUR (Typical) | Support Payments per 1 EUR (Median) | | Base | + Some Regions Can Get Additional |
| Cattle breeding | 210 | ~8 | 0.92 | very strong | +50% | +15% |
| Arable crops | 420 | ~1.5 | 0.34 | strong | 0% | +22% |
| Dairy production | 835 | ~3 | 0.26 | weak | +20% * +50% * | +13% |
| Vegetable cultivation | 2465 | ~0.5 | 0.25 | weak | +20% | +5% |

* There will be a 20% increase in support payments for intensively operating farms that grow grasses sown on arable land, and an increase by up to 50% for extensively operating farms that manage permanent grassland.

Whereas, when comparing GHG emissions in 2019, kg per EUR 1 $ha^{-1}$ of revenue, a completely opposite situation emerges, as this indicator is the highest in cattle breeding, exceeds the dairy sector indicator by 2.7 times, and is 5.3 times higher than in specialised agricultural farms and 16 times higher than in specialised vegetable farms. This means that support payments and their possible increase in the future should be coordinated with reducing the negative consequences of climate change, including the limiting of GHG emissions. However, the case study analysis carried out showed that potential base support payments are predicted to be highest in cattle breeding and dairy farming, which will contribute to even higher GHG emissions. A similar trend is also predicted

in Finland, as the dairy and beef sectors throughout the country still depend on support payments linked to production [40]. However, the lessons learnt in previous studies should be considered, which suggest that the development of farms specialising in breeding of herbivores is necessary, because in Latvia about 1/3 of the agricultural land is an area of various grasslands, and this would be necessary from the point of view of land use, and, these sectors provide a higher level of employment in rural areas [41,42].

## 4. Discussion

The agricultural sector provides food and is the main source of employment, income, and economic activity in rural areas. The Food and Agriculture Organization of the United Nations considers family farms to be the key to a sustainable future in Europe and Asia [30]. Farmers can undoubtedly improve their activities in a sustainable way to improve the situation on our planet, without excluding the possibility of developing the local economy in which they operate [43]. At the EU level, agriculture and the food industry have played a key role in improving labour productivity. On the one hand, employment in agriculture has significantly decreased, but on the other hand, the most significant increase in the share of employment has occurred in the food sector, which is characterised by productivity above the average EU level [44]. The results of the studies show that the granting of subsidies stimulates the creation of added value in agriculture and related sectors, positively affecting the overall gross domestic product. However, scientists note that support payments to agriculture are capitalised in the price of land, and thus the benefits of receiving support are partially transferred to landowners, not to producers. This aspect is particularly important in countries where a large part of the land is cultivated by producers who do not own the land [45]. At the same time, if direct payments are completely abolished, a negative impact on employment can be expected, which shows that direct payments play a positive role in the economy. However, the impact of direct payments on farmers' incomes is limited, so farmers' living standards should be supported by policy instruments other than direct payments [46]. In Finland, a CAP budget reduction of 20% would reduce farm income by 20–25% in cereal production, which was dominant in the south of Finland, while in the central and northern parts of the country, where farms are more dependent on state payments for milk and beef production, the reduction in income would be smaller [40]. Agricultural subsidies are an important factor influencing farm owners' decision-making on production lines. Agricultural subsidy reform could therefore make an important contribution to the transition to a healthier and more sustainable food system, including improving population health, environmental pollution and economic well-being. However, the abolishment of agricultural subsidies could be economically and environmentally beneficial, but could have a negative impact on the health of the population. In contrast, directing all subsidies to the production of healthy and environmentally friendly food could improve the health of the population and reduce GHG emissions, but have a negative impact on the economy [47]. EU Member States have different levels of development. This also applies to the new EU Member States (accession to the EU in 2004 and later), which often face less competitive agriculture due to the insufficient use of intermediate raw materials and low farmers' income from the market. The development of EU agriculture is largely dependent on the CAP. This is especially true for the new EU Member States, as CAP payments make up a relatively large share of income. EU support has influenced capital investment, which has contributed to increased farm productivity, increased agricultural output and income [48]. However, scientists recognise that the CAP subsidy system needs to be streamlined and made stable so that it is no longer an obstacle to increasing production potential. The establishment of new eco-schemes is therefore left to Member States, and in some countries the reforms may not be ambitious enough [49]. The CAP in its original form was very productive given the needs and expectations of the time, which have led to serious problems (e.g., overproduction, price increases) after self-sufficiency was achieved. To deal with this, five reforms followed (in 1992, 2000, 2003, 2008, and 2013). Based on practical experience, it is clear that farmers

