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Commission recommendations for Sweden's CAP strategic plan

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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Recommendations to the Member States as regards their strategic plan for the Common Agricultural Policy

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1. COMMISSION RECOMMENDATIONS FOR SWEDEN'S CAP STRATEGIC PLAN

In the framework of the structured dialogue for the preparation of the common agricultural policy (CAP) strategic plan, this document contains the recommendations for the CAP strategic plan of Sweden. The recommendations are based on analysis of the state of play, the needs and the priorities for agriculture and rural areas in Sweden. The recommendations address the specific economic, environmental and social objectives of the future CAP and in particular the ambition and specific targets of the Farm to Fork Strategy and the Biodiversity Strategy for 2030. As stated in the Farm to Fork Strategy, the Commission invites Sweden, in its CAP Strategic Plan, to set explicit national values for the Green Deal targets[1], taking into account its specific situation and these recommendations.

1.1 Foster a smart, resilient and diversified agricultural sector ensuring food security

Income per agricultural worker has been around 40% of the average wage in Sweden for the last decade. Swedish agriculture is highly dependent on public support: direct payments represent over half of agricultural income per worker, with a higher level of dependence in livestock production in particular and in areas with natural constraints. Agricultural income in Sweden is also among the most volatile in the EU, while the use of tools to stabilise income and to manage income risks is relatively low.

Sweden has a challenging climate and labour costs are high. Total factor productivity has increased more slowly in Swedish agriculture than in the EU on average, and the utilised agricultural area (UAA) and livestock numbers have declined. The low return on total capital hampers investment in modernisation, innovation and productivity and makes generational renewal less attractive. In addition, CAP support has shown a tendency to capitalise in land prices, making farm income support less efficient.

Farmers in Sweden are well organised, with several large cooperatives that have a big share of the market of primary agricultural products, particularly dairy and arable products. Recognised producer organisations (POs) exist only in the fruit and vegetable sector, and agriculture's share of value added is significantly lower than the EU average, having declined almost constantly since 2008. The three major retail chains control over 80% of the market. Action should be envisaged – specifically for small and medium sized farms - to increase the amount of value added captured by farmers along the food chain.

1.2 Bolster environmental care and climate action and contribute to the environmental- and climate-related objectives of the Union

Swedish agriculture can play an important role in achieving the new climate and environmental goals established by the European Green Deal: Sweden manages a very valuable carbon sink at EU level, with significant forest cover (the second highest forested area as a percentage of national land area in the EU) and very carbon-rich soils. Sweden should therefore focus on preserving these carbon sinks, by avoiding deforestation and preserving or restoring peat soils.

[1] It concerns the targets related to use and risk of pesticides, sales of antimicrobials, nutrient loss, area under organic farming, high diversity landscape features and access to fast broadband internet.

Greenhouse gas (GHG) emissions from agriculture are comparatively low, energy consumption by the agricultural and forestry sectors is below the EU average, and the use per hectare (ha) of fossil energy is the lowest in the EU. Almost half of the energy produced in Sweden comes from renewable sources, with forestry as the most important source. Due to ammonia emissions from agriculture, Sweden is at high risk of non-compliance with its ammonia emission reduction commitments for both 2020-2029 and for 2030 and beyond.

The status of groundwater is mostly satisfactory but surface waters all fail to achieve a good chemical status and 62% of them have a less than good ecological status. Regarding the Green Deal target on nutrient loss, the gross nutrient balance in Sweden is better than the EU average, with regional differences, although eutrophication of coastal waters remaining a problem. Agriculture accounts for only a small part of water abstraction and the proportion of arable land with irrigation is relatively small.

The soil quality of arable land is generally satisfactory in Sweden, with relatively good and stable organic matter content and no significant soil erosion. The presence of heavy metals, particularly cadmium, in agricultural soil in some regions is a possible concern, and may require action.

Biodiversity, one of the Green Deal targets, is generally deteriorating in Sweden. The share of habitats in a good state of conservation has decreased and many types of forest and most grassland have an unfavourable or bad conservation status, though with regional differences. The farmland bird index shows a significant drop since 1995, with only a very modest recovery in recent years, and the Natura 2000 network coverage is rather limited.

According to the latest available data[12], the main pressures identified for grasslands are changes in land use and abandonment of agricultural land. Remaining areas of semi-natural grassland are very small and fragmented, and habitat quality is easily eroded in periods of abandonment or disadvantageous management.

Organic farming, another of the Green Deal targets, is well established in Sweden, with 20.3% of the total UAA dedicated to organic farming. Sweden should continue to support to farmers to maintain this level and increase it where possible.

1.3 Strengthen the socio-economic fabric of rural areas and address societal concerns

Sweden has one of the lowest population densities among EU countries. The rural population is ageing more quickly than in urban and peri-urban areas, the average age of farmers is increasing and farmers depend on employment outside agriculture for adequate income and diversification. It is not easy for young farmers to acquire land, which is a challenge for generational renewal.

The employment, growth and social inclusion rates in rural areas are all higher than the EU average. The poverty rate has slightly increased in rural areas, and migrants living in rural areas run a significantly higher risk of poverty than natives.

Sweden must take account of the specific needs of women in agriculture and rural areas to deliver on gender equality and close the gender gaps in employment, pay, pensions, care and decision-making.

Protecting agricultural workers, especially those in precarious, seasonal or undeclared jobs, will play a major role in respecting legal rights. This is an essential element of the fair EU food system envisaged by the Farm to Fork Strategy.

The rural areas of Sweden have many small enterprises and a high share of new business start-ups per inhabitant. The LEADER-method is well established over the whole country and has helped to create jobs. However, weaknesses in the knowledge and innovation system in rural areas hinder innovation.

The bio-economy in Sweden is an important sector, particularly forestry, with its high output of forest products and logging and high productivity[3].

Regarding the Green Deal targets on pesticides and antimicrobials, Sweden leads the EU in the sustainable use of veterinary antimicrobials and pesticides, and use of pesticides in the highest risk category has decreased. Monitoring of pests and controls on pesticide use are generally of high quality. However, Sweden should continue to promote the sustainable use of pesticides, particularly by ensuring the uptake of integrated pest management practices. It should also make an effort to shift towards healthier, more environmentally sustainable diets as it has a high consumption of red meat and a very low consumption of fruits and vegetables.

1.4 Modernising the sector by fostering and sharing of knowledge, innovation and digitalisation, and encouraging their uptake

Sweden has a good general level of education, including for farm managers. However, the agricultural knowledge and innovation system (AKIS) is relatively fragmented and not sufficiently connected to all AKIS-related fields. The rate of innovation is also estimated to be lower in agriculture and food processing than in other sectors. The current rural development programme for Sweden has, until now, a rather low disbursement of funds for training and advice, although the European innovation partnership (EIP) has contributed to innovation networks and innovation support services.

There are few initiatives to connect research results with farming, little applied research on agriculture and access to targeted training for individual farms/enterprises differs between sectors and regions. Farm advisory services are also rather fragmented.

Public expenditure on agricultural research is at a low level and has been decreasing for a long time. Enhancing the AKIS would lead to better coordination and cooperation between its participants to strengthen the impact of EU and national/regional funding for agricultural research and innovation.

It is essential to improve links between public and private advisors and to invest in their training and skills. Advisors should be supported to help capture individual innovative grassroots ideas and to develop them.

Sweden is highly digitalised and has a good broadband coverage although there is a gap between rural and urban areas. To achieve the Green Deal target on access to fast broadband internet, Sweden needs to speed up its roll-out considerably in sparsely populated areas to close this gap.

1.5 Recommendations

To address the above interconnected economic, environmental/climate and social challenges the Commission considers that the Swedish CAP strategic plan needs to focus its priorities and concentrate its interventions on the following points, while adequately taking into account the diversity of Swedish agriculture and rural areas, in particular the difference in needs between Southern and Northern Sweden.

Foster a smart, resilient and diversified agricultural sector ensuring food security

- **Address the weak increase in total factor productivity and the decline of agricultural income and production**, in particular in the livestock sectors, by providing appropriate investment support, in order to maintain food production and ensure attractiveness of farming. Improving the targeting of direct income support, by applying, for example, the complementary redistributive income support for sustainability and the reduction of payments.

- **Maintain and boost the value added captured by the farmers along the food chain**, focussing the support on research, innovation, knowledge, and strengthening the framework for farmers' cooperation, including POs. Support investments and advice to stimulate production of niche products and marketing via contemporary business channels to capture a growing consumer interest.

Bolster environmental care and climate action and to contribute to the environmental- and climate-related objectives of the Union

- **Contribute to the EU Green Deal target on nutrient loss** by supporting targeted operations to improve the nitrogen and phosphorus management and to reduce losses to air and water, as well as improving grassland management in areas with the highest cattle density.

- **Contribute to sustainable energy by** increasing renewable energy production and use on farms. Investment interventions could be envisaged among other support tools.

- **Promote climate change mitigation and GHG emissions reduction** by restoring, preserving, improving the carbon sinks on forest land (e.g. by fostering sustainable forest management) and carbon-rich soils (e.g. peatland and wetland conservation). Suitable tools could include conditionality, eco-schemes, rural development interventions and targeted investments. R**educe methane emissions** in line with the **Methane Strategy** (e.g. with biogas production).

- **Promote climate change adaptation**, by, in particular, conserving and restoring existing grasslands (for carbon sequestration and overall resilience of these ecosystems.).

- Contribute to the **EU Green Deal targets by establishing and maintaining high diversity landscape features** as well as by **preserving and increasing biodiversity and improving the status of protected habitats**, in line with the Prioritised Action Framework for CAP funding. Attention, considering regional differences, should be given to grasslands with high biodiversity value both within and outside Natura 2000 areas, to reverse the decline in farmland birds and

wild pollinators. Appropriate tools could include result-based eco-schemes or agri-environmental management commitments and non-productive investments, among others. The schemes that encourage voluntary set a side of areas with high values for biodiversity in the forestry sector should also be maintained.

- **Increase land with high ecological value** and make use of appropriate CAP instruments to ensure its conservation and enhance its ecological functionality.

- **Foster sustainable forest management**, enhancing multifunctionality, forest protection and restoration of forests ecosystems to reach good condition of habitats and species linked to the forests in order to enhance ecological services and biodiversity, and to build resilience to threats such as climate change impacts on forests. Improving prevention measures against abiotic and biotic damages.

Strengthen the socio-economic fabric of rural areas and address societal concerns

- **Promote generational renewal in farming** by facilitating access to start-up capital and land, in particular with CAP support to young farmers starting up a farm.

- **Boost job creation and social inclusion in rural areas** by facilitating innovation for rural businesses creation and development, by strengthening knowledge transfer and cooperation between research and rural businesses, and developing further the bio economy, in synergy with funding from other funds.

Modernising the sector by fostering and sharing of knowledge, innovation and digitalisation, and encouraging their uptake

- **Increase financing and strengthening of a coherent and coordinated organisation of the knowledge and innovation system**, including for a sustainable agriculture production with a special focus on greenhouse gas emissions reduction and use of biomass. Invest in a better integration of all advisors within the AKIS, so that they can cover all sustainability dimensions and up-to-date knowledge and innovation.

