Chapter 1

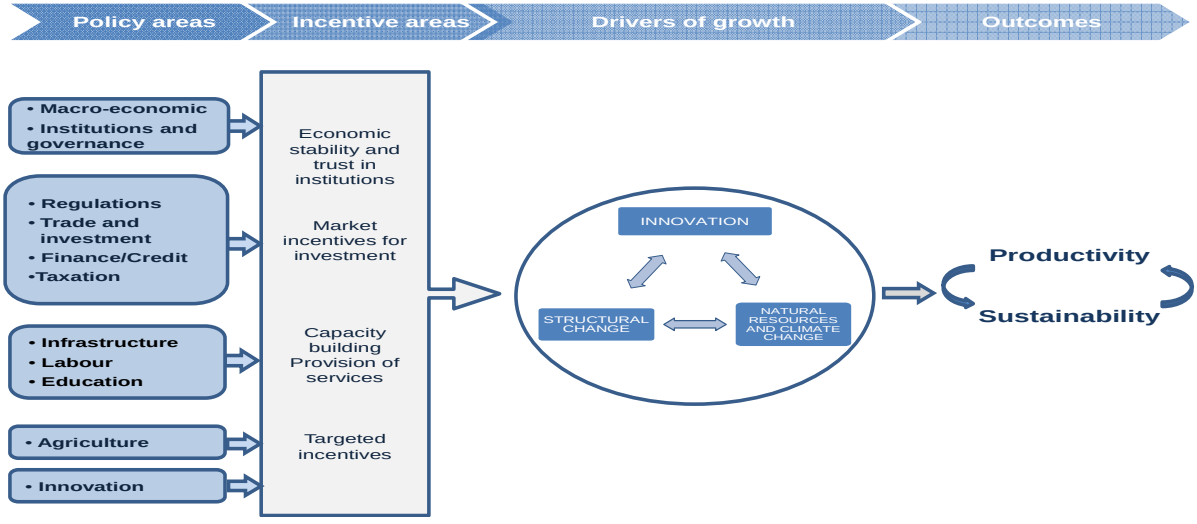
Overall assessment and recommendations

This chapter summarises the findings of the review and presents policy recommendations to foster productivity and sustainability in the food and agriculture sector in Sweden. Policies are examined using a framework developed by OECD to analyse the extent to which a country's policies support innovation, productivity growth, structural change and sustainable use of natural resources in the food and agriculture sector.

A framework for analysing policies for innovation, productivity and sustainability in the food and agriculture sector

Improvements in agriculture productivity growth are required to meet the growing demand for food, feed, fuel and fibre, and these must be achieved sustainably by using natural and human resources more efficiently. A common finding is that a wide range of economy-wide policies affect the performance of the food and agriculture sector, and need to be considered alongside agriculture-specific policies. The framework used to review policies in Sweden considers policy incentives and disincentives to innovation, structural change, and environmental sustainability of agriculture and climate change impacts on agriculture, all of which are key drivers of productivity growth and the sustainable use of natural resources (Figure 1.1).

Figure 1.1. Policy drivers of innovation, productivity and sustainability in the food and agriculture sector



Source: OECD (2015).

This review begins with an overview of the characteristics and performance of the food and agriculture sector and the challenges that it faces (Chapter 2). A wide range of policies is then considered according to the main channels or incentives through which productivity growth and environmental sustainability are impacted. These include: economic and institutional environment (Chapter 3); capacity building, including provision of essential public services (Chapter 4); agricultural policy, domestic and trade related (Chapter 5); and the agricultural innovation system (Chapter 6).

Challenges and opportunities to increase productivity and competiveness of the food and agriculture sector

The key challenges for the Swedish food and agriculture sector are to ensure that innovations strengthen productivity in ways that maintain high standards of environmental sustainability, and balanced regional development within an open trading system.

Since joining the European Union (EU) in 1995, Sweden has endeavoured to support and implement EU and domestic agricultural policy reforms to move towards a more market-oriented and sustainable agricultural system aimed at achieving high levels of environmental performance and animal welfare, while also ensuring high productivity and financial viability for farmers, with lower government

expenditure. As a result, Swedish consumers and citizens have high confidence in the quality and safety of food within their country.

While Sweden does not have a comparative advantage overall in food and agriculture production, there is a high degree of heterogeneity and some sectors, such as vegetables and the downstream food supply chain are competitive. Although there is untapped potential to improve agricultural productivity to supply the domestic market, innovation is estimated to be lower in food and agriculture businesses than elsewhere in the economy. In this respect, efforts to strengthen education, research and innovation are on-going to encourage the adoption of new cost-reducing technologies, while at the same time maintaining high environmental sustainability, food safety and animal welfare standards.

