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Evaluation of the relevance of border protection for agriculture in Switzerland

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OECD

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EVALUATION OF THE RELEVANCE OF BORDER PROTECTION FOR AGRICULTURE IN SWITZERLAND

Report to the Swiss Federal Office for Agriculture (FOAG)

Emily Gray, Lucie Adenäuer, Dorothee Flaig and Frank van Tongeren
OECD

Switzerland's overarching agricultural policy objectives reflect societal concerns about various production aspects of agriculture, such as environmental sustainability and animal welfare, and the expectation that agriculture will provide public goods demanded by society. Among the various policy instruments used by Switzerland to achieve these objectives, border protection represents a significant component of support. This study assesses the relevance of border protection for agriculture in Switzerland. It finds that border protection is not relevant for achieving the overarching objectives of Swiss agricultural policy, with one exception. By stimulating domestic production, high levels of border protection ensure that Switzerland meets its target rate of gross food production. But border protection is unlikely to deliver the other outcomes and public goods desired by Swiss society. This is because support provided through border protection is not conditional on delivery of the outcomes and public goods demanded by Swiss society, and is untargeted towards the activities, inputs and regions most strongly related to those outcomes and public goods. Moreover, border protection imposes significant costs on the Swiss economy. The study concludes by proposing alternative policies in place of border protection.

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***Key words*:** Border protection, multifunctionality, Switzerland, public goods, METRO

JEL classification: Q15, Q17, Q18

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Executive Summary

Switzerland's overarching agricultural policy objectives reflect societal concerns about various production aspects of agriculture, such as environmental sustainability and animal welfare, and the expectation that agriculture will provide public goods demanded by society. The sector is tasked with making a significant contribution towards: ensuring food supplies for the population; preserving natural resources; maintaining agricultural land in a cultivated state; encouraging decentralised settlement; and guaranteeing animal welfare. Among the various policy instruments used by Switzerland to achieve these objectives, border protection – reflecting either a system of tariff rate quotas (TRQs) or single tariffs on agriculture and food imports – represents a significant component of support, in addition to direct payments to producers.

On balance, border protection is not relevant for achieving the overarching objectives of Swiss agriculture. As an instrument of agricultural policy, border protection targets farm incomes by maintaining a price differential between domestic and international prices. This stimulates domestic production so that Switzerland meets its target rate of gross food production. But it does not address the range of market failures that affect the negative externalities and public goods generated through agricultural activities of concern to Swiss society. In addition, by stimulating domestic production and raising domestic prices to high levels, border protection may lead to conflicting outcomes across the overarching objectives.

In summary, border protection is unlikely to deliver the outcomes and public goods desired by Swiss society. This is because support provided through border protection is:

- *Not conditional on delivery* of the outcomes and public goods demanded by society, such as improved environmental outcomes and animal welfare;
- *Untargeted towards the activity or factor of production* most strongly related to those outcomes and public goods, for example, farming systems and practices that preserve natural resources or deliver a higher level of animal welfare; and
- *Untargeted to regions* that are valued by society for services beyond agricultural production, for example, land at risk of abandonment or in areas favoured for recreation and by tourists.

Further, while higher incomes may compensate producers for the costs associated with supplying non-commodity outputs, such as a higher level of animal welfare, border protection is an inefficient instrument for raising farm incomes.

Moreover, border protection imposes significant costs on the Swiss economy by increasing costs for domestic consumers and intermediaries, reducing consumer choice and economic welfare, and constraining growth in less protected and more efficient sectors, including in agriculture. While the TRQ system generates rents, since domestic prices are higher than international ones, they are largely captured by the downstream sectors – and retailers in particular – for most products, as a result of an uncompetitive structure in downstream markets.

Alternative policies are needed in place of border protection that target the outcomes and public goods demanded by Swiss society, and also improve the productivity and competitiveness of the agricultural sector and meet the overarching objectives at a lower cost to consumers and taxpayers. The first includes instruments that are already in place, but could be better structured according to the target of the policy. The second group consists of new risk management tools to help farmers cope with new market conditions, including greater price volatility.

Group 1 – Existing instruments newly structured:

- *Regional differentiation of direct payments*: To enable agriculture to make a significant contribution towards maintaining agricultural land in a cultivated state and preserving natural resources, Switzerland's system of direct payments – and the share of those payments that are untargeted to production situations and geographical conditions in particular – should be restructured to further differentiate between the geographic locations of producers. This would ensure that the system of direct payments better reflects differences in production situations and the potential to supply the outcomes and public goods demanded by Swiss society.
- *Environmental standards*: To improve the environmental performance of Swiss agriculture and ensure natural resources are preserved, agri-environmental policies should be strengthened by incorporating current cross-compliance requirements into mandatory regulations, to provide a baseline for new and more stringent cross-compliance requirements linked to support payments, and differentiating cross-compliance conditions geographically.
- *Consumer information system to influence consumer preferences*: To help producers offset the costs of guaranteeing animal welfare, among other outcomes demanded by Swiss society, the government should invest further in the "Swiss" brand to promote domestic agro-food products.

More generally, this evaluation and the OECD's 2015 review of agricultural policies in Switzerland (OECD, 2015a) found that the performance of Swiss agricultural policy could be improved by more closely aligning policy instruments with objectives, including as they differ between regions. This will enable agriculture to make a significant contribution towards maintaining agricultural land in a cultivated state and preserving natural resources. Similarly, the sector's contribution to ensuring food supplies for the population will be best achieved through targeting investments to improve the productivity of Swiss agriculture to potentially competitive producers:

- *Sustainable productivity matrix*: Organise existing policy instruments by structuring and targeting them according to the overarching objectives and their relevance to Switzerland's agricultural regions.

Group 2 – New risk management instruments

In the absence of border protection, Swiss producers may experience greater price volatility as a result of exposure to international prices. If price volatility reduces producers' incentives to invest in productivity-enhancing innovations or to expand the scale of their operations, it may affect the capacity of the Swiss agro-food sector to make an essential contribution towards ensuring food supplies for the population. It may also reduce producers' incentives to invest in sustainability-enhancing innovations to help preserve natural resources. New risk management tools will be important for helping improve producers' resilience to risks emanating from both domestic and international

sources, for providing a more stable operating environment for investment, and for ensuring that the agriculture sector is able to deliver the outcomes and public goods desired by Swiss society in the long-term.

- *Farm Risk Account*: A voluntary savings account – a part of farmers' direct payments would be deposited in the account, to be drawn on in the case of income losses from operational risks (such as market volatility or unexpected weather conditions). The aim of the account is to encourage farmers to take on more responsibility for managing risks arising from normal variations in production, prices and weather, while providing protection from more extreme market-related shocks.
- *Disaster payments*: Payments to address catastrophic risks that are beyond farmers' or markets' capacity to cope, such as natural disasters, the outbreak and spread of a highly contagious and damaging disease, or a threat to food security. The procedures, responsibilities and limits of the policy response to a disaster – including explicit triggering criteria and types and levels of assistance – would need to be defined as precisely as possible.

1. Introduction

Agricultural policies in Switzerland reflect societal concerns about various production aspects of agriculture, such as environmental sustainability and animal welfare, and expectations that agriculture will provide public goods demanded by society. In the mid-1990s, these expectations were qualified in an article of the Swiss Constitution, which establishes the overarching objectives of Swiss agriculture:

> *« La Confédération veille à ce que l'agriculture, par une production répondant à la fois aux exigences du développement durable et à celles du marché, contribue substantiellement: a. à la sécurité de l'approvisionnement de la population; b. à la conservation des ressources naturelles et à l'entretien du paysage rural; c. à l'occupation décentralisée du territoire. […] »* (Art. 104).

Specifically, the Constitution mandates the Swiss Confederation to ensure that the agricultural sector, by means of a sustainable and market-oriented production policy, makes an essential contribution towards:

- the reliable provision of the population with foodstuffs;
- the conservation of natural resources and the upkeep of the countryside;
- decentralised population settlement of the country.

These objectives are complemented by the Agricultural Act [LAgr, SR 910.1, art. 1, let. e.], which adds aspects of animal welfare. To achieve these overarching objectives, the Agricultural Act mandates the Swiss Confederation to undertake measures such as: creating favourable conditions for production and sale; remunerating farmers for public and ecological services; promoting the sustainable use of resources; supporting a socially acceptable development of the sector; supporting structural improvement; promoting agricultural research; and increasing environmental performance [LAgr, SR 910.1].