- **Promote local development in rural areas and contribute to the Green Deal target on access to fast broadband internet** by speeding up installation of next generation access (NGA broadband capacity) in rural areas, in particular in sparsely populated areas and to end users. In doing so it will be important to ensure synergies with other EU and national funds.

2. ANALYSIS OF AGRICULTURE AND RURAL DEVELOPMENT IN SWEDEN

The agricultural sector in Sweden operates in a Nordic climate with a limited number of crops and a large dairy sector. There are significant differences in production conditions and types between southern and Northern Sweden. The food supply chain up to the level of retail is largely controlled by the farmers via cooperatives except for meats and sugar. Due to geographical and climate constraints for farming, long distances within and between farms outside the main production areas, costs for production, such as labour and inputs, are high. The high national standards for animal welfare and environmental add to these costs, which are not fully compensated by productivity gains. The level of investments in particular for the animal husbandry sectors is low. The overall situation is characterized by a falling agricultural output, in particular for animal products, lack of interest for young farmer start-ups, and a strongly negative trade balance for food. Rural areas in Sweden are in a comparable situation with urban areas in terms of employment, growth and social inclusion, though a digital gap is visible between (in particular remote) rural and urban centres. Furthermore, the innovation capacity is relatively weak in rural areas in comparison with urban areas, and lower in agriculture and food processing than in other sectors of the economy.

2.1 Support viable farm income and resilience across the EU territory to enhance food security

The Swedish agricultural income/worker was 43% of the average wage in the economy from 2005-2019, which is around the EU average. Regarding resilience, years with difficult weather, such as dry conditions in 2009 and 2018 are sticking out with lower incomes.[4] The agricultural factor income per worker is above average, for field crops and granivores, around average for dairy producers but considerably below average for cattle farms. The agricultural factor income per worker for the horticulture production has been on an upwards trend since 2009 and in 2017 was considerably above average[5].

A majority of the farmers combine farming with other economic activities. Income per worker from agricultural activities increases with farm size, with the exception of the smallest farm size class.[6] Approximately half of the agricultural area is denominated as area facing natural or specific constraints (ANC). Incomes are lower in the ANC areas and in particular in the areas defined as mountainous.[7]

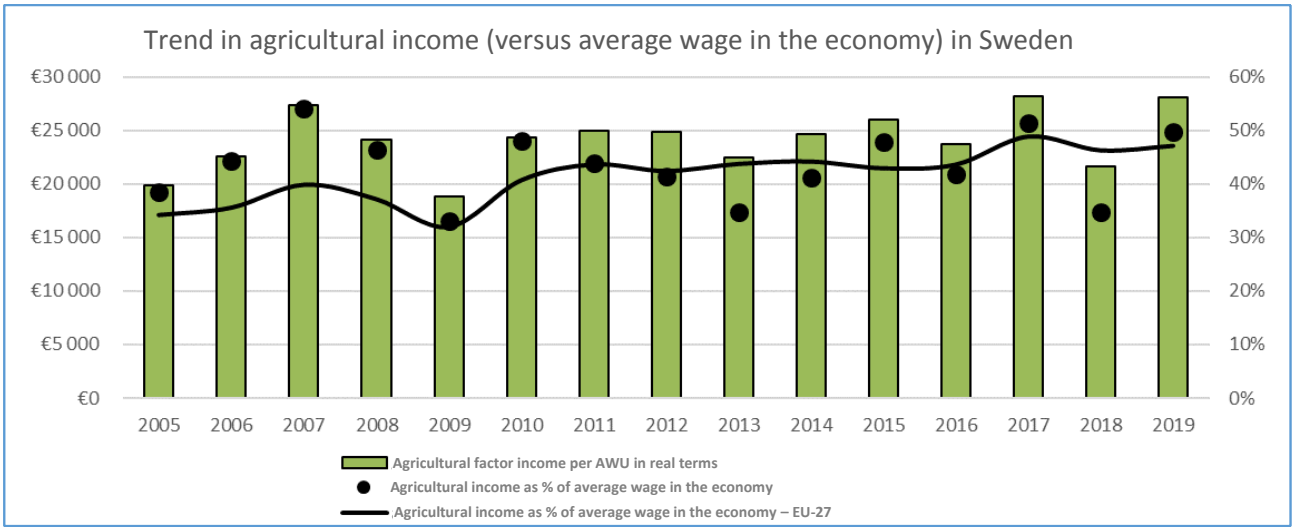
The dependency of direct payments is high in Sweden. Agricultural factor income was EUR 21 636 per worker in 2018 whereof direct payments represented 54%, or EUR 12 590 per worker compared to EUR 6 660 as EU average[8]. The payments falling under the second pillar are relatively high and have a significant contribution to farmers' income, in particular for the livestock production.

Sweden does not apply the redistributive payment. In 2016, 60% of the beneficiaries received less than EUR 5 000 of direct payments.[9] The highest direct payments per hectare are in the livestock farms.[10] In 2018, 20% of beneficiaries received 73% of direct payments. The share has been stable between 2015 and2018. In 2018, 20% of farmers held 68% of the land.[11] Sweden applies a reduction of payments of 5% for amounts in excess of EUR 150 000.[12]

In Sweden in 2018, 13% of direct payments was paid as voluntary coupled support and it was as a bovine premium.[13]

The farm income variability (measured through the coefficient of variation over sectors between 2007 and 2013 equals 1.64, which is one of the highest in the EU (EU average 0.93). Less than 25% of farms have agricultural crop insurance systems covering climatic risks. The number of farmers taking agricultural livestock income insurance systems is less than 1%[14].

The use of the income stabilisation tools is low, however the fiscal legislation allow farmers' to balance income between years with a similar impact. Several, in particular larger, cereals, oilseed and protein crop farms use forward- and futures contracts to hedge prices. The availability of hedging tools adapted to be used at the level of individual farmers is relatively good and provided by cooperatives, traders and banks. There are no agricultural mutual funds.[15][16]



Source: DG AGRI based on EUROSTAT[17]

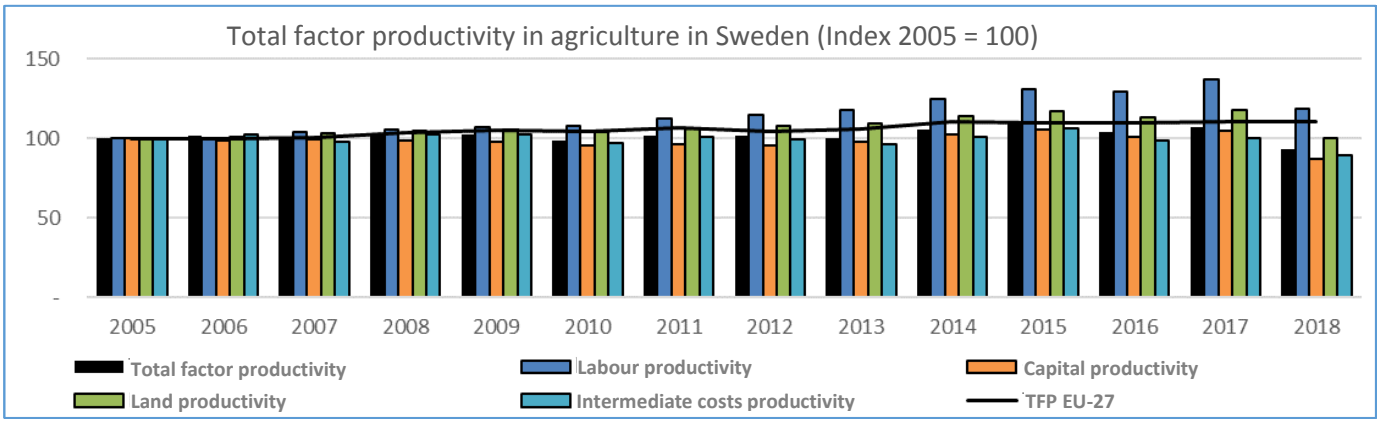
2.2 Enhance market orientation and increase competitiveness including greater focus on research, technology and digitalisation

According to the Farm Structure Survey (2016), there were 62 900 farms in Sweden whereof 15 500 could be classified as employing at least one person. A consolidation of the structure has taken place over time and the number has fallen by -17% since 2005. The average size has in the same period increased from 42 ha to 48 ha[18]. The Utilised Agricultural Area declined in the same period from 3,2 m ha to 3,02 m ha while the number of livestock units declined from 1,84m LU to 1,7 m LU[19]. Sweden has granted coupled support for cattle aged above 1 year since 2007 (13% of the envelope for direct payments)[20].

The Total Factor Productivity (TFP) increased by 0,7% on an annual basis from 2007 to 2017 which is below EU average (+0,9%)[21]. The labour productivity increased faster while the land-, and in particular, the capital productivity increased at a slower pace. The strong increase in the labour productivity can be explained by an outflow of labour from the sector due to a relatively fast consolidation and an ongoing modernisation where labour is replaced by capital (i.e. voluntary milking systems). The relatively high living standard in Sweden and the structure of the labour market results in relatively expensive basic skilled labour. Sectors outside farming have had a stronger increase of the TFP and in relative terms, the agricultural sector has lost competitiveness[22].

Despite an increased TPF in farming and a TFP in Swedish farming, the return on total capital is low which has an impact on the ability to offer competitive salaries and attract skilled labour. The gross fixed capital formation increased from 1995 to 2008 but stagnated after that. Due to low return on total capital, investments for modernisation, innovation and productivity are less attractive. Financing of such investments, including generational renewal, is more challenging when return on investment is low. The policy on land transfer and rents is, compared to many other Member States, in relative terms, less regulated[23]. The decoupled CAP support measures are therefore possibly largely capitalised. This is a challenge for the generational renewal and necessary investments to increase productivity.[24]

Sweden has a negative trade balance in agri-food products since long. The trade deficit has grown from around EUR 4000 million to more than EUR 6000 million in 2018. The trade balance with third countries turned positive in 2012 with spirits (vodka) as a key export product. However, the deficit with intra-EU trade is considerable and has been growing over time[25].



Source: EUROSTAT for TFP and DG AGRI for partial productivity

2.3 Improve farmers' position in the value chain

The cooperatives have a large market share in marketing the primary agricultural production (in particular on dairy and arable products) and supplying with agricultural inputs, such as machinery, fertiliser, seed and feed. The cooperatives are also active in processing, the largest dairy cooperative with a market share of 65% and the largest cereal cooperative with a market share of 65%[26]. The cooperatives are in general not recognised as POs.

There are five recognised POs in Sweden marketing 43% of the Fruit and Vegetables production, though this varies annually due to harvest quantities and market prices. The market share is slightly lower than the EU average at 49% for the sector. However, the proportionately important production of strawberries has only few producers that are member of a PO. There are no recognised POs in the dairy or the meat sector[27]. A target of 60% of the production to be marketed through recognised POs has been set in the national strategy for the food chain for fruit and vegetables[28]. No interbranch organisation (IBOs) has been recognised so far in Sweden.