The food and agriculture sector is a small and decreasing part of the Swedish economy in terms of output and employment. Structural changes in agriculture over time have resulted in a sharp decline in the number of farmers, and farms have become larger and more specialised. The food supply chain is well functioning, but there are concerns about the high concentration in the Swedish retail food industry, although consumers benefit from the resulting economies of scale as well as from smaller specialist retailers supplying niche food markets.

Since Sweden joined the European Union, total factor productivity (TFP) for the agricultural sector as a whole has grown at a slightly higher rate than the EU28 average over 1995-2016. Labour productivity growth is the main source of TFP gains as labour has been increasingly substituted by capital, often embodying the latest technologies. Livestock production, particularly of pigs, milk and beef, has declined since 1995, while in other sectors such as vegetables, grains and poultry broiler, production has increased.

The growth in agricultural TFP is mainly due to structural changes such as the concentration of production in fewer, larger and more efficient farms, and the government is making efforts to accelerate this trend through more targeted research, education and the adoption of new, state-of-the-art technologies. This can help to overcome the inherent disadvantages of location and climate in Sweden. Achieving sustainable TFP growth for the agricultural sector requires a continuation of structural adjustments and well-targeted investment, so that farmers can adopt new or improved technology to help offset high production costs that otherwise impact on financial viability and the ability to invest in innovative techniques.

Input costs are largely determined outside the food and agriculture sector and the low productivity growth in some agricultural sectors in Sweden is due to the high share of input costs in production. Sweden's disadvantages in agricultural productivity relative to other EU Member states are linked mainly to the constraints related to climate and location, large capital investment costs in infrastructure – such as housing and stables for animal husbandry – labour costs and taxes. High labour costs are nevertheless driving forces to incentivise investment in new technology. The difference in cost of production between Sweden and other EU Member states is also important, due to the specific domestic rules with respect to environmental and animal welfare standards that require corresponding infrastructure, auditing and certification of farms, although they are partially offset through price *premia* paid by consumers. These factors explain why Sweden's trade deficit of agro-food products has grown over the years, mainly due to an increase in imports of processed foods. The European Union and, in particular, Nordic countries are the biggest markets for Swedish agricultural products. With the exception of grains, Sweden is a net importer of agricultural products.

Overall policy recommendation

- ***Accelerate implementation of the Swedish Food Strategy platform*** to better account for the knowledge and innovation needs in agriculture.

Framework conditions are enabling innovation and entrepreneurship

Sweden's economy is innovation-oriented and competitive

Sweden has a highly sophisticated and well-educated population that places high importance on environmental and animal welfare issues. It is a knowledge-driven economy with a strong and stable macroeconomic environment and well-functioning markets for goods, labour and capital. Inclusive and sustainable growth over the past two decades has underpinned a high quality of life for Swedes. Being well integrated into international markets has enabled the country to overcome the constraints of a small domestic market and peripheral geographical location.

Sweden is relatively open to trade and foreign direct investment, contributing to a competitive and business-friendly environment. However, there are some restrictions on the ownership of agricultural land by companies, as regulations and customs in Sweden favour farm ownership by individuals and families. Sweden encourages private sector R&D through a number of economic incentives, in the form of special grants and allowances specifically for employment in R&D activities. While social security contributions are reduced substantially for R&D employees, tax allowances for R&D only apply to employment in the private sector.

In Sweden labour taxes accounts for about 60% of total taxation, the remainder accounted by capital and consumption taxes. Farmers are subject to the same rules on taxation and social security as the rest of society. In addition there is an energy and carbon tax which is aimed at reducing fuel consumption, and, thus, improving the environment. The tax on agricultural diesel is amongst the highest across EU Member states.

The value of farmland in Sweden has been increasing due to rising demand (including from urban sources), the capitalisation of support into higher land values and low interest rates. There is a perceived need in Sweden to raise private investments in agriculture not only to increase food supplies, but also to raise the amenity value of the countryside for the urban population. The Swedish Land Acquisition Act favours the purchase of agricultural land by individual farmers rather than by "legal entities" so as to preserve the private ownership of farmland. However, due to low profitability in farming and the need for greater investment in the sector, the rules for land acquisition are under review to encourage a greater involvement of such "legal entities".