Among the various policy instruments used by Switzerland to achieve these objectives, border protection – reflecting either a system of tariff rate quotas (TRQs) or single tariffs on agro-food imports – represents a key component of support. As set out in the technical objectives of border protection identified by Swiss Federal Office for Agriculture (OFAG), border protection creates favourable conditions for production and sale through: supporting domestic production by limiting imports to maintain a price differential between the domestic prices and the international ones; contributing to agricultural producers' revenues (income support); and contributing to ensuring stable conditions for agricultural production. While the level of price distortions has been significantly reduced over time, domestic producer prices remain 60% higher than world prices on average (compared with domestic prices that were 4.5 times higher in 1986-88) (OECD, 2016a).

However, border protection is associated with high costs. It increases costs for domestic consumers and intermediaries, reducing consumer choice and economic welfare. On average, food prices paid by Swiss consumers are 63% higher than EU consumer prices (79% for food and 25% for non-alcoholic beverages) (Eurostat, 2016). Sectors of the food industry that rely mainly on domestic primary agriculture for their inputs (meat and dairy) have to pay relatively high prices for their material inputs that are well above EU price levels, reducing their competitiveness. Moreover, by insulating producers from world

prices and competition, border protection hinders innovation and improvements in the performance of the farm sector (Loi et al., 2016; OECD, 2015a). Given these costs, it is a matter of policy relevance whether support provided through border protection contributes to achieving the overarching objectives of agricultural policy.

Against this backdrop, Switzerland's Federal Office for Agriculture (FOAG) has asked the OECD to assess the relevance of border protection as an instrument of agricultural policy for realising the overarching objectives for the sector. Key to this is whether achieving the technical objectives of border protection – supporting domestic production by limiting imports to maintain a price differential between the domestic and international prices, supporting farm incomes and contributing to ensuring stable conditions for agricultural production – are coherent with the overarching objectives for the sector.

Specifically, FOAG asked the OECD to consider if border protection is relevant to attain each of the overarching policy objectives of the Swiss Agricultural Policy:

1. Do the specific technical objectives of border protection correspond to the various overarching objectives of the Swiss Agricultural Policy? Are there interdependencies between the technical objectives and the overarching policy objectives?
2. To which extent has border protection proven to be relevant concerning the linkage between the various overarching policy objectives and its technical policy objectives?

Furthermore, FOAG asked the OECD to develop recommendations for alternative policy instruments to border protection, which are able to provide a higher degree of coherence to the overarching policy objectives:

1. Which alternative policy instruments to border protection can be envisaged to contribute to the overarching policy objectives?
2. Which would be the main strengths and weaknesses of such alternative policy instruments compared to border protection?

1.1. Scope

Swiss agricultural policy measures are based on a set of hypothetical causal relationships that set out how a policy measure (or intervention) is expected to attain its objectives. This intervention logic (see Annex 1) encompasses the following elements: the overarching policy objectives (in Switzerland typically set out in the Constitution); the technical objectives of the policy measure; behavioural objectives (the changes in the behaviour of economic agents that the policy measure aims to induce); inputs and outputs of the administration of the policy measure; activities of the economic actors; effects (intended and unintended) of the policy measure; other relevant factors (such as the economic and environmental context).

The scope of this analysis is limited to the relevance of the technical objectives of border protection for the overarching policy objectives for agriculture. Other elements of this intervention logic have been discussed elsewhere. Specifically, the effectiveness and efficiency of border protection was examined in the report by Loi et al., (2016), who found that even though the TRQ system is partly effective in achieving its *technical* objectives, the system is inefficient overall. Swiss markets are characterised by an imperfect competition structure, such that rents associated with TRQs have been captured by downstream sectors. Moreover, the OECD found that Swiss consumers bear the cost of the TRQ system through high retail prices, with welfare losses for consumers

exceeding the benefits occurring to producers and to the governmental budget (OECD, 2015a).

Five overarching objectives are considered. Four of these objectives are defined in the Swiss constitution, namely that through a sustainable, market-oriented production the agricultural sector makes a significant contribution towards:

- the reliable provision of the population with foodstuffs;
- the conservation of natural resources;
- the upkeep of the countryside; and
- the decentralised population settlement of the country.

The fifth objective, guaranteeing animal welfare, is set out in the Agricultural Act. The evaluation only considers the relevance of border protection for guaranteeing the welfare of animals that are bred and raised in Switzerland.

2. Border protection in Switzerland: The policy context

2.1. Characteristics of agriculture

Switzerland is a small, open economy strategically located in central west Europe, and sharing land borders with Austria, France, Germany, Italy and Liechtenstein. Switzerland is characterised by high GDP per capita, and relatively low inflation and unemployment rates. The Swiss economy is mostly service oriented, with services accounting for about 70% of GDP (OECD, 2015a).

Agriculture plays a relatively small role in the economy. In 2015, the sector's share in GDP was 0.7%, while its share in employment was 3.2% (OECD, 2016a). Until recently, agriculture dominated the rural economy but its role in rural areas ha declined in recent years, most significantly in the hilly and mountain areas. In these areas, agricultural share in GDP has fallen by around 18% in the last 10 years. In the plain areas, agriculture's share in the rural economy has remained stable (BfS, 2016a).

Geographic and climate conditions largely dictate the distribution of agricultural activities across Switzerland. There are three broad areas – the plain, hilly and mountain areas. The plain areas of Switzerland form the main production base for the sector. Farms in the plain areas primarily produce arable crops, including fruits, vegetables and fodder crops. Fruit and vegetable production mainly takes place in this region and most (around 65%) of Switzerland's pig meat and poultry production also. The plain areas account for around 60% of total agricultural production (BfS, 2016a). The hilly areas account for around 25% of total agricultural production, and are characterised by extensive milk or beef production, in combination with arable crops. Around a third of total pig meat production in Switzerland takes place in this area. The mountain areas account for around 15% of total agricultural production, and are mainly characterised by extensive milk or beef production due to the dominance of grassland and alpine pastures. Around 59% of the agricultural area is natural meadowland, while arable land and irrigated land account for 27% and 2% or the total agricultural area, respectively (BfS, 2016a). More details on the principal farming activities and characteristics of farms by area are given in Box 2.1.

Gross agricultural output has remained relatively stable since the early 1990s. Total agricultural production was 4% lower in 2012 compared with 1990, while land productivity remained stable over the period 1990 to 2012 (OECD, 2015a). Labour productivity in agriculture has increased since the mid-1980s (BfS, 2016b). However, the high level of employment in agriculture compared to its contribution to GDP indicates a relatively low level of labour productivity compared with the other sectors of the economy, especially the services sector (OECD, 2015a). This, combined with stable land productivity, might reflect a policy approach that supports extensive farming, and the fact that high levels of support reduce incentives to increase productivity and discourage structural change.

Agricultural policy as well as geography and climate lead to a focus on livestock production, dairy and beef production in particular. Around 75% of livestock are dairy or beef cattle. The milk producing sector is the most important sector, accounting for around 23% of total agricultural production and nearly 50% of the producers. Beef accounts for around 14% of total agricultural production (OFAG, 2015a; SCM et al., 2015).

Box 2.1. Characteristics of Switzerland's agricultural areas in 2015

Plain areas

- In total there were 23 644 farms, with an average size of 27.1 ha and 35 animals.
- Most farms produce arable crops (mainly fruit and vegetables) and milk and/or meat (mostly beef). Intensive pig and poultry farms are mainly located in the plain areas
- Over all areas, pork and poultry production is mostly placed in this area
- Around 6% of farms are organic (1 511).
- Around 53% of the farms (12 543) have non-farm sources of income, mainly direct marketing (52%), forestry (60%) and subcontracting work (26%).
- For 25% of farms, non-agricultural income accounted for more than 10% of total household income. For 6% of farms, non-agricultural income accounted for more than 50% of total household income.
- Average farm income in plain areas is 15% above the average Swiss farm income.
- Direct payments accounted for 16% of agricultural revenue on average.

Hilly areas

- In total there were 7 901 farms, with an average size of 23 ha and 35 animals.
- Most farms produced either milk or meat (mostly beef), in combination with arable crop production and/or intensive pig production.
- Around 6% of farms are organic (660).
- Nearly all farms have non-farm sources of income, mainly direct marketing (44%) and forestry (86%).
- For 22% of farms, non-agricultural income accounted for more than 10% of total household income. For 5% of farms, non-agricultural income accounted for more than 50% of total household income.
- Average farm income in hilly area is equal to the average Swiss farm income.
- Direct payments accounted for 26% of agricultural revenue on average.

Mountain area

- In total there were 21 950 farms, with an average size of 23.6 ha and 26 animals.
- Most farms produce either milk or beef.
- Around 19% of farms are organic (4 073).
- Around 35% of farms (7 755) have non-farm sources of income, mainly direct marketing (53%) and forestry (70%)
- For 24% of farms, non-agricultural income accounted for more than 10% of total household income. For 4% of farms, non-agricultural income accounted for more than 50% of total household income.
- Average farm income in mountain areas is 20% below the average Swiss farm income.
- Direct payments accounted for 42% of agricultural revenue on average.