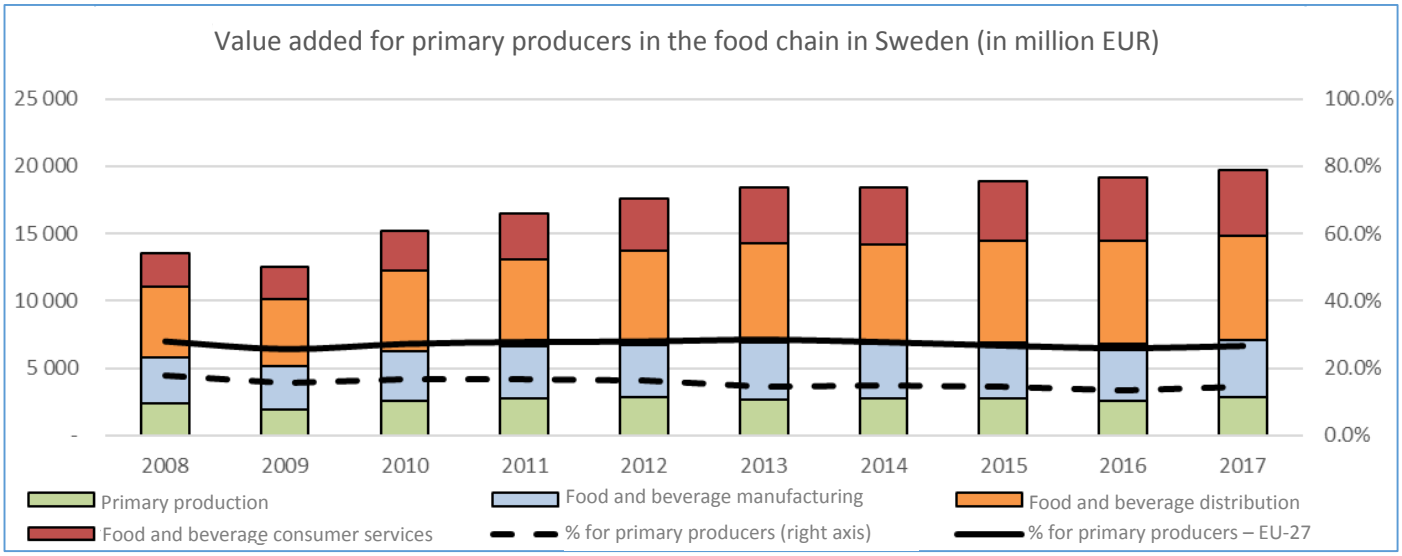
Furthermore, the Swedish primary production is focused on commodities for processing and the share of products suitable for business to consumer sale or, for on farm processing, (such as fruit and vegetables, wine and olive oil) is relatively low. Partly due

to this, the market for business to consumer sales (on-farm and other local food sales) is of relatively minor importance.

The wholesale and retail stage of the chain is highly concentrated, with three retail groups controlling a market share of 86%, which is higher than the EU average. In northern Sweden, the market share of the three main retailers is 99%[29]. The high concentration in the retail stage is to a certain extent balanced by a high consolidation in the processing stage, in some cases by cooperatives under the control of the farmers. The functioning of the food supply chain in general is assessed as relatively good.

The share of the value added captured by the agricultural sector in Sweden is lower than the EU-average (14% in 2017 vs. EU average at just above 20%). The share has declined slightly since 2008[30]. The amount of agriculture produce sold as unprocessed via direct sales on farm, through a short supply chain concept or on open-air markets is minor. Further, the production of typical products suitable for unprocessed direct sales, e.g. fruit and vegetables is relatively low. This structure of the food chain makes the share of value added captured by the farmer low but the farmer can focus on producing commodities and produce a bigger volume and capture a higher value added in absolute terms.

Eleven products are registered under the EU quality schemes whereof three in the category of spirit drinks and two cheeses. There is no support measure on EU quality schemes under the rural development program[31].



Source: EUROSTAT

2.4 Contribute to climate change mitigation and adaptation, as well as sustainable energy

In 2018, non-CO2 agricultural emissions of greenhouse gasses (GHG) in Sweden amounted to 6.8 million tonnes of CO_2 equivalents, down 8.3% since 2000, representing about 12.4%[32] of total GHG emissions in Sweden (above the EU average) and about 1.7% of the total EU GHG emissions from agriculture. In Sweden, the land use, land use change and forestry (LULUCF) sector is of particular importance not only in terms of carbon sinks but also in terms of emissions. In 2018, LULUCF sector as a whole was a net CO2 sink of 42 million tonnes mainly resulting from the large total forest area with an increase of sink by 8.3% from 2000. At the same time, emissions from cropland were 4 million tonnes of CO2 with an increase of 20% from 2000. Grassland was a net sink of 0,11 million tonnes of CO2 with an increase of 33 % since 2000[33].

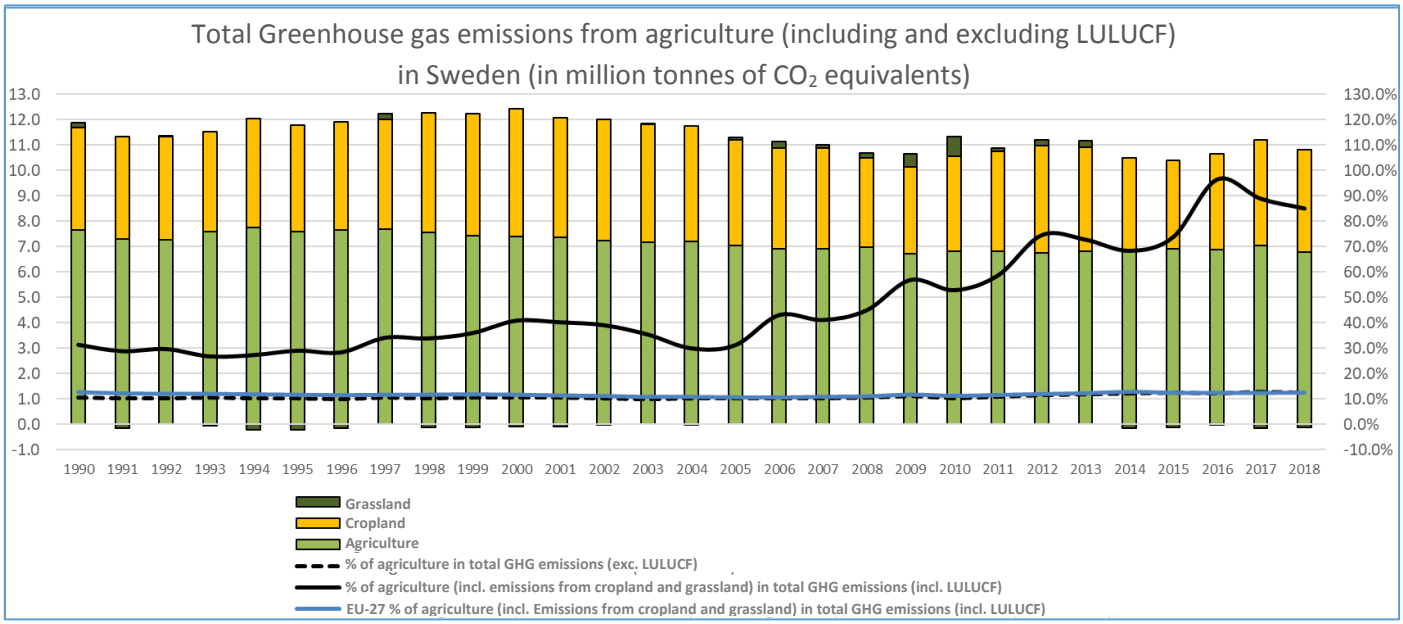
OECD reports that the main agricultural GHG emissions are CH_4 emissions due to the fermentation in ruminant digestive systems (37%), followed by the use of mineral fertilisers (17%), manure management and cultivation of organic soils (14% each). From 1995 to 2014, total agricultural GHG emissions decreased constantly, while agricultural production has varied widely between years. Overall, the carbon productivity – measured as agricultural production per unit of CO_2 emitted – of Swedish agriculture has improved, as GHG emissions decreased at a higher rate than agricultural production. The main drivers of this trend are a decline in the livestock population, particularly for pigs, cattle and dairy cows, and reduced use of fertilisers and animal manure[34]. On the other hand, in terms of carbon sinks, Sweden has the fourth highest mean organic carbon content in soils in the EU[35] and, with nearly 16%, the third highest percentage of peat soils in the EU when including peat soils in the forest areas and in the alpine region[36]. In addition, 69% of the territory of the country is covered by forest[37].

Energy consumption in Swedish agriculture and forestry in relation the total final energy consumption of the Member State (1.9%) is below the EU average (2.9%)[38]. Moreover the use per hectare, with 19.7 kg/ha is the lowest of the EU. The percentage of use of energy in the food processing industry in Sweden (1.1%) is below the EU average of 2.9%[39]. The challenge for Sweden will be to keep these positive indicators.

As regards the National Strategy for Adaptation to Climate Change, Sweden has made a good start with climate adaptation and there is both political will and finances available for this purpose. The Swedish Government recently adopted its first national adaptation strategy, which outlines mechanisms for coordination, monitoring, evaluation and review. Sweden's adaptation work is divided over different levels of administration, where each actor is responsible for adaptation within its sector or area of responsibility. Adaptation progress is generally positive, but an important step is now to move into concrete implementation, especially at the municipal level, where much of the responsibility lies, including for physical planning[40].

The **2**014-2020 Rural Development Programme (RDP**)** for Sweden spent around 1% of its budget on priority 5 promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sector.Around half of is spent on investments in renewable energy and the other half on reduction on investments in livestock management in view of reducing GHG and/or ammonia emissions. The execution of the RDP specifically designed for climate measures is low in general and in particular for biogas. By the end of 2019, less than 40% of the target for renewable energy set for 2023 had been realised while the target for reducing GHG and/or ammonia emissions by investments in livestock management had realised by slightly over 55% of its 2023 target value[41]. An evaluation from 2018 pointed at various reasons and proposed adaptations[42]. Furthermore, many of the measures under priority 4 "Restoring, preserving and enhancing ecosystems related to agriculture and forestry" with its total share of around 60% of the total EAFRD budget contribute as secondary effect to a reduction of emissions, increasing resource efficiency and fostering carbon sequestration. This includes knowledge transfer, investments, agri-environment and climate measures and support for organic farming[43]. The National Strategy for Forests in Sweden takes the form of a strategy for Sweden's National Forest Programme adopted on May 2018, followed by an action plan adopted in July 2018. The strategy focuses on five main areas: (1) sustainable forest management with greater climate benefits, (2) multiple uses of forest resources for more jobs and sustainable growth throughout the country, (3) world-class innovation and processed forest products, (4) sustainable use and conservation of forests as a profile issue in Sweden's international cooperation and (5) a knowledge leap to ensure the sustainable use and conservation of forests[44].

The country is generating 48.5% of their renewable energy production from agriculture and forestry as share of total energy production (EU-27 average of 41.4%). Almost 50% of renewable energy production in Sweden comes from forestry (with a slight decrease from 2015 to 2018). The share of agriculture in renewable energy grew from 0.9% in 2015 to 2.4% in 2018 which is still well below the EU average of 12% and could hence be boosted[45].