Regulations in Sweden are more extensive and complex than those in other EU Member states

The regulatory environment for entrepreneurship, including the food and agriculture sector, is governed by both EU and national legislation. Over time, Sweden's environmental policies have become very strict, as reflected in the OECD's environmental policy stringency indicator, now amongst the highest in the OECD area.

Sweden's environmental policy is defined by the "Generational Goal" framework, which sets out 16 environmental quality objectives. Its main purpose is to achieve a clean and healthy environment within one generation. In agriculture, the focus is to ensure a "varied agricultural landscape", reduce climate change impact and achieve zero eutrophication with specific guidance on the management of agricultural resources.

The Swedish Environmental Code and the EU's Environmental Impact Assessment Directive govern environmental standards for agricultural production. An environmental impact assessment is required for a wide range of agricultural activities, in particular, for intensive poultry and animals produced for food. The cost of the assessment is borne by the farmer. Although the number of regulations has declined over the last decade, the level and complexity of the regulations in Sweden are still onerous and well above those in other EU Member states.

National legislation tends to set norms and standards for environmental and animal welfare well above EU requirements in the food and agriculture sector, particularly in relation to the types and permitted

uses of pesticides, and the use of antibiotics in animal production, as well as animal welfare requirements such as housing, space, and husbandry practices. The Swedish Board of Agriculture (SBA) has recognised these concerns, and is currently reviewing these specific regulations with a view to simplifying them and reducing costs to farmers.

While Swedish regulations on the environment, crop production and chemical use, as well as animal health and animal welfare, reflect citizens' preferences and their willingness to pay, they are complex and costly to implement. In effect, the administrative and operational costs of implementing these higher standards are an additional burden on agriculture and food producers compared to farmers in other EU Member states.

While specific environmental, animal health and welfare requirements raise costs to producers, they can also act as a spur to the transfer of knowledge, technical know-how and innovations, which are aimed at encouraging a more resilient and sustainable agriculture and food sector. Nevertheless, a high priority of the Government is to simplify and relax the implementation of these regulatory measures, with a view to lowering both the administrative burden and compliance costs on enterprises in the food and agriculture sector. Greater acceptance of mutual recognition agreements across European countries, such as those on pesticides, is also likely to contribute to reducing the relative cost impact on Swedish farmers.

In Sweden, Genetically Modified Organisms (GMOs) are strictly regulated by a number of agencies. In agriculture, the SBA has primary responsibility for land-based genetically modified plants, animals, and the use of GMOs in animal feed. As regards the food sector, the Swedish Food Agency is primarily responsible for approving all new food products and validating the source of these products.

Regulations on products and processes in Sweden are largely determined at the EU level, whilst implementation, as in all EU Member states, is at the national level. In the food and agriculture sector, most of the legislation is harmonised with other EU Member states; in some cases, Swedish legislation takes precedence. Sweden has a long tradition for having higher standards than other EU Member states with respect to animal health and has a special “guarantee” in relation to salmonella standards and the use of antibiotics in agriculture. As a result, Sweden is salmonella “free” due to both its strict National Control Programme in production of animals for human and its favourable cool climate and low population density. Sweden has the lowest use of antibiotics in animal for human food production in the European Union and low incidence of resistant bacteria. Nevertheless, further reducing the need to use antibiotics and mitigating the increase in antibiotic resistance is a high priority for Sweden, as it is for the European Union and across the world.

In the area of plant health, Swedish regulations on plant protection products are stricter than the harmonised EU legislation. Some products used in the European Union are currently banned in Sweden due to environmental concerns. However, a 2014 audit by the Food and Veterinary Office (FVO) concluded that the system of mutual recognition is not correctly applied in Sweden, as Sweden does not accept the assessment of other EU Member states. With fewer plant protection products authorised in Sweden, the lack of access to important pesticides has increased the cost of production of some crops and has thus put Swedish producers at a cost disadvantage compared to farmers’ in other EU Member states. On the other hand, from a consumer perspective, food may be safer for human health in Sweden as a consequence.

Sweden maintains one of the highest standards on animal welfare in the European Union and globally. These standards cover all aspects of animal production ranging from housing to husbandry, transport and exercise space. While these requirements create additional demands and costs on livestock producers, they are a highly important aspect of food production in Sweden reflecting societal preferences. The Animal Welfare Act 1988 is very stringent, and in some cases, may impede opportunities for developing and adopting new innovations in livestock production. A new Animal Welfare Act is under discussion, and one of Sweden’s priorities is for stricter EU requirements on animal welfare across all member states.