Source: BfS (2016a), Dux et al. (2016).

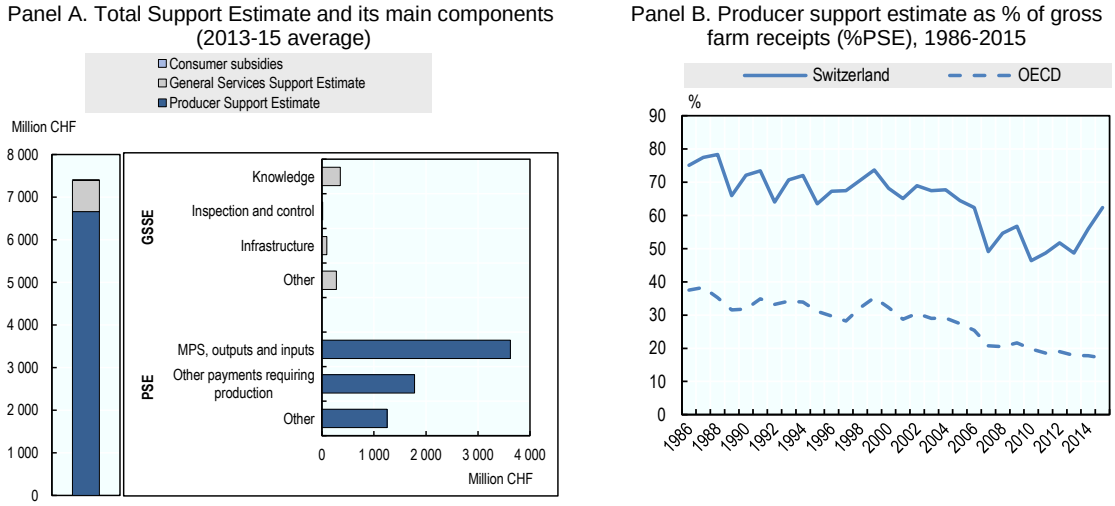
The sector is dominated by relatively small family farms. In 2015 there were 53 232 farms, averaging almost 25 hectares in size. The number of farms has declined at an average annual rate of around 2% since the mid-1990s. Annual farm income averaged CHF 88 300 in 2015, including non-farm income of CHF 29 900 (almost 34%). However,

there are differences between the three agricultural areas. Farm incomes are highest on average in the plain areas, and lowest on average in the mountain areas. Average farm incomes range from CHF 100 900 in the plain areas, with non-farm income accounting for around 30%, to CHF 74 400 in the mountain areas, with non-farm income accounting for around 35%. In general, incomes are highest for fruit and vegetable farms, and pig and poultry fattening farms (Dux et al. 2016).

2.2. Current support to the agricultural sector

Switzerland's level of producer support is among the highest of the OECD countries, although it has declined since the 1990s. In 2013-15, transfers from consumers and taxpayers accounted for almost 56% of Swiss gross farm receipts (%PSE), down from 66% in 1995-97, but around three times the level of support in the EU (19%) and the average for the OECD area (18%). In 2013-15, total support provided to the agricultural sector averaged CHF 7.4 billion a year – including around CHF 4.5 billion a year in transfers from taxpayers and CHF 3.6 billion a year from consumers – or 1.2% of GDP. This is significant given agriculture's small share of GDP (0.7%). Support is primarily provided in the form of direct support to farms, with expenditures on general services accounting for around 10% of the total support (Figure 2.1) (OECD, 2016a).

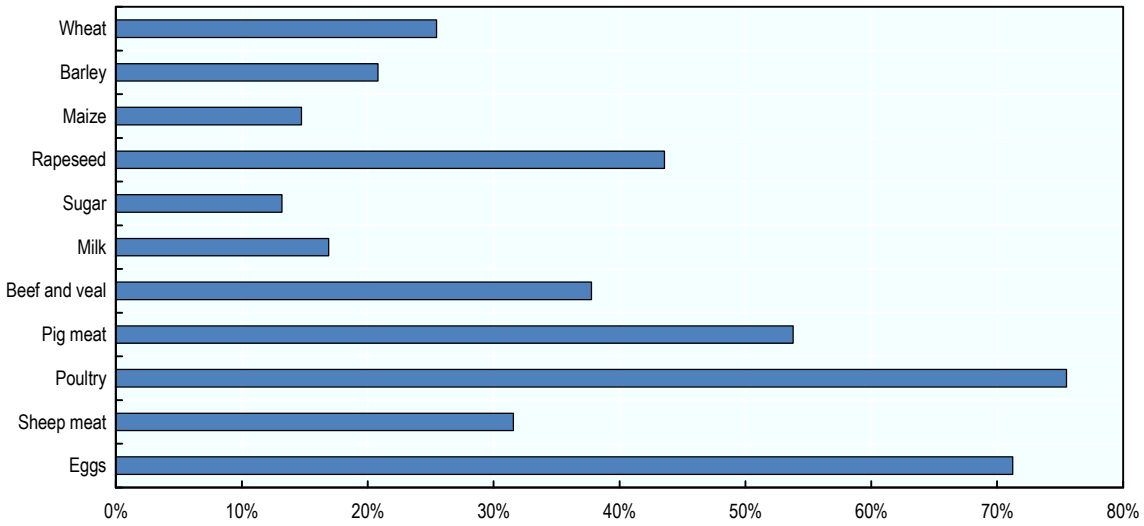
Figure 2.1. Switzerland: Level, structure and evolution of agricultural support



Note: Consumer subsidies averaged CHF 8.5 million a year in 2013-15.
Source: OECD (2016b), "Producer and Consumer Support Estimates", OECD Agriculture Statistics (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

One of the main components of support provided to Swiss farming is market price support (MPS) resulting from border protection. In 2013-15, MPS accounted for around 47% support provided to farmers, down from 73% in 1995-97 as a result of policy reforms implemented since the early 1990s. The level of price distortions has also declined. In 2013-15, the prices paid to the farming sector were 61% above world prices, compared with domestic prices that were 4.5 times higher in 1986-88 (OECD, 2016a). Nevertheless, support provided through MPS still accounts for a large share of gross farm receipts for some commodities, from less than 20% for sugar, maize and milk, to more than 70% of gross farm receipts for poultry meat and eggs (Figure 2.2).

Figure 2.2. Market price support to specific commodities as a percentage of gross farm receipts, 2013-15



Source: OECD (2016b).

Switzerland also provides direct payments to farms, all subject to environmental cross-compliance. The importance of direct payments has been increasing over time. While they represented around 20% of total support in the 1980s it has increased to around 53% of producer support in 2013-15 (OECD, 2016a). Direct payments account for around three quarters of government spending on agriculture (BfS, 2016a).

Since their introduction, the system of direct payments has been adjusted to meet the specified overarching policy objectives, most recently under the current agricultural policy framework, *Politique Agricole 2014-17* (AP 2014-17) The current system has seven categories of payments, which are linked to the achievement of specific policy objectives and the provision of public goods:

- *Payments for ensuring food supplies*: area payments, with rates differentiated between the plain and hilly and mountain regions;
- *Farmland payments to maintain open landscape*: area payments to maintain farming in especially difficult conditions and to maintain a cultivated landscape in mountainous areas and on alpine summer pastures;
- *Biodiversity payments*: payments targeted to specific outcomes or farming practices; especially the enhanced quality of the ecological compensation areas is expected to improve the habitat and the possibilities for dispersal of target and indicator species in agriculture;
- *Payments for landscape quality*: payments for preservation and promotion of landscape diversity (including more diverse crop rotation, flowering fields and traditional agricultural practices);
- *Payments for production systems*: payments providing incentives for nature-oriented, environment and animal-friendly production systems (e.g. organic farming).

- *Resource-efficiency payments*: payments providing incentives to use specific production techniques (e.g. certain manure spreading methods and soil conservation methods like no-till).
- *Transitional payments*: are provided to farmers who suffer a loss of direct payments under the new system. These payments are scheduled to decrease gradually during 2014-17 and phased out totally within the four years following 2017 (OECD, 2016a).

Switzerland also provides budgetary support for production and marketing activities. Producers receive output-based payments for milk production (milk used for cheese processing and milk produced without silage) and an area payment for sugar beet (OECD, 2016a).

2.3. The Swiss TRQ system[1]

As noted previously, one of the main components of support provided to Swiss farming is market price support (MPS) resulting from border protection. The system of border protection has remained largely unchanged since the mid-1990s.