Source: European Environmental Agency. As in EUROSTAT [env_air_gge]

2.5 Foster sustainable development and efficient management of natural resources such as water, soil and air

The gross nutrient balance has been fluctuating between 30 and 42 Kg N/ha/y until 2017 and had a sharp increase to 60 Kg N/ha/y in 2018[46]. The potential surplus of nitrogen is in average 34 kg N/ha/y during 2012-2017 (< EU-27 average of 46.5% kg/N/ha/y), with a national surplus. The nitrogen load in southern Sweden is somewhat higher than in other parts of the country, but the differences between regions are otherwise not remarkable.[47] The potential surplus of phosphorus on agricultural land is on average 0.5Kg P/ha/year, which is the same as the EU average. The phosphorus surpluses have decreased over time and regional differences are noticeable, with deficits in the plains where more crops are cultivated but the density of livestock and granivores is low on average. However, around half of the nitrates and phosphorous loads attributable to human activities are of agricultural origin. In this context, special attention is to be paid to the Baltic Sea, where eutrophication is a long lasting environmental pressure. At least 97% of the region was assessed to be below good eutrophication status, including all of the open sea area and 86% of the coastal waters. Indicators reflecting nutrient levels were generally furthest away from good status[48]. 100% of the open sea and 82% the coastal waters of Sweden given as area and proportion by status class for the open sea and the coastal waters for whole Baltic Sea (HELCOM area) have a not good status regards to eutrophication[49].

Under the WFD 62% of surface waters are in less than good ecological status with all surface waters failing to achieve good chemical status[50] due to high natural levels of

mercury in the bedrock. For groundwater the majority of water bodies are in good quantitative status (99.7%) and the same for chemical status (98%)[51]. In terms of pressures on surface waters diffuse agricultural pollution was not the most significant but was reported to affect 8% of surface water bodies and affected 5% of groundwater bodies also.

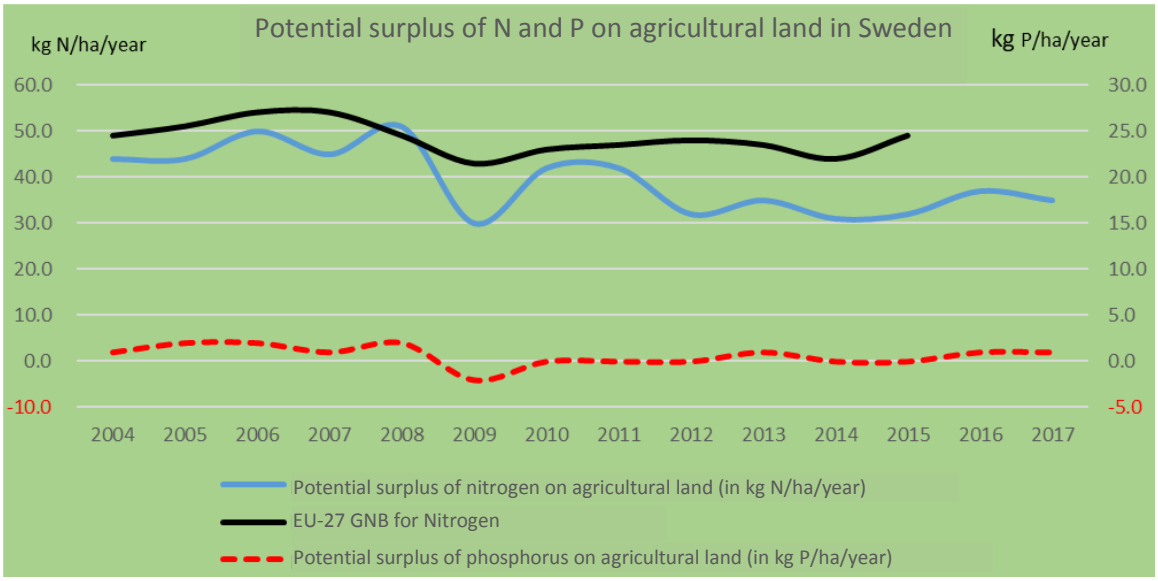
In general, water availability and resources are not an issue in Sweden, except in some regions where scarcity can have a considerable effect on agriculture. Of the total water abstraction in Sweden 3% is used by agriculture (one third for animals and two thirds for irrigation). Only 6% of the arable land has access to irrigation, but not all of this land needs irrigation in a given year.[52] There are considerable regional and annual differences, where agriculture in South of Sweden uses about 67% of the water abstraction for irrigation of the whole country (in total 111 052 560m3 in 2010)[53].

Soil organic carbon (SOC) in arable land in Sweden is in total 551 mega ton and the mean is 48 g/kg (mean EU: 43.1 g/kg), which is overall satisfactory and stable or slightly increasing over time[54] but with some regional differences. At the national average, the area at risk of soil erosion in 2016 in Sweden is 0.4 t ha^{-1} yr^{-1}, well below the EU-average. In addition, the area under severe erosion in Sweden is only 0.3%. There are slight regional differences, but there is no general erosion problem in Sweden[55]. In 2018, 10% of agriculture land in Sweden is under contracts to improve soil management, which is slightly below the EU average of 12%[56]. In 2016, 75% of tillable area was tilled conventionally and increasing conservation/zero tillage would be beneficial to increase carbon sequestration and reduce carbon loss of soils[57].

As for soil quality, heavy metals, primarily cadmium, originating from the bedrock, air, mineral fertilizers and liming material are also threatening sustainable management of arable land as a natural resource. Cadmium is more frequent in the plains in the south and middle Sweden[58] due to the natural composition of the bedrock.

The impact of soil management practices in Sweden may be further increased by linking them to research, innovation and demonstration activities available under the forthcoming Horizon Europe Mission on soil health.

Air quality: There is a downward trend in the total ammonia emission from agriculture in Sweden since 2005, with an increase between 2013 and 2015, followed by a slight decrease again as of 2016 (for the contribution of the RDP in this respect see point 2.4. above). A similar trend is visible in the EU. Overall, 87% of the total reported ammonia emissions in Sweden come from agricultural sources (2018 data)[59]. In the south of Sweden, the NH3 emissions are higher compared to the north because most of the agricultural land is located in the South and the temperatures are higher. Emissions per hectare are below the EU-average. However Sweden is found to be at high-risk of non-compliance with the emission reduction commitments for NH3 for both 2020-2029 and for 2030 and beyond[60].as established by the NEC Directive.



Source: EUROSTAT [aei_pr_gnb]

2.6 Contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes

According to the report recently submitted by Sweden on the conservation status of habitats and species covered by the Habitats Directive for the period 2013-2018 (EEA, 2020), the share of habitats in good conservation status has decreased compared to the previous reporting period (2007-2012). In Sweden 84% of grassland has an unfavourable or bad conservation status. The more favourable areas are located in the northwest of Sweden, whereas the unfavourable–bad grasslands are located in the south[61]. Importantly, all permanent grasslands in Swedish Natura 2000 sites have been designated as environmentally sensitive permanent grasslands. Conservation status of all grassland habitats is still unfavourable, although the use of agri-environmental schemes to support the conservation of grasslands seems to be yielding results[62]. The agri-environmental schemes make up a substantial part of the Swedish Rural Development Program. Sweden's score in the Farmland birds index decreased from 120.5 in 1995 to 71.7 in 2014[63], but went slightly up to 74.3 in 2018[64]. The 2015 Swedish Red List[65] showed that the rate of biodiversity loss had neither increased nor decreased over a 15 year period. Logging in old forests and overgrowth of grasslands, forests and wetlands were identified as the main threats to species.

The Rural Development Program of Sweden 2014-2020 allocate over 60% of its budget to the priority "Restoring, preserving and enhancing ecosystems related to agriculture and forestry". By the end of 2019, Sweden had almost achieved its target for 2023 of 19.2% of agriculture area (UAA) under management contacts contributing to biodiversity and /or landscape features[66].

The conservation status of many forest types also remains inadequate and many forest species are threatened.[67] Sweden indicates as main objective as to health and vitality of forests to maintain and improve the resistance of forests to abiotic and biotic risks[68]. In addition, pursuing monitoring efforts to complement this information for the forest habitat types listed in Annex I of the Habitats Directive that are in an unknown condition is essential (53,293 km² in unknown habitat condition out of the 61,735 km² of forests in total in the three biogeographical regions of Sweden)[69]. As indicated by Sweden, the reported main pressures on habitats are agriculture or the disappearance of agricultural

activity, natural systems modification, forestry and natural biotic/abiotic processes. The number of landscape elements as % in UAA is somewhat higher (1.7%) then the EU average (0,5%)[70]. 5.4% of UAA was fallow land in Sweden in 2018, which was above the EU average of 4.1%. Since 1975 there is a trend of fewer farming enterprises using more land or having bigger herds, which means that the farms are present in fewer places and leads to land abandonment. This ultimately is a threat for biodiversity; so agriculture is needed in the whole country.[71]

Regarding farming intensity[72] it may be relevant to point at regional variations in Sweden as slightly over 30% of farming land is intensely used, mainly on plains in south of Sweden and around the big lakes, where land and climate conditions are favourable for farming and where yields tend to be high. Approximately 24% of UAA is classified as High Nature Value (HNV) farmland. HNV in Sweden are comprised primarily of semi-natural pastures and meadows that contain trees, bushes or other landscape features. The main challenge for HNV is abandonment, which leads to overgrowth of scrub and eventually forest[73]. Around 34% of total Utilised Agricultural Area (UAA) is managed by farms with low input intensity per ha and around 35% is managed by farms with medium input intensity per ha. The Swedish average input expenditure per ha is 357 EUR per ha in constant input prices, which is below the EU-28[74] average of EUR 417 /ha. Over half of the land of total UAA in Sweden are areas of extensive grazing (primarily in the northern parts of Sweden), which is above the EU average. Here as well regional differences are significant in Sweden; with extensive grazing on 78% of the area of UAA in the northern parts of Sweden and 35% in the south.