Public institutions facilitate a sound business environment through protecting property rights, an independent judicial system, and a low level of business and administrative corruption

Sweden's governance model is recognised by the OECD for its efficient legal system in settling disputes, for government spending that is well targeted, and its transparency in decision making. Decentralisation in Sweden has largely been successful and beneficial to rural entrepreneurship and agri-food businesses; local governments are able to provide high-quality services and sub-national authorities are sufficiently equipped financially to undertake their tasks and meet expenditure responsibilities while ensuring equity in public service provision and welfare to all. There are nevertheless concerns about the availability and quality of rural services which are linked to the need to improve policy coherence.

Recommendations to improve incentives for private investment

- ***Efforts to simplify domestic regulations*** related to the environment, animal and crop health, and animal welfare that go beyond EU regulations by reducing administrative and compliance costs should be continued to be a priority. In particular, there is a need for better policy integration and collaboration between businesses in the food and agriculture sector, policy makers and regulators, so as to ensure that encourage the development and adoption of innovations and improve productivity and competitiveness of the food and agriculture sector.
- ***Strengthen efforts to focus agri-food research and innovation*** on knowledge-intensive high-tech areas including biotechnology, green energy, and food waste, and shorten and improve food and agriculture supply chains. Sweden, which does not have a comparative advantage in extensive agricultural systems, but has a highly developed knowledge economy, is well placed in this regard.
- ***Improve technology transfer across in the food and agriculture system***, in particular with the aim of enhancing access in remote regions.
- ***Assess competition and functioning of the food production and food retail markets*** through, for example, the Swedish Competition Authority.
- ***Consider establishing a scientific council for animal welfare*** as suggested in the 2016 Food Strategy.

Capacity and services for sustainable productivity growth could be further improved

The overall quality of transport infrastructure in Sweden compares well with other OECD countries. There are, however, major differences between types of transport. While the quality of port infrastructure is among the highest of OECD countries, the railway infrastructure needs to be improved – which would benefit the food and agriculture sector. In this regard, the government is currently engaged in a massive investment programme in transport infrastructure, mainly in roads and rail operations and maintenance. New infrastructure is generally funded by State grants. However, co-funding from counties, municipalities, companies, the European Union, and user fees or congestion taxes are also used.

Sweden aims to take a leading role in digital transformation. Almost all people in Sweden already have wired or wireless access to the Internet. However, for fast broadband, accessibility to 100 Mbit/s Internet is still lower in rural areas than in urban areas (which is not unique to Sweden). Regarding telephone ownership, the number of cellular telephones is above the OECD average.

A major strength of Sweden is the quality of its electricity supply, which is considered one of the best in the world. Over 50% of Swedish electricity is produced using renewable energy (mainly hydro power, biomass and wind power) with the objective to have an entirely renewable electricity system by 2040.

Agricultural land improvement infrastructure in Sweden mainly consists in drainage systems that cover around 80% of arable land. Upgrading the drainage system, which is in poor condition on a third of all arable land, is an important component in raising agricultural productivity and sustainability.

Labour market efficiency in Sweden is estimated to be above the OECD average. However, there is a clear lack of flexibility, as reflected by business analysts and leaders who perceive restrictive labour regulations as the second most problematic factor for doing business.

An important challenge faced by the Swedish labour market is the integration of new migrants and asylum seekers. Early migrants generally have a low level of education and literacy proficiency, which has resulted in high unemployment rates for this segment of the population. The government has already taken some steps in order to tackle this issue. Increasing the accessibility of the food and agriculture sector to immigrants has the potential to increase productive migrant employment and assimilation.

The quality of higher education and the training system is among the best across OECD countries. However, enrolment rates in tertiary education have been declining, mainly reflecting the homogeneity of employment rates among educational attainment level and the low earnings advantage of tertiary education.

Encouragingly, the trend of declining learning outcomes in Sweden over the past decade seems to have been reversed. The mean Programme for International Student Assessment (PISA) scores for 2015 has been above the OECD average. Swedish adults also recorded high scores in the Programme for the International Assessment of Adult Competencies (PIAAC) survey and exhibit some of the strongest ICT skills among OECD participants. Science and engineering play an important role in formal education in Sweden and are the main areas of studies in higher education and research.