Imports of most agro-food products that are domestically produced are regulated either by single tariffs or, for a number of products, by a combination of relatively low in-quota tariffs and high out-of-quota import tariffs within a system of Tariff Rate Quotas (TRQ). Tariff Rate Quotas cover a number of basic agricultural and food products, in particular meat, milk products, potatoes, fruits, vegetables, bread cereals and wine (OECD, 2016a). In general, TRQs are only released to supplement domestic production with imports when there is a shortage on the domestic market (Loi et al., 2016).

Tariff protection varies substantially across and within sectors, averaging 30.8% for agricultural products, compared with 2.3% for non-agricultural goods (according to WTO definitions) (WTO, 2017). The Swiss agricultural tariff schedule consists of specific tariffs.[2] There are currently 28 Tariff Rate Quotas (TRQs) for imports of livestock, animal and vegetable products, possibly including sub-quotas (some TRQs are sub-allocated to specific products) and preferential quotas. TRQs are usually filled or even overfilled (that is, additional imports are authorized at the in-quota duty, in excess to the quota notified at the WTO). For agricultural products, preferential access is provided mainly through bilateral tariff quotas. TRQs are administered in different manners, such as auctioning; requirements on domestic purchases; historical imports; first-come, first-served (Loi et al., 2016; Agriculture Act [LAgr, SR 910.1]). Import quotas are released by FOAG according to market needs. However, crucial decisions for TRQ administration (timing and volume of releases of import quotas) are *de facto* decided by concerned operators, including producers, processors, traders, retailers and importers (Loi et al., 2016). Since

1. The base for regulations on imports of agricultural products is given by legal texts on agriculture (Agriculture Act, LAgr, SR 910.1) and on customs, including the Customs Tariff Act (LTaD; SR 632.10), and by ordinances on agricultural production, such as the Ordinance on Imports of Agricultural Products (OlAgr, SR 916.01). In addition, there are specific ordinances for vegetable products (OIELFP, SR 916.121.10) and animals for slaughter and meat (OBB, SR 916.341).

2. Specific tariffs are levied as a specific rate per physical unit, as opposed to ad valorem rates, which are levied as a fixed percentage of value.

1999, allocated TRQ volumes have been transferable from one importer to another (OECD, 2016a).

Tariff revenue was CHF 643 million in 2016, up from CHF 545 million in 2012. Revenue from quota auctions – for example, for butter and milk powder, meat, and quotas for some fruit and vegetables, and potatoes – was CHF 202 million in 2016 (AFF, 2017). Imports of agro-food products that are subject to compulsory stockpiling incur additional import fees, included in the customs tariffs levied on those products, which are used to finance the guarantee funds that support the stockpiling scheme. This includes sugar, rice, edible oils and fats, coffee, and some cereals (WTO, 2017).

The TRQ system generates rents, since domestic prices are higher than international ones. However, quota rents are largely captured by the downstream sectors – and retailers in particular – as a result of an uncompetitive structure in downstream markets (Loi et al., 2016). For some products, such as beef and strawberries, this quota rent has been increasing as a result of diverging domestic prices relative to international prices (domestic consumer prices are increasing while farm prices are relatively stable).

3. Analytical frameworks for analysing the relevance of border protection

As discussed earlier, in Switzerland, border protection is viewed as a key instrument for achieving the overarching objectives of agricultural policy, to the extent that it creates favourable conditions for the production and sale of agricultural products by:

- Supporting domestic production by limiting imports to maintain a price differential between the domestic prices and the international ones;
- Contributing to agricultural producers' revenues (income support); and
- Contributing to ensuring stable conditions for agricultural production.

To determine the relevance of border protection, the evaluation first considers whether border protection has had an effect – that is, whether border protection has contributed to Switzerland achieving each of the five overarching objectives of agricultural policy. Second, the evaluation considers whether border protection is an appropriate policy instrument to achieve the overarching objectives.

Two analytical frameworks are used to evaluate the relevance of border protection for achieving the overarching objectives of Swiss agricultural policy, to differentiate between the overarching objectives according to whether they are concerned with the commodity outputs or non-commodity outputs of agricultural activities. In addition to producing marketable commodities such as food, fibre and raw materials, agricultural activities can shape the landscape, provide environmental benefits such as land conservation, the sustainable management of renewable natural resources and the preservation of biodiversity, and contribute to the socio-economic viability of rural areas. On these grounds, a distinction can be made between the objective that agriculture 'should make an essential contribution towards ensuring food supplies for the population', and the other objectives set out in the constitution and Agricultural Act.

3.1. Evaluation of the relevance of border protection for ensuring food supplies

Switzerland's high levels of border protection stimulate domestic production by limiting imports to maintain a price differential between the domestic prices and the international ones. Countries that protect their agricultural sectors produce more and consume less than would be the case if resources were allocated in line with their comparative advantage (Brooks and Matthews, 2015). Given this, a key question concerns the effect of reducing border protection on Switzerland's capacity to keep its current level of domestic production in calories terms and to maintain its production capacity.

To evaluate the relevance of border protection for ensuring food supplies, the analysis in this study uses model simulations from the OECD's computable general equilibrium (CGE) trade model, METRO (OECD, 2015b and Box 3.1) to explore the effects of border protection in the Swiss agro-food supply chain. Specifically, it considers how domestic production and imports are affected by the abolishment of border protection, and the extent to which border protection is responsible for maintaining production at current levels.

The distinguishing feature of the OECD METRO model is that it incorporates the OECD Trade in value added data (TiVA) and is able to distinguish trade and production by use

categories (final consumption, capital formation and intermediate inputs). Simulation scenarios were designed to ascertain the effects of border protection on intermediate inputs into agriculture (most notably animal feed) as well as agricultural commodities to yield insights into:

- Changes in input costs to primary agriculture;
- Import and export effects in primary and processing sectors;
- Overall economic effects.

Box 3.1. What is the OECD METRO model?

In 2015, the OECD launched a new global computable general equilibrium (CGE) trade model, METRO (ModElling TRade at the OECD), the model is described in detail in OECD (2015b). CGE models are computer simulation models that use data to explore the economic impact of changes in policy, technology and other factors. They show how different sectors inside one economy are linked and how multiple economies are connected to each other, and how resources such as labour, capital and natural resources are best allocated across all economic activities. The METRO model builds on the GLOBE model developed by McDonald and Thierfelder (2013).

The METRO database currently covers 61 economies across 57 economic sectors. It is based on the GTAP (Global Trade Analysis Project) database, and uniquely incorporates recent OECD statistical developments. METRO allows users to analyse global value chains (GVCs) by drawing on the OECD-WTO Trade in Value Added (TiVA) database, providing a platform to more fully integrate structural policy issues in the analysis of trade policy. METRO also features an extensive library of trade-related policies, including current border tariff rates and export restrictions, as well as domestic taxes and support. Using METRO, it is possible to track trade flows by their use (i.e. intermediate, household, government and investment) in addition to bilateral links between source and destination markets. This enhances the ability to model movements of goods and services, especially along global value chains.

Global CGE models show the linkages of sectors and agents inside an economy and the connection between economies. In doing so a CGE model depicts the effects between agricultural and food sectors as well as the effects on and reaction of other sectors in the economy. Also effects and reactions of final demand and trade partners are modelled. In contrast to a partial equilibrium model, which typically shows more detail on the sectoral level but where analysis is limited to agro-food production, the CGE model thus shows effects on the whole economy and on final demand.

An extended description of the METRO model is found in Annex B.

Source: OECD (2015b), METRO v1 Model Documentation, TAD/TC/WP(2014)24/FINAL.

3.2. Multifunctionality and the potential role for agricultural policy

The remaining overarching objectives of Swiss agricultural policy reflect the view that agriculture is multifunctional – namely, that the sector also has a role in producing so called ‘non-commodity outputs’ (NCOs) such as landscape management, environmental quality and contributions to rural development. To the extent that these non-commodity outputs have the characteristics of public goods, and markets do not exist for them, they may be produced in suboptimal amounts in the absence of agricultural production. On these grounds, government intervention is often deemed necessary to support the non-commodity functions of agriculture and ensure the production of non-commodity outputs.

To evaluate the relevance of border protection for achieving the multifunctional objectives of Swiss agricultural policy, this report applies a framework for analysing multifunctionality in agriculture developed by the OECD (2001, 2003, 2008a). This framework identifies the key elements of multifunctionality that are relevant from a policy perspective, and proposes a series of questions that provide guidance on when a policy intervention is needed to secure the supply of a particular non-commodity output, and what that intervention should be. According to the framework (OECD, 2001, 2003), the key elements of multifunctional agriculture are:

- The existence of multiple commodity and non-commodity outputs that are ***jointly produced*** by agriculture.
- The fact that markets for some of these non-commodity outputs do not exist or function poorly – that is, some non-commodity outputs exhibit the characteristics of public goods leading to ***market failure***.