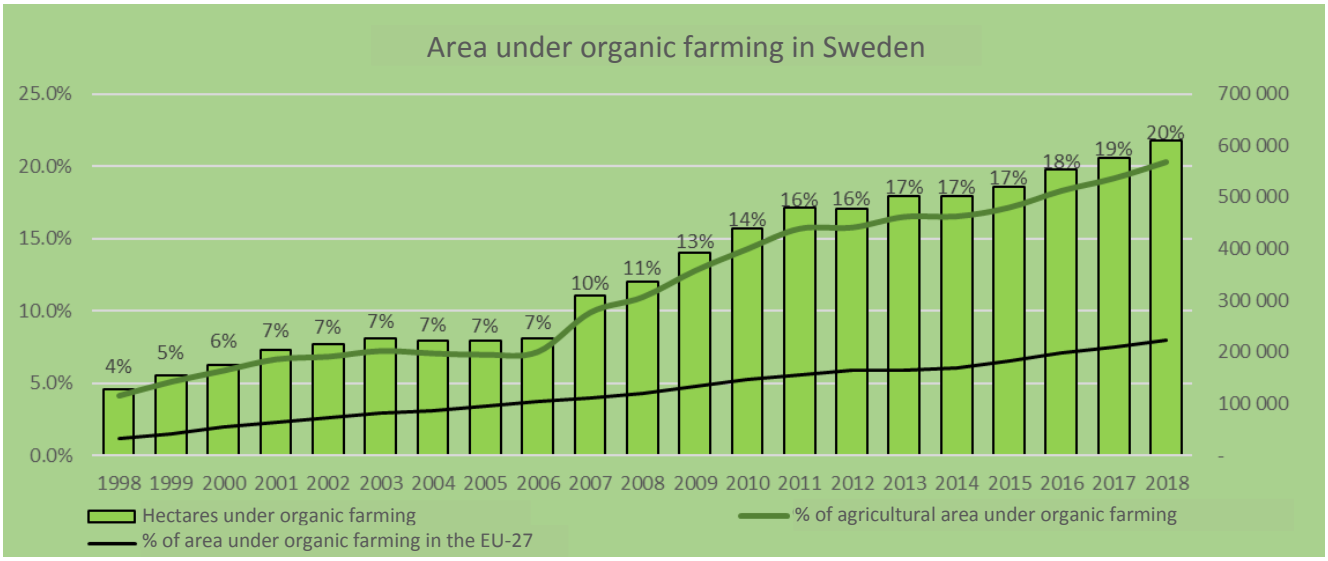
In 2019, around 12% of the Swedish territory is under Natura 2000's network (i.e. below EU-27 average of almost 18%)[75], 4% of its Agricultural area (including natural grassland) and almost 9% of Forest area (including transitional woodland shrub) are Natura 2000 areas, which are both well below the EU averages of 11% and 31% respectively.[76]. Sweden has an extensive program, with a significant uptake, for voluntary set a side of forest areas with high nature values. Voluntary set aside of such forest areas is a precondition for participation in commercial certification schemes for forestry and is often commercially interesting for forest owners.

According to the latest available data (draft Prioritised Action Framework), the main pressures identified for grasslands are land use changes and abandonment of agricultural land[77]. It notes especially that remaining areas of semi-natural grassland are very small and fragmented, and that habitat quality is easily eroded in periods of abandonment or disadvantageous management. Abandonment of agricultural land and changes in land use are also key threats to Swedish heathlands and scrub habitats.

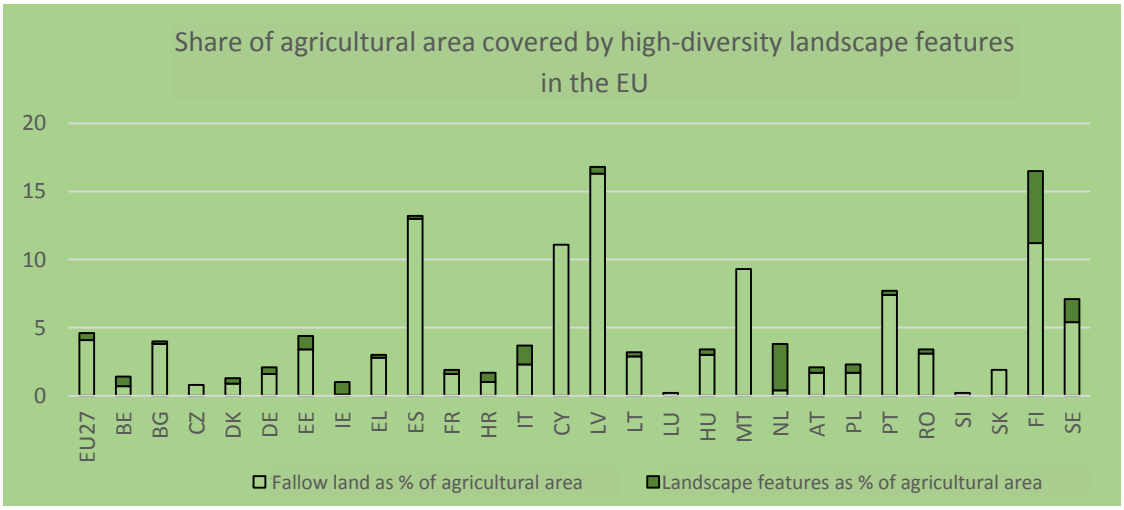
In Natura 2000, the draft PAF identifies needs to support active and recurring management of grassland habitat types, of heathland and scrub habitat types and of three rocky habitats, dunes, and sparsely vegetated lands habitat types (6110, 8230, and 8240). Also management of problematic native species and control of problematic alien species; Restoration measures to increase the area in favourable conservation status (including restoration of pastures and meadows and restoration of forests to Fennoscandian wooded pastures (9070)). In terms of governance/administrative capacity/training, the draft PAF notes a need for more measures directed to farmers, such as information on management methods and expected results for biodiversity, considering the generally poor and deteriorating state of grassland habitats.

The total area under organic farming (certified and under conversion) has doubled in Sweden between 2008 and 2018, covering 608 754 hectares in 2018[78]. This type of

farming has grown with around 1% yearly in 2007-2018, with a few exceptions[79]. With 20.3% of the total utilized agricultural area under certified organic farming in 2018, Sweden is above the EU average (8%). There are notable regional differences, with 20% of total UAA under organic farming in the north of Sweden and 13% in the south[80]. There is still, however, room to reach the Green Deal target of 25% of the UAA converted by 2030. The number of organic producers slightly increased from 5600 in 2012 to 5800 in 2017. The share of animals held by organic farmers increased from 2013 to 2018 for sheep and to lesser extent cattle[81]. The challenge for Sweden will be to step up efforts to meet the Farm to Fork targets.



Source: EUROSTAT [org_cropar_h1] and [org_cropar]



Source: DG AGRI based on Eurostat and JRC based on LUCAS survey.

** Linear elements considered here: Grass margins, shrub margins, single trees bushes, lines of trees, hedges and ditches. This estimation is to be taken with caution because of methodological caveats.*

2.7 Attract young farmers and facilitate business development in rural areas

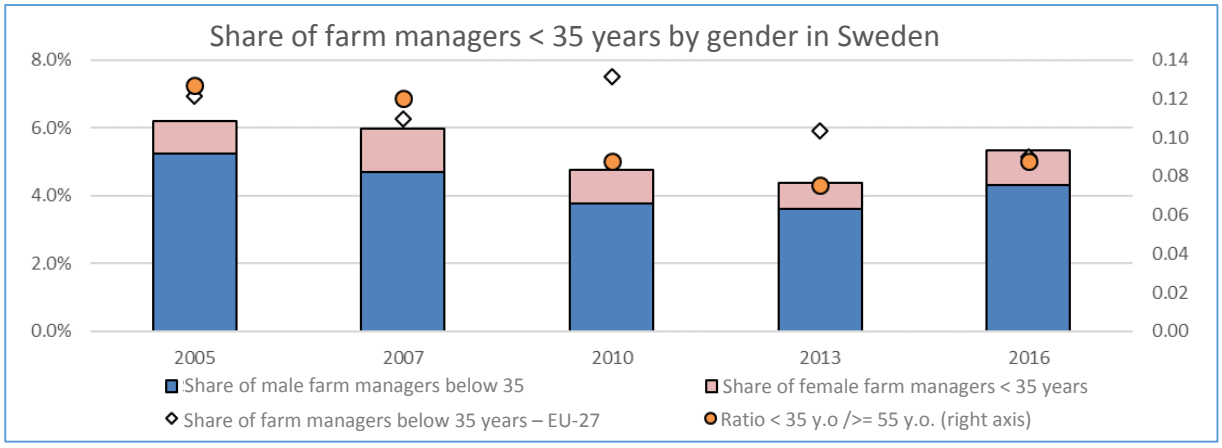
Population in rural regions has declined in most Member States, but grown in Sweden between 2014 and 2019 which also recorded the highest population growth rates, with an increase above 10.0 per 1 000 persons in 2018[82]. However, in several counties, primarily

in more remote areas of northern Sweden the population diminished[83]. In Sweden 32.7% of farmer managers is +65 years (EU average 32.8%)[84] and the average age of the farmer has increased during 2005-2016 and the age of >64 years has gone up from 20% to 30%[85], while the ratio of young /elderly farmers is slightly under the EU average (SE: 30.9%, EU average 32.5% in 2016)[86]. Around 5% of the total number of farm managers in Sweden are young farmers[87] under the age of 35 years (close to EU average) and 10% are under the age of 40 years (slightly below the EU average of 10,7%). There are significant regional differences. Whereas the EU-trend is downward between 2010 and 2016, Sweden shows an upward trend between 2013 and 2016. Around 21% of young farm managers are female in Sweden in 2017 (compared to 13% of the age group of >65 year old). Younger farmers have in average a higher education than older colleagues[88]. In Sweden almost 37% of farm managers under the age of 40 years have a full agriculture training compared to the EU average of 19%[89].

The average land price for arable land and pastureland has increased significantly in recent decades, even faster than inflation, which has affected the demand for finance for the purchase of land. For the year 2017, land prices increased by an average of 10% throughout the country.[90] It is not easy for young farmers to get access to land[91]. Young farmers and new entrants require substantial start-up capital in order to access land and face particular difficulties in accessing finance. The demand for finance is, therefore, higher for this group. Based on the results of the fi-compass survey, the unmet financing demand for the agriculture sector in Sweden is estimated at EUR 148 million.

Most of the investment support from the Rural Development Programme (RDP) was used for investments in new or modernised stables and farmers below 44 years old have benefited from almost 40% of the support. Support to young farmers gives them a smoother start to their new business operations, but in some regions, the budget for such support has run out. Young beef and dairy producers benefit most from the EAFRD start-up support.[92] Young farmers in Sweden received 1.4% of the Pillar I support (same as EU average) in 2018[93].

The rural areas of Sweden have many small enterprises and a high share of new business start-ups per inhabitant. The frequency of start-ups is similar in rural and urban areas and the self-employment is in many places stronger in the rural areas than in the urban agglomerations[94]. However, a relatively weak AKIS[95], diminishing access to educated people and limited research competence in rural areas is hindering innovation.[96].



Source: EUROSTAT

2.8 Promote employment, growth, social inclusion and local development in rural areas, including bio-economy and sustainable forestry

Sweden is one of the EU countries with the lowest population density (less than one fourth of the EU average of 109 inhabitants/km^2) and even lower if considering rural areas (SE 9 inh/km^2, EU 51 inh/km^2)[97], but the regional differences are considerable. The Swedish rural areas are well below the EU average (SE 24%, EU 45%) but the intermediate areas considerably above (SE 68%, EU 46%)[9899]. Only 9% of the Swedish population live in rural areas which is less than half of the EU average of almost 21%; most Swedes live in intermediate areas (SE 51%, EU 39%) and almost 40% live in urban areas (close to EU average)[100]. The rural-urban population divide in Sweden has been rather stable between 2005 and 2019 with a slight population increase in urban areas. In Sweden, rural population has aged more quickly than in urban and peri-urban areas, but if you look at the population younger than 15 years there is only a slight difference between urban (18.3%) and rural population (16.9%) in 2018[101]. Sweden has a slightly higher share of younger people in rural areas than the EU average[102]. However, in several counties, primarily in more remote areas of northern Sweden the population diminished[103] and they are listed among the rural regions with shrinking future demographic trends. However, for the projected old-age dependency ratio in 2070 (i.e. ratio of the number of people aged 65 or over, compared to the number of people aged 20-64 years old), Sweden is one of the EU countries with the lowest projected rate (< 53.7%)[104].