Agricultural education is mainly provided through vocational and higher education programmes. However, the interest for agricultural studies is low and has been decreasing over the years. Some of the students with agricultural or food-related education end up working in other sectors. Nevertheless, there is a shortage of high-skilled workers in the agro-food chain: agriculture, horticulture, plant breeding and food processing. There is an increasing need for high-skilled workers with both theoretical and practical knowledge as well as entrepreneurial and managerial skills, especially in large agri-businesses. Workers need to be able to adapt to new technologies and rapid development in the industry. There is thus a need to better connect and integrate the labour skills and needs of the agro-food chain with the courses and training in the educational system.

Sweden has a long-standing tradition of environmental education, which starts at pre-school level and extend until higher education and research. This interest for environmental issues is also reflected in agricultural education where fields such as environment and natural resources have taken an increasing share of curricula.

Sweden needs to further improve the coherence of its national rural policy

About 70% of the Swedish population lives in urban areas. Rural areas are facing important challenges, such as an ageing workforce and economic outcomes that are generally lower than their urban counterparts. Availability and access to basic services has been decreasing in the most remote parts of the country, where the population is declining and provision of such services is more costly.

While the intention is to achieve greater equity in service provision across rural and urban areas – and there has been some success in this endeavour – there is a need for better policy and programme coherence to facilitate investment and promote growth in rural areas. There is lack of clarity in policies and no clear mechanism to adapt those delivered through sectoral ministries to the needs and circumstances of rural areas. The governance and funding arrangements for the Rural Development Programme (RDP) also differ from regional growth policy in many regions. This separation reduces opportunities to co-ordinate investments delivered through the regional growth policy and the RDP at the regional level. Moreover, the challenge of the very large regional diversity in rural conditions requires localised policy targeting, rather than across the board policies at the national level.

While Sweden has a well-developed regional growth policy framework, with a main focus on promoting equity between regions, the development of a new rural policy provides opportunities to improve the conditions for growth in rural areas.

Recommendations to improve capacities and services to boost innovation

- ***Implement and facilitate pro-active skills policies*** – through for example the creation of education councils for the sector to promote life-long learning, and labour mobility to alleviate shortages of high-skilled workers in the agro-food chain and to better identify current and future skill requirements of the sector.
- ***Prioritise inter-generational renewal in agriculture*** by developing tailor-made schemes that target Swedish young farmers. Assess the extent to which land regulations, taxation, inheritance law, territorial planning and agricultural policies such as direct payments impede generational renewal.
- ***Place greater focus on training and skill needs*** for the existing agricultural workforce, including paid workers.
- ***Assess the support needs of new entrants to farming*** and identify their potential business and organisational models, such as which knowledge they manage and how they acquire it, the use of technology, their access to capital (including land) and financial management, their marketing strategies, and co-operation initiatives.
- ***To counter the declining number of students enrolled in agri-food courses*** strengthen the co-ordination between agricultural education institutions and the food and agriculture industry, and facilitate discussions between education and knowledge institutions and the industry so as to identify the skills needed for future development.
- ***Establish a mechanism*** to engage with stakeholders with the aim of improving the coherence of rural development policy.
- **Strengthen the socio-economic foundation of the rural economy** by stimulating the bio- and circular-economy in sustainable agricultural, forestry and agri-forestry business models.
- ***Fully connect farmers and rural population to the digital economy*** by ensuring reliable high-speed internet access across all rural areas and upgrading the people's skills and business practices so that they can fully benefit from these new technologies.
- ***Identify market failures in land markets*** to design better targeted policies to facilitate structural adjustment.

The agricultural innovation system is mostly integrated in the general innovation framework

The food and agriculture sector consists of numerous small actors that face challenges in co-ordinating and communicating research needs. Research – applied and basic – relevant to the food and agriculture sector is conducted by a number of universities and research institutes. Applied research is also conducted and funded by private actors. There is a debate as to whether the mix of basic and applied research is the most suitable, if there is enough funding, if the research undertaken suits the needs of the food and agriculture sector and if the organisation of the research providers is well functioning.

Both the public and private sectors in general invest strongly in research, but not significantly in agriculture and the agri-food chain. The main focus of research activity related to agriculture and food is in developing new technologies and green energy sources, and reducing food waste. Budget expenditure on agricultural R&D accounts for a smaller share of agricultural gross value added than in many neighbouring countries, including EU Members.

Funding of R&D is complicated because of its multiple sources, although it is simpler for agriculture because the main funder is the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas), which also includes environment-oriented research. In addition, farmers' organizations fund some of the applied research on agriculture.