3.2.1. Jointness in production

Jointness exists if the production of two or more outputs is interlinked in such a way that a change in the supply of one also affects the supply of the others (Cahill, 2001). The degree and nature of jointness in the production of commodity and non-commodity outputs has implications for the most efficient policy intervention. In the first instance, if commodity and non-commodity outputs are not joint in production – in other words, there is no technical or economic link between them – then there is no role for agricultural policy. For example, the maintenance of historic buildings (and their associated cultural heritage values) on farms may be possible without any agricultural activities (Cahill, 2001). Similarly, if there is only a weak link between the commodity and non-commodity outputs, a policy intervention that targets the production of the non-commodity itself will be more efficient than an intervention that is linked to agricultural activities (OECD, 2008a).

Even if commodity and non-commodity outputs are joint in production, non-agricultural provision of the non-commodity output may be more efficient, which again suggests a limited role for agricultural policy. This may be the case if the production of non-commodity outputs can be separated from agriculture, such as for NCOs that are not tied to agricultural land, and if non-commodity outputs supplied by non-agricultural activities are substitutes for those supplied by agriculture (OECD, 2001). On the other hand, there may be economies of scope – that is, a cost advantage – from producing a given non-commodity output in conjunction with a commodity output. If agricultural provision is the most efficient option, then there may be a role for agricultural policy.

The source of jointness – that is, the nature of the technical or economic relationship between the commodity and non-commodity outputs[3] – will also have implications for the most efficient policy intervention. Considerations include whether the commodity and non-commodity outputs are complements or competing in production, and whether provision of the non-commodity output is related to the level of output, or a production factor (such as land) or farming system. Depending on the nature of jointness, a policy

3. ***Technical interdependencies*** describe situations where increases or decreases in the level of the commodity output influences the supply of the non-commodity output without changing input allocation to these outputs. Two outputs are ***technically complementary*** if an increase in the supply of one raises the marginal input productivities in producing the other; they are ***technically competing*** if the reverse holds (OECD, 2001).

intervention may be better targeted at the production factor most strongly related to the NCO or the adoption of specific technologies and practices, rather than production incentives (OECD, 2008a). Similarly, if there are spatial (site and area-specific) aspects to the production of non-commodity outputs – for example, because of differences in site productivity and scale dimensions – then a policy intervention may be better targeted at specific regions than at an industry or the sector as a whole (Cahill, 2001; OECD, 2008a).

3.2.2. Market failure and the public good characteristics of non-commodity outputs

Jointness between agricultural production and non-commodity outputs is necessary for agricultural policy to be relevant for ensuring non-commodity outputs are provided. However, as a further condition for government intervention, there must be some market failure that results in the suboptimal provision of a non-commodity output. In general, markets for non-commodity outputs are under-developed or non-existent – the value of improved environmental outcomes or landscape maintenance is not reflected in agricultural commodity prices. This may result in their under-supply, to the extent that the market does not provide sufficient incentives for private production by farmers (OECD, 2015c).

Non-commodity outputs that are jointly produced with agricultural commodities are not always associated with market failure, and government intervention may not be required to ensure their provision (OECD, 2001). An important consideration is whether a change in the level of commodity production (for example as a result of lower domestic prices) also affects the supply of the non-commodity output. This would depend on how the industry adjusts and the nature of jointness in production. For example, if low-productivity farmers exit agriculture as a consequence of lower prices and their resources (land and capital) are acquired by more efficient farmers, then the overall supply of the non-commodity output may not be affected – there is no market failure. In other cases, the supply of the non-commodity output may not be affected as long as *some* level of agricultural production takes place. On the other hand, if lower prices result in land being taken out of production or allocated to another commodity or farming system (that is not associated with the non-commodity output), then the market is not providing for the non-commodity output (Cahill, 2001).

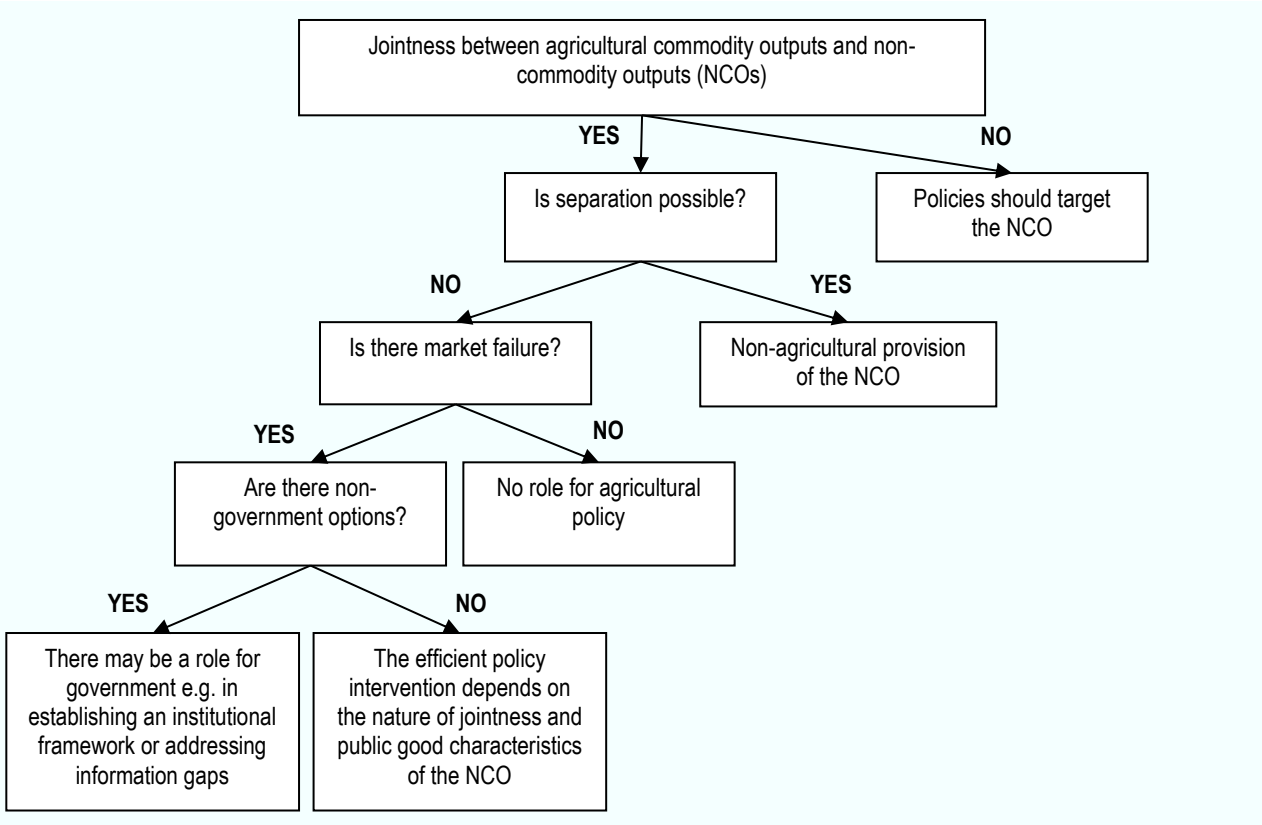
The presence of negative externalities may also reduce the possibility of market failure in the supply of the non-commodity output. This is because agriculture has multiple positive and negative effects. Taking negative externalities into account may reduce the possibility of market failure because a decrease in supply of a positive externality may be offset by a decrease in the negative externality (OECD, 2001).

If there is both jointness and market failure in the provision of non-commodity outputs, a further consideration is whether there are non-governmental options such as market creation or voluntary provision of the non-commodity output. Farmers may be able to enter into contracts with those who use or value certain non-commodity outputs, for example with the tourism industry or consumers. In other cases, a lack of awareness may mean that farmers are not taking into account the long-term private benefits associated with some non-commodity outputs, such as those associated with improved environmental outcomes. Addressing these information gaps may mean that farmers produce a sufficient level of the non-commodity output without government intervention.

In the absence of non-governmental options, the most efficient intervention to ensure the non-commodity output is produced – and whether it is border protection or some other

agricultural policy instrument – will depend on the nature of jointness and the public good characteristics of the non-commodity output (Cahill, 2001).

Figure 3.1. OECD Framework for analysing multifunctionality in agriculture



Source: Based on OECD (2001, 2003).