thought rationally and responded to changes in the support system [50]. Over the last 20 years, the EU CAP has developed into a multifunctional policy instrument. As part of this transformation, most farmers receive income that is paid independently of production, giving this payment category a production-neutral or "fully" decoupled status. The current CAP emphasises the provision of non-market public goods through rural development policies, as well as market measures and a system of direct payments that is not linked to production, yet provide farmers with income [13]. This study also confirms this, since in Latvia, 70% of the beneficiaries in 2019 maintained the rural landscape, contributing to the provision of public goods for society. However, will it also be the case in the future, with the introduction of the new CAP reforms from 2023? Scientists recognise that this CAP reform will allow: (1) maintaining of support for farm income, which will facilitate the viability and sustainability of farms; (2) achievement of greater ambitions in environmental protection and climate-friendly practices, helping to achieve the goals of the European Green Deal: reduce the use of chemical plant protection products, fertilisers, and antimicrobials; increase organic farming areas; preserve and restore biodiversity (pollinators and high-diversity landscape elements); and expand broadband connections in rural and remote regions [14]. CAP reforms should preserve both investment incentives and agri-environment payments. The first type of subsidies would be important for small- and medium-sized farms to increase their economic potential and accelerate the concentration of capital in agriculture, but this does not have to be at the expense of the environment [51]. This will also be possible in Latvia, because when the reformed CAP is implemented in 2023, it is the small and average small farms that will receive a proportionally larger increase in support payments compared to average large and large farms in arable crop, dairy production, and cattle breeding farms.

The existing support policy should be orientated away from the types of coupled support towards support not linked to production; thus, the CAP reform would support both economic efficiency and environmental issues. Policymakers have an important role to play in creating policies that could be both economically and environmentally effective [52]. Research shows that the world as a whole has missed an opportunity to "better recover" from COVID-19 through a green recovery. However, such claims ignore the emerging trends that the governance of the global green recovery is embedded in the "Global Green New Deal" package of norms. This research programme can also provide more detailed insights into the heterogeneous impact of COVID-19, climate change, and its economic impact [53]. Scientists believe that the gap between policy goals and their implementation by land managers needs to be reduced quickly and effectively in order to achieve the European Green Deal's climate, biodiversity, and rural development goals [54]. Eco-schemes and agro-ecological schemes will therefore play a key role in ensuring the objectives of the European Green Deal to meet the environmental and climate requirements set by 2030 [6]. However, there is an opinion that with the introduction of the new, green policy, overall EU food production could decrease, thereby increasing food prices. This means that consumers will have to bear these additional costs [55]. This and other possible risks should be carefully evaluated by both farms and policymakers in order to make more reasonable decisions for the development of agriculture. The introduction of environmental measures is predicted to result in lower yields and an increase in production costs; together with a decrease in support, the viability of farms will be affected in some European regions, especially where financial margins are already very limited [56]. However, positive perceptions and responses to climate risk, even if they increase the environmental costs for companies in the short term, can significantly impact the overall economy in the long term. In the long run, however, it is important to keep the whole economic system on track towards carbon neutrality [57]. The CAP reform for the years 2023–2027 also provides support to promote risk management tools that help farmers manage the production and market risks to reduce the negative impact of price and market instability, as well as income instability in agriculture [58].

Therefore, further research is needed to assess the risks caused by the European Green Deal policy to find the best solutions in the future on the impact of CAP direct payments on EU agriculture at both the sectoral and regional level. This would also be relevant for every Member State, including Latvia. Considering the ongoing reform of the EU CAP, the net added value in agriculture should be increased through targeted income support for small- and medium-sized farms. The source of funding for the support could be the funding provided for in the European Economic Recovery Plan. Furthermore, the further improvement of financial integration across the EU would provide funds for investment in agriculture [59].