The employment (men and women)[105] and social inclusion[**106**] rates in rural areas are in general following the rates in other areas of Sweden and these are all higher than the EU average. However, youth unemployment in rural areas in Sweden is higher than the EU average (SE 17.4%, EU 14.6%). The Swedish GDP/capita is above the EU average in total and in rural areas[107], however there is a strong urban rural gap of almost 50 percentage points which is similar to the EU average[108]. 15% of farm managers in Sweden are women, which is nearly half of the EU average of 28% in 2016. The poverty rate has in 2018 slightly increased in rural areas (20.4%) compared to total rate (17%)[109] and migrants living in rural areas run a significantly bigger risk of poverty than natives[110]. As for tourism, the majority of bed places are located in rural areas, although the total number of bed places in rural areas decreased by 0.1% between 2012 and 2017. Tourism is important for the diversification of the service sector outside agriculture sector in rural areas[111] and Sweden is well above the EU average regarding bed places in rural areas (SE 56%, EU 45%[112]). Between 2005 and 2016 the number of very small farms (<EUR 2000 standard output) has been steadily decreasing (from approximately 13% to about 7%) and the number of small farms (<EUR 8000 standard output) has been marginally decreasing (from slightly above to slightly under 40% of farms). In terms of hectares, the very small farms represent only a few percentage points and the small farms less than 10%[113].

Local development: Almost 8% of the current Rural Development Programme is spent on local development and a majority of rural population (over 57%) is covered by local development strategies (including LEADER, basic services and other). Sweden is thereby exceeding the target (of 52.20%) set for 2023. The LEADER-method is a well-established tool for rural development all over the country and has contributed to job creation. Territorial instruments such as Community Lead Local Development with multi-fund support contribute to strengthening the socio-economic fabric of rural areas.

Rural infrastructure and services: In Sweden there is barely a difference between urban and rural areas regarding the financial burden of health care, and it is less of a problem than in other EU countries. In Sweden, rural areas are to a lower degree than urban areas and towns and suburbs self-reporting unmet needs for medical examination. Rural and urban areas spend about the same share of consumption expenditure on food and non-alcoholic drinks, but people in rural areas spend about 1/3 more on transport than people do in cities. In Sweden (in 2016) the main reason for not meeting needs for formal childcare services was that it is not available (and not because of distance or financial reasons). The rural areas in Sweden have a higher rate for crime, violence or vandalism measured by degree of urbanisation than the EU average, but lower than the rate of cities, towns and suburbs in Sweden and it is following the same trend. Overcrowding rate by degree of urbanisation (of total population) is not an issue for Swedish rural areas, compared to non-rural areas in Sweden and to the EU average in 2012-2018[114].

Bio-economy[115] counts for 7% of the GDP, 11% of the total turnover and 23% of the total export of goods. Almost 350 000 persons are employed in the bio-economy sector (i.e. 7% of the total employment)[116]. From 2008 to 2015, the employment numbers have slightly decreased while the turnover slightly increased, with yearly variations. The turn over per person employed in the bio-economy in Sweden has remained double the EU average figures in this period[117].The most important sectors are bio-based textile, paper and wood products and furniture which together contributed to half of the bio-economy sector in terms of turnover in Sweden in 2015[118].

In Sweden 69.6% of the total area is forestry area (30 505 000 ha)[119]. The forestry sector employs 0.5% (i.e. 27 300 persons) of the population employed in Sweden, agriculture 1.1% (57 200 persons), food industry 0.9% (44 400 persons) and tourism 3.2% (164 300 persons). The Swedish forestry employment is slightly above EU average (0.3%) while the other sectors are below EU average (agriculture 4%, food sector 2.4% and tourism 4.8%). The labour productivity in the forestry sector in 2017 was slightly above the EU-27 average, similar relation also for the years 2015-2017[120]. In the EU (in 2017) Sweden had the highest output of forestry and logging (over EUR 9000 million) and gross fixed capital formation in forestry[121], the second highest score as regards productivity and third highest in terms of employment[122].

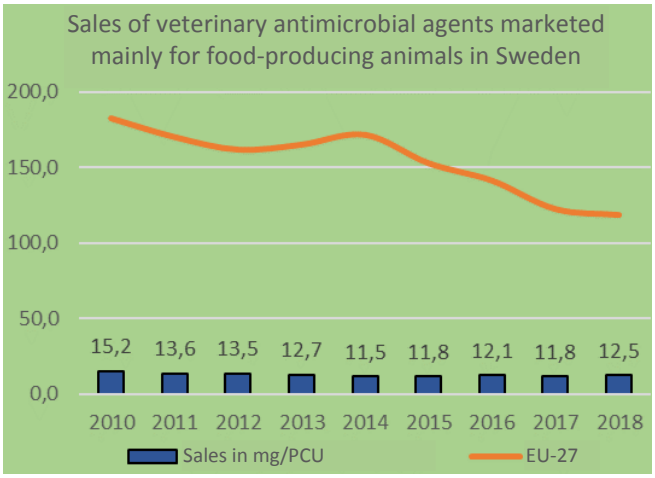
2.9 Improve the response of EU agriculture to societal demands on food and health, including safe, nutritious and sustainable food, as well as animal welfare

Antimicrobial resistance (AMR) is a priority area for the Farm to Fork strategy. In Sweden, the distribution of antimicrobial veterinary medicine products (VMPs) is only on prescription through pharmacies. Feed mills may only mix antimicrobial VMPs in feed if they are controlled and authorised by the Swedish Board of Agriculture. Sales of medicated feed to farmers are only allowed on prescription (i.e. the farmer presents the prescription to the feed mill). Mixing of antimicrobials in feed may also take place on farms, provided that the Swedish Board of Agriculture has controlled and authorised the establishment for this purpose. All pharmacies, feed mills and farms authorised to mix medicated feed in Sweden are required to provide sales statistics to a central database. The tenth ESVAC Report in 2020 states that the use of antimicrobial VMPs in Sweden with 12.5 mg/PCU (2018) is the lowest of the EU (average of 118.3mg/PCU)[123].

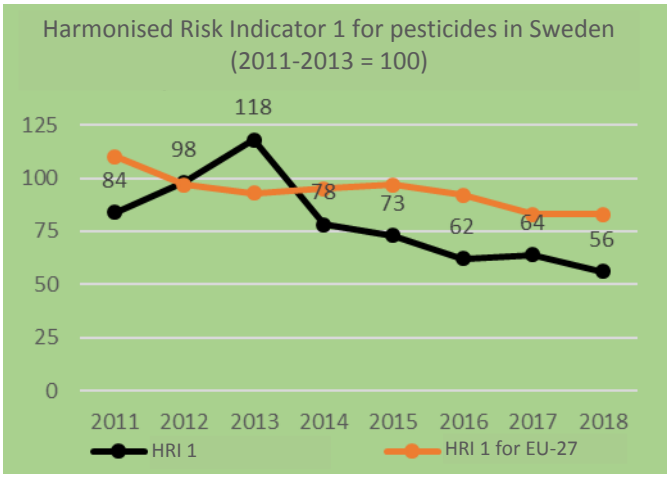
Animal welfare is another priority area for the Farm to Fork strategy. The Commission has already stressed that adequate resources should be devoted to implementing EU rules in the above areas[124]. The present Swedish strategy is based on prevention of animal welfare problems through compliance with the national legislation, which in many regards is stricter than the relevant EU requirements. The Board of Agriculture has in turn set objectives to ensure good- risk based and fair controls and uses its Multi-Annual National Control Plan operational objectives to monitor the performance[125]. The Rural Development Programme for Sweden for 2014-2020 devotes approximately 3.6% (around EUR 140 million) of its total public expenditure budget to animal welfare[126] and has almost reached its target for 2023[127]. An evaluation from 2019 shows that the measure has worked well in general and should be maintained[128].

Sweden has had action programmes to reduce the use of plant protection products since the 1980s. The risks to human health and the environment associated with pesticides in Sweden are low by historic standards, and remain stable against a backdrop of increasing use in recent years. The current National Action Plan focuses on reducing the risks associated with, and dependency on, pesticides. It establishes clear objectives, with specific targets in some cases. The Competent Authorities have taken a range of measures to implement the Directive on sustainable use of pesticides. In relation to this area, the main issues in Sweden are about inspection of pesticide application equipment in use, derogations granted in relation to inspection of certain pesticide application equipment and (while Commission past audits highlighted a number of good practices, such as an extensive pest monitoring system[129]) effective controls on the implementation of the general principles of IPM[130]. Figures published by the Swedish authorities show a significant decrease of more than 44% since the 2011-2013 baseline of the harmonised risk indicator (HRI) 1 indicating the use and risks of pesticides. For the calculation of HRIs, the active substances are divided into Groups 1-4 (Categories A-G are subgroups within Groups 1-4. Category 1 (low-risk active substances) shows a big increase but categories 2 and 3 remain stable. HRI 2 shows a decrease of the use of most risky products by derogation from the standard prohibition. Increasing resilience of the agricultural and forestry sectors by improving the uptake by farmers of integrated pest management principles (such as crop pest management, using more resistant varieties and species, using risk management tools (such as insurance) etc.) is however important in Sweden too.

According to studies, Swedish diets are often unbalanced, lacking in fruits and vegetables[131], but with a high estimated consumption of red meat. Efforts should focus on shifting towards healthy sustainable diets, in line with national recommendations, in order to contribute to reducing the incidence of non-communicable diseases while simultaneously improving the overall environmental impact of the food system. This would include moving to a more plant based diet with less red meat and more fruits and vegetables, whole grains, legumes, nuts and seeds. Further efforts as regards addressing food waste and loss are expected in the forthcoming national food waste prevention programme, as required by Article 29(2a) of the Waste Framework Directive 2008/98/EC.



Source: DG AGRI after ESVAC, Tenth ESVAC Report (2020)



Source: EUROSTAT [aei_hri]

2.10 Cross-cutting objective on knowledge, innovation and digitalisation

The public sector continues to be the main source of funding for agriculture R&D and business investment in R&D is normally driven by market demand, but governments also provide different kinds of incentives. The intensity of public expenditures on agricultural research is low and variable[132]. The research intensity of budget expenditure on agricultural R&D – expenditure expressed as a share of agricultural gross value added (GVA) – was 0.9% in 2015 (and equal to economy-wide research intensity) compared to 0.5% in 1981 and 1.8% in 2005. Compared to neighbouring countries, public research intensity for agricultural R&D is much lower in Sweden[133]. The Swedish (public) financing of research and development in the agriculture sector has declined from EUR 52,9 million in 2013 to EUR 42,8 million in 2018 (UN Sustainable Development Goal 2 SDG2)[134].