3.2.3. Policy implications

If there is both jointness and market failure, and non-governmental options are lacking, attention can turn to the most appropriate policy instruments to ensure the supply of non-commodity outputs. The OECD's framework for analysing multifunctionality in agriculture also identifies the implications of jointness in production and market failure for the most efficient policy intervention. As summarised in OECD (2008a), the key policy implications include the following:

- Policies should be conditional on delivery of the non-commodity output, and there should be monitoring to ensure that the desired outcomes are being achieved.
- Policy action should be targeted at the activity or input into production most strongly related to the non-commodity output and should avoid unnecessary increases in the intensity of agricultural production.
- Policy action should be geographically targeted unless the non-commodity output is associated with all or a large percentage of the production or agricultural land in a country.
- Moreover, transaction costs should be taken into account in policy design and the level of government at which policy decisions are taken should correspond as closely as possible to the geographical occurrence of the demand for non-commodity outputs.

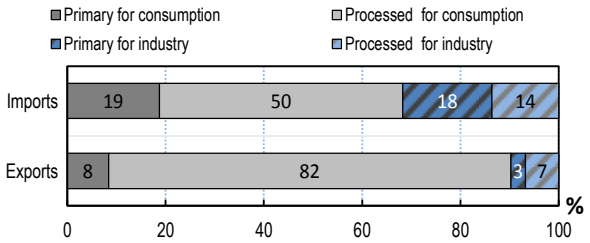
4. The relevance of border protection for attaining the overarching objectives of Swiss agricultural policy

4.1. The relevance of border protection for ensuring food supplies for the population

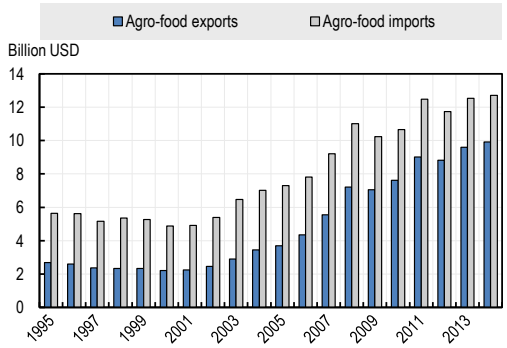
Switzerland has consistently been a net agro-food importer (Figure 4.1). Almost 74% of Switzerland's agricultural imports are sourced from the European Union, in particular, Germany (roughly one quarter of Switzerland's agricultural imports), France, Austria, Italy, the Netherlands, Spain and Belgium. South and Central America account for 10% of agro-food imports, and the United States and Canada account for a further 4% (FAOSTAT, 2016). Nevertheless, the share of agro-food imports in total imports is low at around 5%, while the share of agro-food exports in total exports is around 3%. Between 2010 and 2014, almost 70% of agro-food imports were primary and processed products for final consumption, while agro-food exports were dominated by processed products for final consumption (OECD, 2016a).

Figure 4.1. Switzerland's agro-food trade

Panel A. Composition of agro-food trade, 2000-2014



Panel B. Agro-food trade, 1995-2014



Source: UN Comtrade database, http://comtrade.un.org/data/.

High levels of border protection raise food prices in countries that are net food importers in order to bring national supply and demand into equilibrium. Countries that protect their agricultural sectors produce more and consume less than would be the case if resources were allocated in line with their comparative advantage, implying fewer imports (Brooks and Matthews, 2015). Switzerland's high levels of border protection stimulate domestic production by limiting imports to maintain a price differential between the domestic prices and the international ones – currently, prices paid to the farming sector remain on average 60% above world prices (OECD, 2016a). Given this, a key question concerns the effect of reducing border protection on Switzerland's capacity to maintain domestic production at levels sufficient to meet its target rate of food production in calories.

The Swiss constitution tasks agriculture with making an essential contribution towards ensuring food supplies for the population. The current agricultural policy framework has set a target rate of net food production on a calorie basis of 21 300 TJ, and a target rate of gross food production of 23 300 TJ, which correspond closely to the level of production

in 2015 (L'Assemblée fédérale, 2016).[4] The evaluation takes the current level of food production to represent the overarching objective of 'making an essential contribution towards ensuring food supplies for the population'. The OECD's computable general equilibrium (CGE) trade model, METRO (OECD, 2015b, Box 3.1, and Annex B) is used to assess the effects on the level of food production under a unilaterally liberalised agricultural market, compared with current levels of food production. Two scenarios are considered:

1. **Liberalisation**: Switzerland unilaterally abolishes border protection (tariffs and TRQs) on agricultural and food imports (as represented in the GTAP v9 database); the payment rates for direct payments are maintained.
2. **Swiss preference**$^{+}$: Switzerland unilaterally abolishes border protection (as per the liberalisation scenario) and Swiss consumers have a higher preference for Swiss agricultural and food products.

Regarding scenario 2, faced with greater choice between Swiss-produced and imported agro-food products, consumers have a stronger preference for Swiss agro-food products. This reduces the substitutability of imports for Swiss products. There is a consensus in the literature that labelling (and associated marketing and promotion activities) significantly affects the willingness to pay and the substitutability of products (reflected in the substitution elasticity) (for example, see Arnot et al., 2006; Kawashima and Sari, 2010; Lopez and Pagoulatos, 2002; Zander and Hamm, 2010). Surveys of Swiss consumers' preferences have found that product quality and origin play an important role in consumers' purchasing decisions, and that consumers consider Swiss agricultural products to be of high quality. Moreover, the surveys showed that this translates into a higher willingness to pay for Swiss agricultural products (which has increased over time) (Rieder et al., 2015). Similarly, a study by Bolliger (2012) on the Swiss market found that consumers are willing to pay more for goods that are labelled as Swiss goods (consumers were willing to pay 25-45% more for chicken; 40-60% more for strawberries; and 20-30% more for apples).[5] The main reasons for the increased willingness to pay were higher food standards, higher quality in the production process (related to animal welfare and environmental standards), better taste, and supporting domestic producers. Consistent with the approach taken in these studies, the **Swiss preference**$^{+}$ scenario reflects this higher willingness to pay by reducing the substitutability of imports and domestic goods by 40% for all agricultural and food products.

4. The level of food production in Switzerland is calculated based on the energy value of single food products in calories. A distinction is made between gross food production and net food production. When calculating net food production, imported feed is taken into account by reducing the domestic animal production by the proportion of domestic production based on imported feed (OFAG, 2016). The analysis considers the effect of unilateral trade liberalisation on gross production. Production volumes are converted into calories using FAO conversion ratios.

5. Bolliger (2012) analysed Swiss consumers' willingness-to-pay for agricultural products with the "produced in Switzerland" attribute using a dichotomous choice model. Consumers were first asked which of two identically priced products they would choose – one produced in Switzerland or one produced in the EU. If they chose the Swiss product, they were asked if they would pay a higher price. If they chose the EU product, they were asked if they would pay a lower price for the Swiss product. The study participants were then asked about one of three different offers at random. To determine their willingness-to-pay, several logistic regression models were developed and then used as a basis for calculating the absolute mean and percentile distribution.

Both scenarios show that Switzerland's level of gross food production, measured in calories, would decrease following trade liberalisation. However, the extent to which production would decline depends on Swiss consumers' preference for Swiss agricultural and food products. Gross food production decreases by 15% under the **Liberalisation scenario**, but by only 8% under the **Swiss preference$^+$ scenario**, compared with the current level of production. Moreover, the decline in domestic production may be overestimated because official statistics, and hence model simulations, do not take into account consumer purchases across the border (*tourisme d'achat*). In Switzerland, food sector losses as a result of border trade are estimated to amount to nearly 3 billion francs a year (Rudolph, Nagengast and Nitsch, 2015). To the extent that prices fall under trade liberalisation, the domestic demand response may be stronger as consumers have less incentive to cross the border to make food purchases.

In the **Liberalisation scenario**, the largest impacts on Switzerland's overall level of production in calories come from lower production in meat-related sectors, both primary agriculture and food, which experience reductions of more than 34% (primary agriculture) and up to 57% (food) (measured in calories). This is in response to lower domestic prices following unilateral trade liberalisation, as import prices for these (and other agro-food) sectors decline substantially once tariffs and TRQs are abolished.[6] For example, production of other meat products, which includes pig and poultry meat, and eggs, falls by 57%, while production of meat products, which include cattle (beef and veal), sheep, goat and horse meat, falls by 46%. These products receive the highest levels of market price support and have the highest border protection of Swiss agro-food products (see Figure 2.2 and WTO (2017)). There are also significant falls in wheat production (−23%) and fruits and vegetables (–20%). There is also a shift in production towards some low-calorie sectors, such as plant-based fibres. The dairy sector – Switzerland's largest agricultural sector in terms of agricultural production and farmer numbers – is largely unaffected by trade liberalisation, despite high levels of tariff protection. Under the **Liberalisation scenario**, production of raw milk and dairy products falls by less than 2%.