The government allocates the task of evaluating research to higher education institutions and research councils. By law, public universities and university colleges are individually responsible for quality.

The Swedish Higher Education Authority is responsible for quality at a national level, as described in the Research and Innovation Government Bill. In 2012, the OECD identified the lack of evaluation as a weakness in the Swedish Innovation System. As formulated and regulated in the Government appropriations for each council, according to the OECD, evaluations should cover the quality of research and its effects from a diverse perspective. However, the lack of a central system of standards and practices for the evaluation of research results in variations in interpretation.

Sweden encourages private sector R&D through a number of economic incentives. The Government provides incentives in the form of special grants and allowances for employment specifically in R&D activities. In addition, the social security contributions are reduced substantially for R&D employees. However, the R&D allowances only apply to employment in the private sector and public sector employees are ineligible, including those working in the agro-food sector.

Public research mainly takes place in universities, with the Swedish University of Agricultural Sciences (SLU) carrying out most agriculture-related research. Swedish universities achieve research excellence (according to global rankings) but linkages between basic research, applied research and the industry need to be strengthened. In the agricultural innovation system, there is also potential to improve the weak link between basic research, applied research and the advisory services.

Recent efforts to strengthen the general innovation system have focused on improving governance and linkages: methods include strategic programming, co-operation programmes, funding mechanisms, the creation of a research institute (RISE, the Research Institutes of Sweden Holding AB) to connect researchers and users, and the implementation of the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-Agri). Efforts have been made to improve technology transfer and commercialisation of agri-food products, in particular through closer collaboration between industry and academia, which is an integral part of the Strategic Innovation Areas and Challenge Driven Innovation programmes.

Programmes of the Swedish Governmental Agency for Innovation Systems (Vinnova) aim to support targeted collaboration between research and development providers and industry. Several schemes continue to support centres of excellence at universities, which seek to create excellent academic research environments in which industry actively participates. However, the low number of patents filed by universities is often seen as a consequence of “professor's privilege”, which entitles researchers (instead of institutions) to patent their own inventions.

Public research institutes, which were grouped into a single holding entity (RISE) in 2009, have received further government funding and have undergone major restructuring since 2014 in order to achieve a consolidated and internationally competitive sector. RISE is intended to serve as a knowledge partner for businesses, as an intermediary between academia and industry, and as a nexus for participation in EU research and development projects. International co-operation in public research is mainly within EU programmes and the Nordic Council, with a high share of food and agriculture research results published in collaborative projects with foreign researchers.

These developments are expected to facilitate research collaboration on agriculture-related topics in the future. For example, the implementation of EIP-Agri, which is only in the early stages, should offer opportunities for further collaboration along the value chain. The SLU created a Green Innovation Park, and a strategic programme on the circular and bio-based economy was launched in 2016. There are currently a number of green networks and clusters at the national and EU levels. On the other hand, there is no agricultural research institute charged with carrying out more applied R&D, and the RISE network only includes small agriculture-related activities.

Public and private organisations in the farm advisory system include several large consulting companies, as well as the SBA, which is the main public actor. Recent efforts have aimed at increasing the role of universities in knowledge transfer. Recent evaluations of the advisory system outline the need to better understand users' needs, which vary by sub-sector, and to develop a general strategy for upgrading skills that involves all education, research and advisory actors.

Recommendations to strengthen incentives to innovation

- ***Develop a long-term strategy for research and innovation in the agriculture and food sector*** by clarifying the institutional roles of SBA, SLU and RISE, or by establishing a platform to co-ordinate their tasks, or by merging them within RISE. Create a national council to monitor R&D policies of institutions and assess the effectiveness of the allocation of funding from research councils and universities.
- ***Strengthen research evaluation*** by improving the well-established internal system for quality assurance, and strengthen research evaluation through an external and impartial evaluation of their research quality and impact.
- ***Improve the research infrastructure*** by establishing a national agricultural research institute to carry out more applied R&D.
- ***Prioritise policy coherence*** through more and better policy co-ordination, integration and collaboration between innovators in agriculture, regulators, and across ministries, such as the Ministry of Education, in order to increase agriculture's visibility in the Swedish innovation system to facilitate a faster and more effective adoption of new technologies.
- ***Maintain and strengthen efforts*** that focus on agriculture and food research and innovation on knowledge-intensive high-tech areas, including the bio- and circular economies.
- ***Facilitate the organisation of producers and the industry*** to enable them to contribute more effectively and efficiently to AIS, including through participation in networks or articulation of their needs.
- ***Encourage producers, researchers and the industry*** to actively participate in RISE, EU and international networks.
- ***Fully explore the opportunities that arise from the EU EIP-Agri*** to transfer innovation into agricultural practice through participation of famers, stakeholders and researchers.
- ***Develop indicators and tools*** to evaluate AIS performance and monitor the rate and quality of innovation in the food and agriculture sectors. In addition to traditional indicators on efforts (e.g. R&D expenditures) and outcomes (e.g. number and quality of patents), consider including indicators on impact (e.g. the rate of innovation adoption, TFP, environmentally adjusted TFP growth and agri-environmental indicators).
- ***Continue developing information systems***, including market intelligence (big data). On data ownership, data governance principle should be agreed with the providers of technologies and farmers.
- ***Ensure that farm advisors are well-trained***, and are in possession of the most up-to-date practical knowledge and skills.