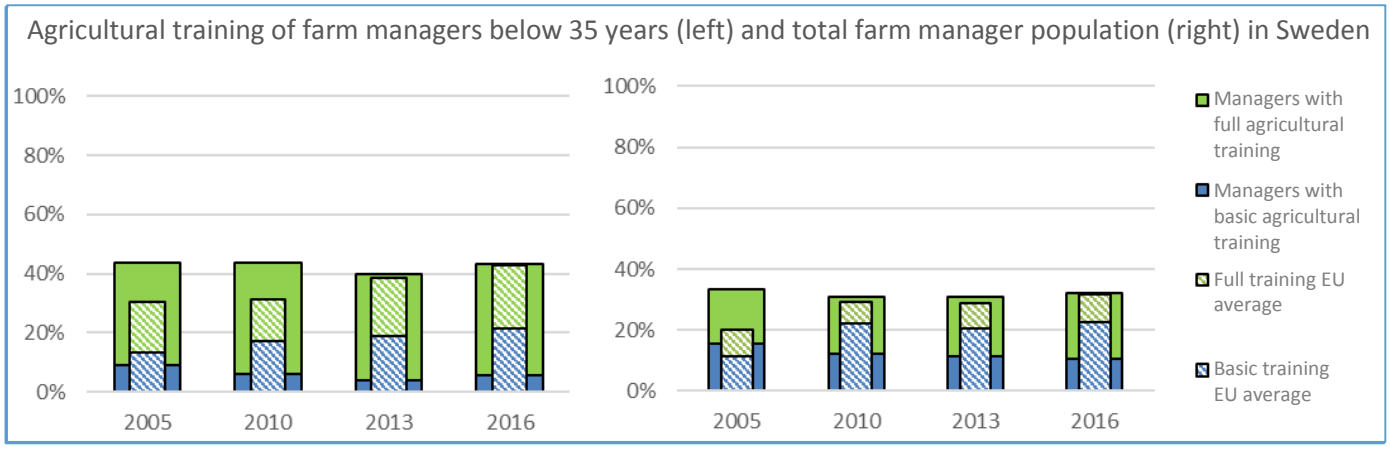
In the Rural Development Program Sweden spends relatively much on knowledge transfer, advisory services and EIP cooperation. Sweden programmed 7.85 % or their RD envelope to these areas, compared to 3.6% as EU average. However, by the end of 2019 Sweden had realised less than 25% of its target set for these measures[135] (as it has had difficulties to get started with advisory services and knowledge transfer in other areas than the already earlier established ones addressing agri-environment and climate issues) and reduced the expenditure in these fields in 2020[136]. By the end of 2019, the Swedish Rural Development Program support for EIP had exceeded its target of establishing 80 EIP Operational Groups while less than half of the target of total number of cooperation operations (supported under the cooperation measure) had been achieved[137].

The agriculture and food sector has a relatively diversified and fragmented knowledge and innovation system[138], which is weaker in comparison with that of other economic sectors. This might be explained by the fact that many SMEs in the sector have limited resources for own innovations and marketing of new products[139]. In addition, there are rather few initiatives to connect research results with farms, little applied research concerning the agriculture sector and varying access possibilities to training for individual farms/enterprises[140]. The Swedish farm advisory has been considered relatively fragmented[141]. In the current programming period, the National Rural Network had a specific objective to foster innovation and had among their tasks the networking of advisors and operational groups, and the facilitation of knowledge and exchange. The Swedish National Rural Network has been among the most active ones among different national networks during the current programming period[142]. Almost all households

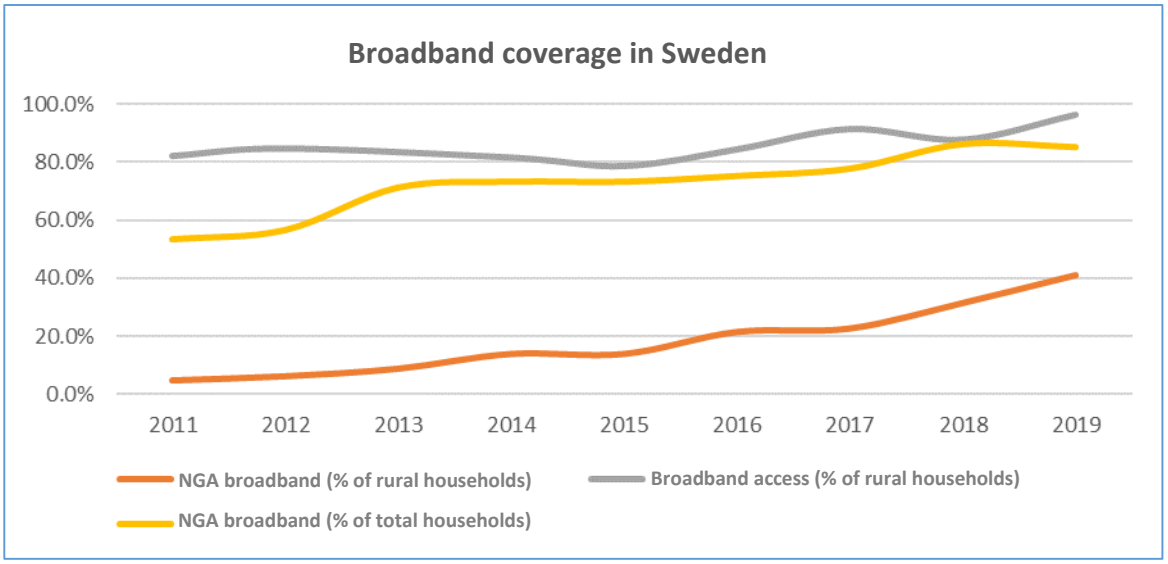
(96%) in Sweden have access to **b**roadband, 85% of households to NGA broadband but there is a digital gap with rural areas since only 40% have NGA access[143]. In areas outside the agglomerations, the cable capacity is often lower[144]. The roll-out in sparsely populated areas needs to speed up as to close the rural-urban divide. Nearly 12% of the 2014-2020 Rural Development Program (RDP) for Sweden is spent on ICT (broadband) and the commitments exceeded 100% at the end of 2019. However, the achievement of the target set for 2023 has been rather low for various reasons; the projects are rather big, with several connections, lengthy project design and the difficulty to install broadband in rural areas has often been underestimated[145].

Sweden ranks 2nd amongst EU Member States in the Digital Economy and Society Index (DESI) 2020 and in the Connectivity dimension (score: 64.4, against 50.1 EU average), having 77% household coverage with Fixed Very High Capacity Network coverage in 2020 (EU average: 44%)[146]. In the 5G readiness index, Sweden scores 22%, compared to an EU average of 21%[147]. People in rural areas in Sweden have relatively high digital skills (i.e. it would be expected that there is a good basis for innovation and digitalisation). Sweden has not yet opted for the use of satellite-based means to monitor CAP implementation.

Swedish farm managers are relatively well trained - the proportion of farm managers in Sweden with "full agricultural training" is significantly higher than the EU average (33% of the total farm managers attained basic or full agricultural training in 2016. This share is rather stable over time)[148].



Source: EUROSTAT [ef_mp_training]



Source : DESI report

[1] Swedish Environmental Protection Agency. Prioritised Action Framework (PAF) for Natura 2000 in Sweden. Draft version from the Swedish Environmental Protection Agency to the Swedish Ministry of the Environment and Energy. First version: 14/12/2018, revised 26/09/2019 https://naturvardsverket.se/upload/miljoarbete-i-samhallet/miljoarbete-i-sverige/regeringsuppdrag/2018/PAF-EN-Sweden-NV-v3-20181214a.pdf

[3] European Commission JRC. DATAM bio economy. Jobs and Wealth in the European Union Bioeconomy. https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html

[4] European Commission . *CAP context indicator C.25 Agricultural factor income* and *CAP context indicator C.26 Agricultural entrepreneurial income*. Income based on EUROSTAT [aact_eaa04], [aact_ali01] and [aact_eaa06], adding back the compensation of employees to the entrepreneurial income and divided by the total number of annual working units. Note: 2019 data estimated. The Average wage in the economy based on EUROSTAT [nama_10_a10_e] thousand hours worked using employees domestic concept and [nama_10_a10], item wages and salaries

[5] Directorate General for Agriculture and Rural Development own calculations based on FADN data (up to 2018).

[6] Directorate General for Agriculture and Rural Development own calculations based on FADN data (up to 2018).

[7] Farm Accountancy Data Network. FADN Standard reports. YEAR.COUNTRY.ANC3 and own calculations (up to 2018)

[8] European Commission. CAP indicators – Data explorer. CAP Result indicator RPI_ 01 Share of direct support in agricultural income.

[9] Directorate General for Agriculture and Rural Development own calculations based on CATS (Clearance of Accounts Trailing System) data (up to 2017)

[10] Directorate General for Agriculture and Rural Development own calculations based on FADN (Farm Accountancy Data Network) data (2015)

[11] Directorate General for Agriculture and Rural Development own calculations based on CATS (Clearance of Accounts Trailing System) data (up to 2017)

[12] European Commission. Direct Payments: Financial mechanisms in the new system. https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/direct-payments-financial-mechanisms-jun2016_en.pdf

[13] European Commission. Direct payments 2015-2020 Decisions taken by Member States: State of play as from December 2018, Information note. https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/simplementation-decisions-ms-2018_en.pdf

[14] Directorate-General for Agriculture and Rural Development, ECORYS and Wageningen Economic Research. *Study on risk management in EU agriculture*. Publication Office of the EU, Brussels 2018. 302 pages.

[15] Directorate-General for Agriculture and Rural Development, ECORYS and Wageningen Economic Research. *Study on risk management in EU agriculture*. Publication Office of the EU, Brussels 2018. 302 pages.

[16] Fi-compass. *Financial needs in the agriculture and agri-food sectors in Sweden.* 2020. 94 pages. https://www.fi-compass.eu/sites/default/files/publications/financial_needs_agriculture_agrifood_sectors_Sweden.pdf

[17] European Commission. *CAP context indicator C.25 Agricultural factor income.* Based on EUROSTAT [aact_eaa04], [aact_ali01] and [aact_eaa06] and *CAP context indicator C.26 Agricultural entrepreneurial income.* Based on EUROSTAT [aact_eaa04] and [aact_ali01] Note: 2019 data estimated. The Average wage in the economy based on EUROSTAT [nama_10_a10_e] thousand hours worked using employees domestic concept and [nama_10_a10], item wages and salaries.

[18] Eurostat. Farm structure (ef). National Reference Metadata in ESS Standard for Quality Reports Structure. [FSS_ESQRS_A]. https://ec.europa.eu/eurostat/cache/metadata/EN/ef_esqrs_se.htm#stat_pres1521799740438

[19] Eurostat. Farm structure (ef). National Reference Metadata in ESS Standard for Quality Reports Structure. [FSS_ESQRS_A]. https://ec.europa.eu/eurostat/cache/metadata/EN/ef_esqrs_se.htm#stat_pres1521799740438

[20] European Commission. Direct payments 2015-2020 Decisions taken by Member States: State of play as from December 2018, Information note. https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/simplementation-decisions-ms-2018_en.pdf

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[55] European Commission. *CAP context indicator C.42 Soil erosion by water.* Original source: Joint Research Center

[56] European Commission. *CAP indicator – Data explorer* https://agridata.ec.europa.eu/extensions/DashboardIndicators/Soil.html

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[64] European Commission. *CAP context indicator C.35 Farmland birds index (FBI)*. Based on EUROSTAT [env_bio2], original source: EBCC, BirdLife, RSPB and CSO.