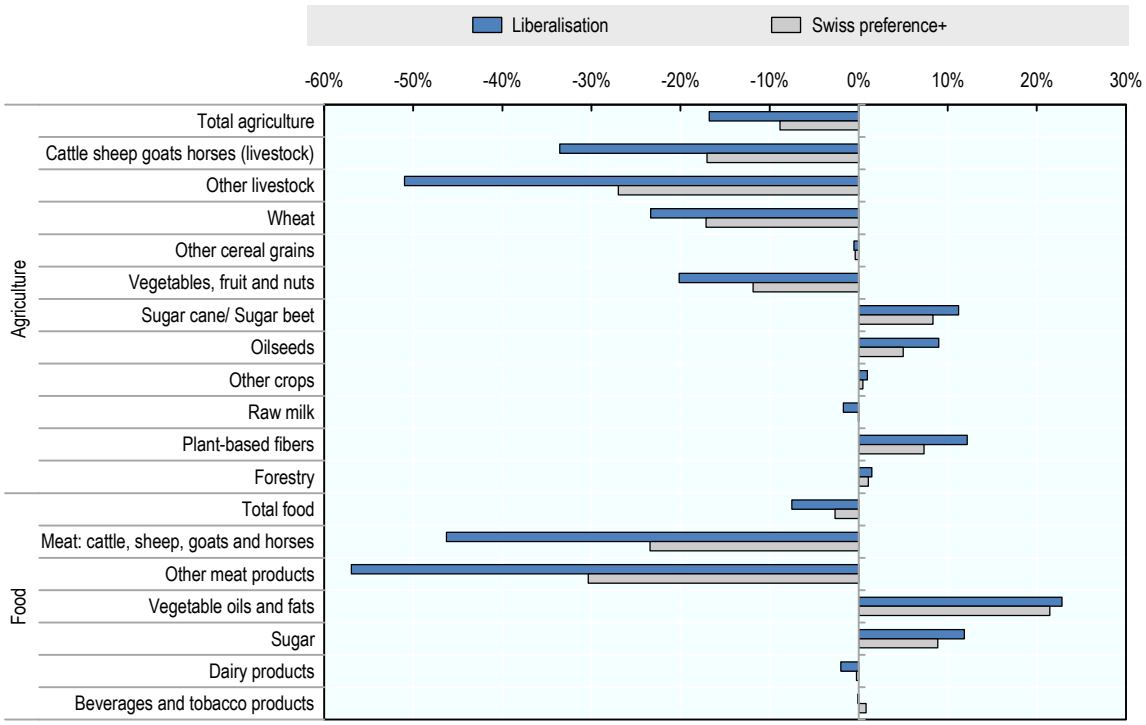
In contrast, production decreases are significantly less when Swiss consumers have a strong preference for Swiss agricultural and food products (the **Swiss preference$^+$ scenario**). This is particularly the case for meat-related sectors, where the effect on production is half that of the **Liberalisation scenario**. Specifically, production of other

6. The decrease in production is larger than that obtained in the previous OECD review of agricultural policies in Switzerland (OECD, 2015a), although the extent to which production declines depends on Swiss consumers' preference for Swiss agricultural and food products (represented in this analysis by the Swiss preference$^+$ scenario, which reduces the substitutability of imports and domestic goods by 40% for all agricultural and food products). A key difference is that this evaluation considers the economic impacts of unilateral trade liberalisation, whereas OECD (2015a) used the OECD's Policy Evaluation Model (PEM) to evaluate the economic impacts of further market integration with the European Union. As a result, producer prices fall by more in this analysis, leading to a larger domestic supply response. To illustrate, in 2015 producer prices for beef and veal in Switzerland were 73% higher than world market prices – EU producer prices were lower but still 32% higher than world market prices. In addition, this evaluation considers more commodities than the 2015 OECD review of agricultural policies in Switzerland, including some which benefit from very high levels of protection, including pig and poultry meat, where Swiss producers prices were respectively 153% and 349% than world market prices in 2015 (OECD, 2016b).

meat products (pig and poultry meat, and eggs) falls by 30%, while meat produced from cattle (beef and veal), sheep, goat and horse falls by 23%.

Following trade liberalisation, some agricultural sectors experience a smaller fall in production than their associated food sectors (Figure 4.2). In particular, the production of the livestock sector (cattle, sheep, goats and horses) falls by 34%, while meat production (from cattle – beef and veal – sheep, goats and horses) falls by 46%. If Swiss consumers have a strong preference for Swiss agricultural and food products, the production of the livestock sector falls by 17% while meat production falls by 23%. The livestock sector includes recreation and competition horses, breeding stock, and livestock kept for landscape maintenance and tourism (in other words, livestock used to produce non-commodity outputs), in addition to animals intended for meat production. While the number of animals intended for meat production fall following trade liberalisation, the numbers of other livestock increase as a result of lower input costs, including for feed and land. In contrast, the production of the meat processing sector falls as a result of lower domestic throughput as well as increased competition from imports.

Figure 4.2. Simulated change in production quantity



Notes: Simulated percentage changes in production volumes are equal to percentage changes in production measured in calories because the FAO conversion ratios used to convert volumes into calories are fixed.
Other livestock includes pigs and poultry, and other meat products include pig and poultry meat, and egg products. Vegetable oils and fats are processed oils and fats for final consumption. The sector includes sunflower seed oil, olive oil and rapeseed oil.
Source: OECD estimates.

Levels of border protection vary between agro-food sectors, encouraging resources to stay in heavily protected sectors (based on expectations about the returns that can be earned under border protection). As a result, Switzerland's current trade policy protects specific sectors *at a cost* to other agro-food sectors, and to the economy as whole. Trade liberalisation may encourage resources, such as land and capital,[7] to move from formerly heavily protected sectors to those that had received less protection – including sugar, plant-based fibres and oilseeds – leading to production increases in those industries.

Domestic production benefits from liberalisation in two ways: **First**, under both the **Liberalisation** and **Swiss preference$^+$ scenarios,** input costs decrease in nearly all agricultural and food sectors, most significantly in the 'other meat' sector (pig and poultry meat, and egg products). This direct effect is caused by a fall in the prices of imported inputs. This includes imported feed and, in the case of other meat products, imports of meat products for further processing. In addition, and as an indirect effect, the overall production costs of Swiss producers decrease, which leads to falls in the prices of domestically-sourced inputs (Figure 4.3). For example, meat (from cattle, sheep, goats and horse) production costs decline by 2.9% because of a reduction in the prices of imported inputs used in raising livestock (−7.5%) and a reduction in the cost of other inputs.

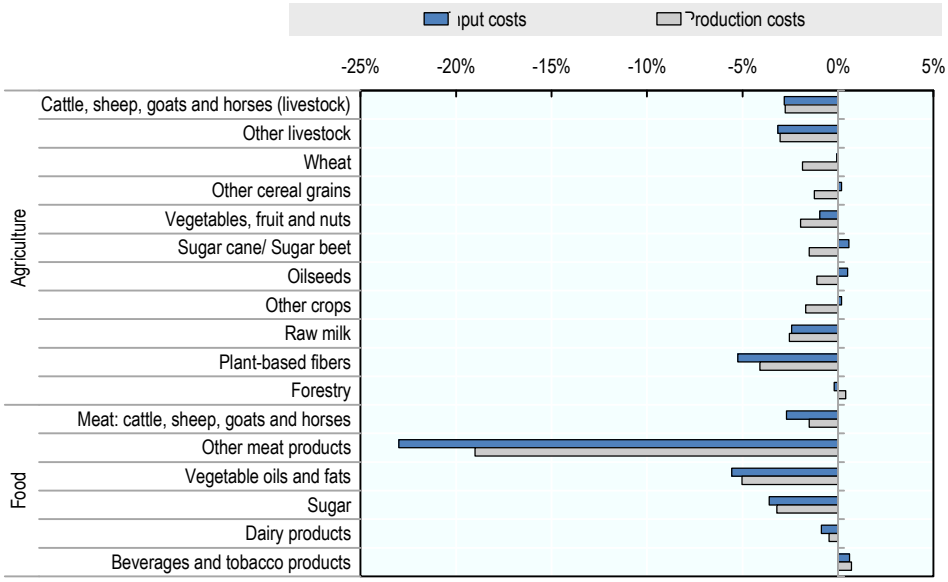
Second, production costs decrease as a result of lower land prices, as support provided by border protection is capitalised into land values. Moreover, this also benefits heavily protected industries, to the extent that lower land rents offset some of the effects of lower prices under trade liberalisation.