Rebalancing agricultural policy towards long-term productivity growth and sustainability

Sweden strongly favours policies that allow the food and agriculture sector to respond to market signals, within the context of EU membership

Income support to farmers is one of the primary instruments intended to ensure financial viability and to compensate for, or partly offset, variations resulting from differences in agri-environmental conditions and regional agricultural potential across the country. Although the objectives of EU farm policy are common across all EU Member countries, the effect of support payments on farm productivity is variable and context specific. The available evidence suggests that dependence on support linked to commodity production in total farm revenue generally has a negative impact on farm efficiency and productivity. However, although the effects of decoupled income support payments on farm efficiency and productivity appear to be mainly positive, they are small. In this context, it should be noted that access to farm credit is, in general, not a constraint in Sweden.

In principle, whether agricultural policy reform boosts or impedes productivity growth depends on the policy instruments chosen. While increased market orientation can be associated with a drive towards more production efficiency, increased regulation might generate the opposite effect in the short run. However, in Sweden, environmental and animal health and welfare regulations and policies are significant, so they serve to conserve the natural resource base for future production, and can be a positive force for increasing production efficiency in the longer term. Moreover, measuring production

efficiency only in *quantitative* terms needs to be adjusted in the light of Swedish consumer and citizen preferences for the *quality* and methods of production. Whether the positive or negative effects dominate is an empirical question that should be evaluated against a wide range of criteria, not just focusing on trends in the input/output ratio in assessing efficiency.

Further reduce the share of government support in farmers' incomes: Government support is one of the primary instruments used to drive farm profitability and intended to compensate for variations resulting from differences in agri-environmental practices and regional agricultural disparities. Although farm decoupled payments are provided in all EU Member countries to achieve similar objectives, the impact is variable on farm efficiency and productivity. Research has in fact shown both positive and negative influences of farm support on farm efficiency. These findings are related to specific countries, production specialisation and methodological application. However, research shows that, overall, dependence on government support, or a large share of support in total revenue, has a negative impact on farm efficiency.

Explore possibilities to reduce input costs. Consider the possibility to reduce input costs to improve productivity, for example, through an improvement of the supply of capital to agriculture; changes in farm structures to benefit from economies of scale, recognising heterogeneity in regional factor endowments and encouraging further diversification of on-farm activities.

Facilitate generational renewal in agriculture: Explore ways and means to facilitate generational renewal in agriculture because as many as a third of farmers are now over the age of 65. Young farmers have a key role to play in structural adjustment. Farms managed by younger farmers are often found to be more efficient. This is mainly associated with their higher level of education, implying knowledge of more advanced technology, interest in making structural adjustments and investments and enthusiasm. Older farmers tend to have less up-to-date knowledge on advanced technologies and be more resistant to structural changes. Adjustment assistance should be considered as a way to facilitate and smooth the process of structural change.

Recommendations to making agricultural policy more conducive to innovation

- ***Prioritise further reform of agricultural policies*** by advocating the implementation of results-based, nationally specified agricultural policies (devolution) that reflect the diversity and uniqueness of Sweden's agri-environment, within the broad guidelines agreed at the EU level.
- ***Identify appropriate policy measures*** that target the development of agricultural activities that are potentially financially viable, as well as those that ensure the provision of sufficient collective or public goods (environmental, cultural, social values) provided by agricultural activities.
- ***Reduce the relative importance of government support*** in agricultural incomes and increase farmers' returns from the market through investment and strengthening the knowledge-based for farming through more research and innovation by encouraging further integration of agriculture in SIS.
- ***Assess investment needs*** and enhance the effectiveness of public investment support by focusing on areas where financial markets fail to provide funds for the provision of public goods, and better integrate business advice and synergies with research and innovation.
- ***Boost investments*** into innovation, modernisation, farm restructuring, diversification and uptake of new technologies and digital-based opportunities such as the use of big data, precision farming and clean energy. New business models as well clarity around the rules on data sharing will be necessary before the full potential of these technologies can be exploited.