In addition, the public shows more and more interest in food culture, food origin, and hunger, but less interest in purely scientific topics. To understand the topics of interest mentioned above, a certain level of general knowledge will be required as a basis for building further knowledge and creating a better understanding of agriculture and how food is made. Interest in society has changed from agricultural producers to modern food consumers, whose interest in agriculture has changed from "farm" to "taste". If we want a sustainable society, then we need sustainable food production systems and more public awareness and interest in it. This could be achieved by increasing investment in agri-food promotion and research covering the entire food chain from farm to fork [60].

## 5. Conclusions and Recommendations

By 2030, on the basis of the European Green Deal policy, the EU must introduce instruments that not only reduce greenhouse gas emissions from agriculture, but also increase carbon sequestration and the sustainability of agricultural production, improve biodiversity in rural areas, and help ensure quality food for the growing global population by envisaging substantial resources for dealing with these issues. Therefore, the European Commission established that in the CAP support for 2023–2027, at least 25% of the direct payments should be earmarked for eco-schemes, while 35% of the funding for rural development should be allocated to climate support measures, biodiversity, and animal welfare. Researches have shown that support payments have contributed to increases in labour productivity and value added, and contribute to a certain share of farmers' income. Therefore, support payments influence farm decision-making when planning the direction of agricultural production development.

In Latvia in 2019, 83% of the total number of farms received support; out of 57,000 beneficiaries, 79% participated in the SAPS, and only 20% of the total number of beneficiaries were legal entities. On average, each farm received EUR 5616 per year; beneficiaries of the SAPS received 24% more. Only 30% of the total number of beneficiaries have requested to be allocated marked diesel fuel with a reduced excise tax rate, which shows the proportion of farms producing agricultural products of the total number of beneficiaries, leading to the conclusion that the other beneficiaries ensure public benefits for the population. Income from agriculture in farms that received marked diesel fuel with a reduced excise duty rate averaged almost EUR 58,000, or EUR 648 on average per managed ha. All beneficiaries received on average EUR 183 per ha; therefore, it can be concluded that the support accounted for 28% of agricultural income.

Comparing the indicators in all the four groups of specialised farms in Latvia, it can be found that vegetable farming and dairy farming can be considered effective sectors, because they are least dependent on support payments, which in 2019 accounted for 24–26% of their income, calculated per ha, while in arable crop farming the support accounted for 34% of the income, and in cattle breeding, 92%. This indicates that support payments are essential in ensuring the viability and resilience of farms. Therefore, when assessing the expected risks from European Green Deal policies, including CAP reform from 2023, farms need to adopt strategies to reduce the risks of climate change and policy changes and maintain agricultural productivity and farm profitability.

In Latvia, GHG emissions in 2019 per EUR 1 $ha^{-1}$ of revenue were the largest in cattle breeding (8 kg); this indicator was 2.7 times higher compared to that of the dairy

production sector, 5.3 times higher than that of arable crop cultivation farms, and 16 times higher than that in specialised vegetable cultivation farms. This should be considered when determining the reformed CAP support for farms from 2023. However, the detailed calculations carried out show that the possible base support payments are expected to be higher specifically in cattle breeding and dairy farming, which may contribute to even greater GHG emissions in the future and hinder the achievement of the goals of the European Green Deal. Thus, the hypothesis put forward for the study, namely, that in the application of the CAP reform introduced from 2023, contradictions arise between support to small farms, employment promotion, GHG reduction, and efficiency promotion in agriculture, is confirmed.

Implementing the European Green Deal policy would cause changes in the support system in Latvia. The responsible institutions need to create extensive information campaigns for farmers and their non-governmental organizations to justify the necessary activities and their possible costs, so that farmers can assess possible risks and make optimal decisions in the implementation of the new policy conditions in everyday farming practices. Therefore, it would be recommended that national governments, based on this research and similar ones, develop detailed action plans and offer risk-management strategies to help farmers mitigate the effects of climate change and the policies caused by it, thus increasing the long-term resilience of agriculture and increasing farm profitability.

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