[65] SLU, Swedish Species Information Centre. The Swedish 2015 Red List Summary. Last updated April 2017. (https://www.artdatabanken.se/en/the-red-list/the-2015-red-list---summary/#share-box-header)

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[78] European Commission. *CAP context indicator C.19 Agricultural area under organic farming.* Based on EUROSTAT [org_cropar_h1] and [org_cropar]

[79] European Commission. *CAP context indicator C.19 Agricultural area under organic farming.* Based on EUROSTAT [org_cropar_h1] and [org_cropar]

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[85] European Commission. CAP context indicator C.23 Age structure of farm managers. Based on EUROSTAT [ef_m_farmang]

[86] European Commission. CAP context indicator C.23 Age structure of farm managers. Based on EUROSTAT [ef_m_farmang]

[87] Even though the CAP considers someone a young farmer when the person is below 40 years, EUROSTAT, up to 2013, split up the age class at 35 years

[88] European Commission. CAP context indicator C.24 Agricultural training of farm managers. Based on EUROSTAT [ef_mp_training]

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[97] European Commission. *CAP context indicator C.04 Population density*. Based on EUROSTAT [demo_r_d3dens] and [urt_d3dens]

[98] Please note that there are different ways to define "rural areas". The text above is based on the so-called "urban-rural typology" in line with the CAP common context indicators. However, according to the definition based on the "degree of urbanisation typology", in Sweden 64.2% of the territory are rural areas and 20% of the population live in rural areas. Source: Eurostat.

[99] European Commission. CAP context indicator C.03 Territory. Based on EUROSTAT [reg_area3] and [urt_d3area]

[100] Please note that there are different ways to define "rural areas". The text above is based on the so-called "urban-rural typology" in line with the CAP common context indicators. According to the definition based on the "degree of urbanisation typology", in Sweden 64.2% of the territory are rural areas and 20% of the population live in rural areas. Source: Eurostat.

[101] European Commission. *CAP context indicator C.02 Age structure*. Based on EUROSTAT [demo_r_pjanaggr3] CAP Context Indicator C. 02 shows that population of +65 has increased with 1,4% in rural areas and with 0,8% in urban areas. Moreover, ca 23% of rural inhabitants are +65 while it is ca 18% in urban areas in 2018.

[102] European Commission. *CAP context indicator C.02 Age structure*. Based on EUROSTAT [demo_r_pjanaggr3] In Sweden 16.9% of the population in rural areas are under 15 compared to the EU average of 15.2%

[103] Statistikmyndigheten SCB *Hitta statistik / Befolkningen ökar svagt på landsbygden*. https://www.scb.se/hitta-statistik/artiklar/2018/befolkningen-okar-svagt-pa-landsbygden/

[104] European Commission, *Staff Working Document on the demography report* (SWD(2020) 109 final).

[105] The employment rate for 20-64 year old in Sweden is in total is 82% (84% for men, 80% for women) compared to EU average of 73% (79% for men, 67% for women) and 83% in rural areas in Sweden compared to 73% EU average.

[106] European Commission. CAP context indicator C.09 Poverty rate. Based on EUROSTAT [ilc_peps11] The poverty rate is 18% in total in Sweden compared to EU average of 21.6%, and 20.4% in rural areas in Sweden vs EU average of 23.6% in rural areas.

[107] European Commission. *CAP context indicator C.08. GDP per capita.* Based on EUROSTAT [nama_10r_3gdp] and [nama_10r_3popgdp]. GDP/capita expressed as index PPS in 2018 was in Sweden 121 compared to the EU average of 100 and in rural areas (in 2016) 104 compared to EU average of 71.]

[108] European Commission. *CAP context indicator C.08 GDP per capita*. Based on EUROSTAT [nama_10r_3gdp] and [nama_10r_3popgdp]. Figures for GDP in total refer to 2018 and for the rural/intermediary/urban divide to 2016.

[109] European Commission. *CAP context indicator C.10 Structure of the economy*. Based on EUROSTAT [nama_10r_3gva]

[110] Natale, F., Kalantaryan, S., Scipioni, M., Alessandrini, A. and Pasa, A., Migration in EU Rural Areas, EUR 29779 EN, Publications Office of the European Union, Luxembourg, 2019. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC116919/migration_in_eu_rural_areas.pdf

[111] Jordbruksverket, *Förutsättningar för den gemensamma jordbrukspolitiken 2021-2027 – SWOT-analys*. https://www.regeringen.se/4a7081/contentassets/d4e9ac5e331e4f129e3d637681ce34c8/bilaga-1-forutsattningar-for-den-gemensamma-jordbrukspolitiken-2021-2027-utkast-till-swot.pdf

[112] European Commission. *CAP context indicator C.30 Tourism infrastructure*. Based on EUROSTAT [tour_cap_nuts2d]

[113] European Commission. *CAP context indicator C.17 Agricultural holdings (farms)*. Based on EUROSTAT [ef_m_farmleg]

[114] European Commission. EUROSTAT EU-SILC survey [ilc_lvho05d]

[115] Tillväxtanalys (2016). *Den svenska bioekonomins utveckling – statistik och analys. Svar Direkt 2016:12.* The analysis by Tillväxtanalys (2016) sets that the concept of bio-economy has been based on the national accounts and Swedish Standard Industrial Classification (SNI-codes). This involves subjective assessment of the extent to which certain SNI-code relate to bioeconomy.

[116] Tillväxtanalys (2016). *Den svenska bioekonomins utveckling – statistik och analys. Svar Direkt 2016:12.*

https://www.tillvaxtanalys.se/download/18.62dd45451715a00666f1c6ca/1586366168312/svardirekt_2016_23_Den%20svenska%20bioekonomins%20utveckling%20–%20Statistik%20och%20analys.pdf

[117] European Commission, JRC. DATAM bio economy. *Jobs and Wealth in the European Union Bioeconomy*. In 2008: SE €207 927, EU €97 000, in 2015: SE €255 997 and EU €119 000. https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html

[118] European Commission, JRC. *DATAM bio economy. Jobs and Wealth in the European Union Bioeconomy*. https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html

[119] European Commission. *CAP context indicator C.29 Forest and other wooded land (FOWL).* Based on EUROSTAT [for_area], original source FAO, Forest Europe and Unece.

[120] European Commission. CAP context indicator C.15 Labour productivity in forestry. Based on EUROSTAT [for_eco_cp] and [for_awu]

[121] EUROSTAT [nama_10_a64]

[122] European Commission. CAP context indicator C.29 Forest and other wooded land (FOWL). Based on EUROSTAT [for_area], original source FAO, Forest Europe and Unece.

[123] European Medicines Agency, European Surveillance of Veterinary Antimicrobial consumption (ESVAC). *Sales of veterinary antimicrobial agents in 31 countries in 2018 – trends from 2010 to 2018 Tenth ESVAC Report.* EMA/24309/2020.

[124] Letter to Sweden from Commissioner Kyriakides, 20/05/2020

[125] European Commission, DG SANTE, FVO report (2019): https://ec.europa.eu/food/audits-analysis/audit_reports/details.cfm?rep_id=4209

[126] Rural Development Programme for Sweden for 2014-2020, version 7.0, including the indicative public support to animal welfare of approximately 136 million, corresponding to 3.41% of the RDP total public expenditure)

[127] Annual Implementation Report (AIR) of Rural Development Programme of Sweden, 2019. By the end of 2019 Sweden had realised 16.8% of the target for animal welfare which is 17.4% to be achieved by 2023 (indicator T25 showing % of LU covered by M14).

[128] Swedish Board of Agriculture, Evaluation of animal welfare payments (2019) *Jordbruksverkets Utvärdering av djurvälfärdsersättningar (2019)*

[129] More details in European Commission, DG SANTE, FVO Audit Report, 2017: https://ec.europa.eu/food/audits-analysis/audit_reports/details.cfm?rep_id=3909

[130] Letter to Sweden from Commissioner Kyriakides 20/05/2020.

[131] Eurostat. https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=hlth_ehis_fv3c&lang=en . Defined as: consumption of ≥ 5 portions is below EU27 average and one of the 2 additional criteria is met: a) 1-4 portions below EU27 average, b) 0 portions above EU27 average.

[132] OECD. Food and Agriculture Review (2018). Innovation, Agricultural Productivity and Sustainability in Sweden, 2018.

[133] OECD. Food and Agriculture Review (2018). Innovation, Agricultural Productivity and Sustainability in Sweden, 2018.

[134] Eurostat. *Government support to agricultural research and development* [Code: sdg_02_30] https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=sdg_02_30&plugin=1)

[135] Annual Implementation Report (AIR) of Rural Development Programme of Sweden, 2019. (T1 target for 2023 is 8,03 while uptake at the end of 2019 was 24,78%). In the 6th program amendment (adopted on 16 September 2020) Sweden reduced the expenditure in this area.

[136] European Commission. Commission Implementing Decision of 16 September 2020 approving the amendment of the rural development programme of Sweden for support from the European Agricultural Fund for Rural Development and amending Implementing Decision C(2015)3485, C(2020)6441).

[137] Annual Implementation Report (AIR) of Rural Development Programme of Sweden, 2019, p. 4 and p.1

[138] Knierim, A. (University of Hohenheim, Germany), and Prager, K. (James Hutton Institute, Scotland). Pro-AKIS study. PRO AKIS, funded by the European Commission 7th Framework Programme project (2015).

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[140] Statens Offentliga Utredningar SOU 2015:15 *Slutbetänkande av Konkurrenskraftsutredningen*. 2015.

[141] OECD. Food and Agriculture Review (2018) *Innovation, Agricultural Productivity and Sustainability in Sweden*. 2018.

[142] European Commission. *ENRD screening of NRN action plans2020.* https://enrd.ec.europa.eu/sites/enrd/files/y5_rdp_screening_nrns_summary_report.pdf

[143] European Commission. Digital Economy and Society Index (DESI) 2020. *Report DESI 2020 Connectivity*. p.8 https://ec.europa.eu/digital-single-market/en/connectivity

[144] Jordbruksverket, *Förutsättningar för den gemensamma jordbrukspolitiken 2021-2027 – SWOT-analys*. https://www.regeringen.se/4a7081/contentassets/d4e9ac5e331e4f129e3d637681ce34c8/bilaga-1-forutsattningar-for-den-gemensamma-jordbrukspolitiken-2021-2027-utkast-till-swot.pdf

[145] Annual Implementation Report (AIR) of Rural Development Programme of Sweden, 2019. By the end of 2019 Sweden had realised 10.08% of the target for 2023 (T24) percentage of rural population benefitting from new or improved services/infrastructures (ICT), i.e. 0.49% realised of the set target of 4.86%. The budget had however been fully committed and almost 1/3 of it had been paid.

[146] European Commission. Digital Economy and Society Index (DESI) 2020 Sweden

[147] European Commission. Digital Economy and Society Index (DESI) 2020 Sweden

[148] European Commission. CAP context indicator C.24 Agricultural training of farm managers. Based on EUROSTAT [ef_mp_training]