Improving sustainability

While Sweden is well advanced in developing policies addressing the agri-environment…

Sweden was one of the earliest OECD countries to raise awareness of environmental issues and to develop environmental policies. Protecting biodiversity and cultural landscapes (ensuring a balance between open landscapes associated with agricultural activity, and forests) while reducing pollution have risen progressively to the top of the policy agenda. Sweden has also been a leader in improving animal health and welfare. More than 60% of the 2014-20 RDP budget is allocated to ecosystem management, reflecting the traditional government emphasis on environmental sustainability issues. Payments for environmental service provision and some far-reaching regulations on polluting activities (e.g. taxes on pesticides) are the result of the increased integration of environmental concerns in agriculture. These schemes have contributed to the good progress that has been made in decoupling agricultural production from environmental pressures.

Several measures are used to encourage the adoption of sustainable management practices and technologies. Education and the provision of information to individual farmers are pivotal in attaining environmentally sustainable agriculture. Sweden is one of the few countries to apply the polluter-pays-principle (developed and agreed to by the OECD in 1972) through the use of pricing instruments such as taxes on pesticides in order to reduce environmental externalities of water pollution and GHG emissions, to promote the adoption of "cleaner" farm management practices and technologies, and to make farmers responsible for the adoption of "cleaner" farm management practices and technologies.

Long-term projections of climate change suggest several potential benefits for Sweden: vegetation and cultivation periods will be prolonged, yields will be increased, and new crops may be introduced. There are, however, risks such as the possibility of crop and animal diseases associated with warmer temperatures. In order to capitalise on the opportunities and challenges posed by climate change, it is imperative that adaptation strategies be prepared to take advantage of these new conditions.

… further improvements in environmental sustainability from cross-compliance and greening of policies are likely to be small

Most of the cross-compliance requirements have existed within Swedish legislation for a long time, pre-dating those introduced by the European Union. The greening requirements of the CAP 2014-2020 are very broad and do not take into consideration the varying geographic context and the specific problems of managing biodiversity and nutrient leakages into water courses in Sweden or managing biodiversity.

Sweden faces the challenge of land abandonment, especially of grazing land in forest regions, both in the north and the south, which risks jeopardising the achievement of its main environmental objective of varied agricultural landscapes, especially the preservation of cultural heritage values and biodiversity. In broad terms, agricultural activity in the north-forest regions is associated with the provision of environmental (biodiversity, ecosystems) and landscape benefits – whereas, in the southern lowland plains with intensive crop production, the main issue is environmental pollution. Due to heterogeneity in environmental impacts and costs, more targeted actions and regional adaptation of greening measures, particularly for Ecological Focus Areas, and agri-environmental schemes to address the landscape requirements and biodiversity, and strengthening the application of the polluter pays principle, are therefore critical.

Recommendations to enhance the environmental sustainability of agriculture

- ***Ensure that environmental and climate change concerns*** continue to be taken into account when developing and assessing policies that can contribute to productivity and competitiveness.
- ***Strengthen efforts to assess the feasibility of implementing performance-based agri-environmental payments***, which are steps towards increasing the cost-effectiveness of such programmes. Such payments, in addition to increased flexibility provided to farmers, achieve greater environmental benefits than practice-based measures. In this regard, payments to remunerate farmers for the provision of environmental standards that the Swedish public and politicians want, yet go beyond what is expected of farmers to provide (reference levels), need to be made available, assessed in terms of costs and benefits, and transparent, within the constraints of overall budgetary provision.
- ***Establish measurable indicators of performance*** to regularly monitor and evaluate the achievements of agricultural policies in meeting objective, and to make course corrections when outcomes fail to meet the objectives of policy.
- ***Apply the polluter-pays-principle*** more systematically to hold farmers accountable for all harmful environmental effects from crop and livestock pollution by considering, for example, taxes on fertilisers and penalties where these contribute to water pollution. ***Intensify efforts to provide targeted and tailored advice*** to farmers on sustainable technologies and practices by paying more attention to supporting activities, such as technology monitoring, training advisors and production, collection and storage of technical knowledge.

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