In some sectors, this leads to a significant increase in production, Following trade liberalisation, the production costs of the vegetable oils and fats sector fall by around 5%, leading to a significant increase in production (23% under the **Liberalisation scenario**, see Figure 4.2). This also increases demand for oilseeds, which drives the 9% increase in domestic production seen in Figure 4.2 – oilseed production becomes more profitable relative to other agricultural commodities following trade liberalisation.

Figure 4.3 also suggests that trade liberalisation results in marginal increases in input costs for some agro-food sectors, including sugar beet, oilseeds, other grains and other crops. These sectors have a higher share of manufacturing and service inputs, and demand increases for these inputs following trade liberalisation across the Swiss economy as a whole, resulting in higher prices for inputs. However, this is also a function of how inputs are aggregated in the METRO model – for example, manufacturing includes fertiliser as well as other inputs not widely used in agriculture. For this reason, the simulated increase in the input costs of some agro-food sectors should be considered not significant from zero.

7. In the METRO model, land and capital stay in production and there is no exit of production factors, only re-allocation between alternative uses. This may result in an overestimation of production increases in some sectors.

Figure 4.3. Simulated change in input and production costs, Liberalisation scenario



Notes: Production costs include the costs of (intermediate) inputs and value added, where value added includes land, labour and capital. The overall effect depends on the production structure of the sector.
Other livestock include pigs and poultry, and other meat products include pig and poultry meat, and egg products. Vegetable oils and fats are processed oils and fats for final consumption. The sector includes sunflower seed oil, olive oil and rapeseed oil.
Source: OECD estimates.

The effect of trade liberalisation on Switzerland's agro-food imports (by volume and country of origin) is shown in Figure 4.4. Under the **Liberalisation scenario**, imports increase in 10 agro-food sectors, ranging from a marginal increase in crop imports to a 250% increase in other meat products (including pig and poultry meat, and egg products). The most significant increases occur for imports of livestock products (250% increase in other meat products; 246% increase in meat from cattle, sheep, goats and horse; and 60% increase in dairy products), followed by wheat (24%), oil seeds (23%), and vegetable oils and fats (12%).[8] In contrast, imports decrease in 4 agro-food sectors, with the largest reduction occurring in imports of other livestock (−26%). Imports of other cereal grains fall as a result of lower domestic production of production of other livestock (mainly pig and poultry) and a relative increase in the competitiveness of domestic cereal grains, as a result of lower production costs.

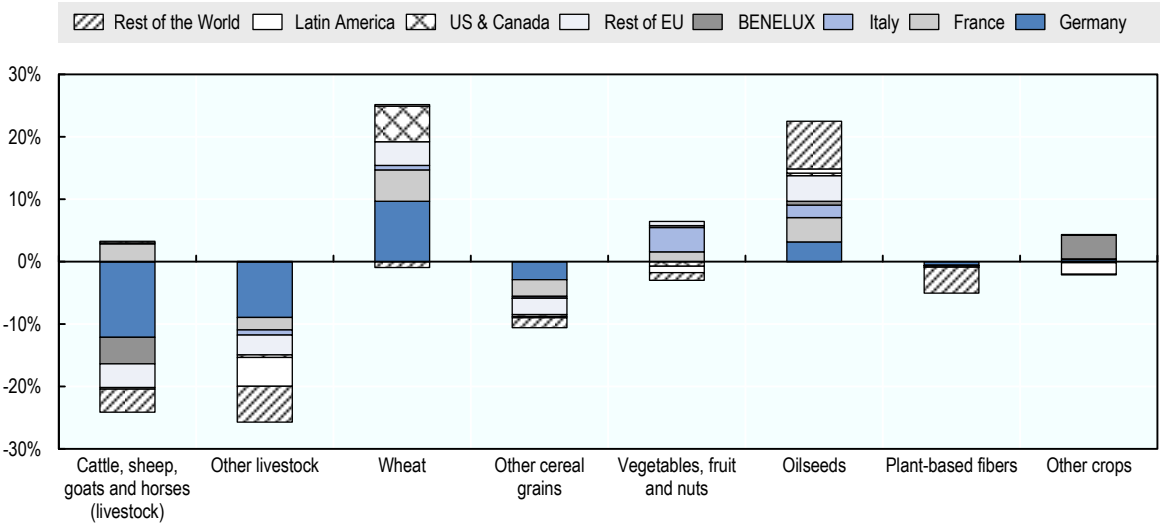
Following liberalisation, higher food import volumes would be supplied, in large part, by neighbouring countries. For meat products (from cattle, sheep, goats and horse), around half of the increase in imports would be supplied by EU countries, with German meat imports accounting for 44% of additional EU imports (Figure 4.4b). Additional imports of meat products would be sourced from the US and Canada, and from Latin America, while meat imports from Australia and New Zealand would fall. Additional imports of other meat products (pig and poultry meat, and egg products) would be supplied by a relatively small number of countries – Germany, France, the rest of the European Union and Brazil. Additional imports of dairy products would be supplied by EU countries (in

8. Following trade liberalisation, Switzerland's imports and exports of vegetable oils and fats increase significantly. Domestic production of vegetable oils and fats also increases, predominantly for export. Domestic consumption remains constant.

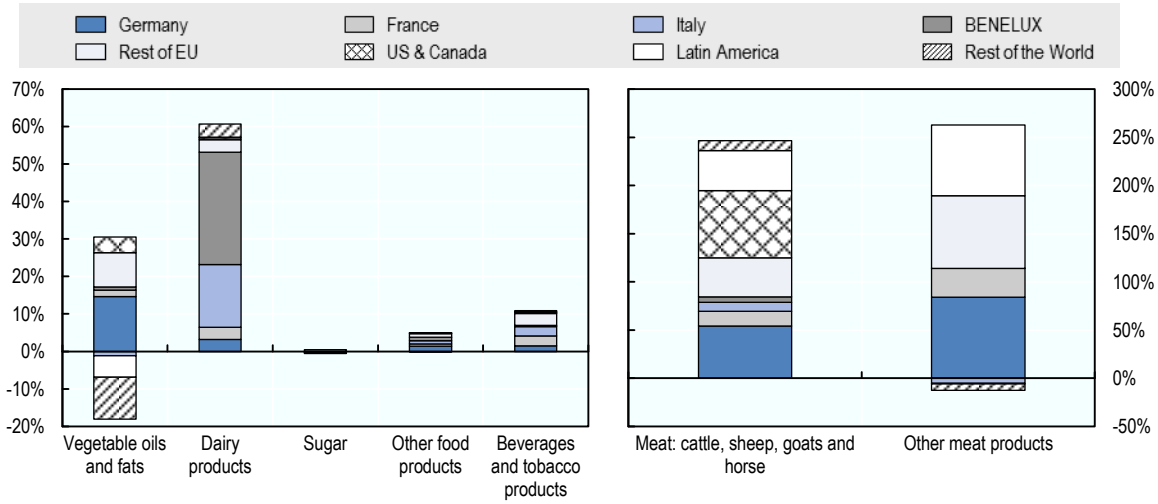
particular, Belgium, the Netherlands, Luxemburg and Italy). Following trade liberalisation, imports of vegetable oils and fats from Brazil and the rest of the world would decline, while imports from EU countries and the United States would increase.

Figure 4.4. Change in imports by product and trade partner, Liberalisation scenario

a) Agricultural imports



b) Food imports



Notes: Other livestock includes pigs and poultry, and other meat products include pig and poultry meat, and egg products. Vegetable oils and fats are processed oils and fats for final consumption. The sector includes sunflower seed oil, olive oil and rapeseed oil.
Source: OECD estimates.

Results from both the **Liberalisation** and **Swiss preference$^+$ scenarios** indicate that removing border protection has a positive effect on the economy overall. Table 4.1 shows the simulated effects on Gross Domestic Product (GDP) and several other macro-economic indicators. Overall production of goods and services increases as a result of a more efficient allocation of resources. Moreover, trade liberalisation has a positive effect on demand, as lower food prices allow for a reallocation of expenditure of final demand.

Exports are found to increase more strongly than imports, indicating that the current policy of border protection represents an implicit tax on exports. Lower input prices make domestic firms more competitive on exports markets. In addition, exports are found to be reinforced by lower domestic prices as well as a slight depreciation of the exchange rate, even under unilateral trade liberalisation.[9,10]

Table 4.1. Macroeconomic effects

	Full liberalisation	Swiss preference+
Real GDP	0.58%	0.38%
Final Domestic Demand	0.25%	0.15%
Total Import demand	1.51%	1.10%
Total Export demand	2.00%	1.43%
Total Swiss Production	0.22%	0.21%
Household Income	0.84%	0.79%
Equivalent Variation in % to income	0.30%	0.19%

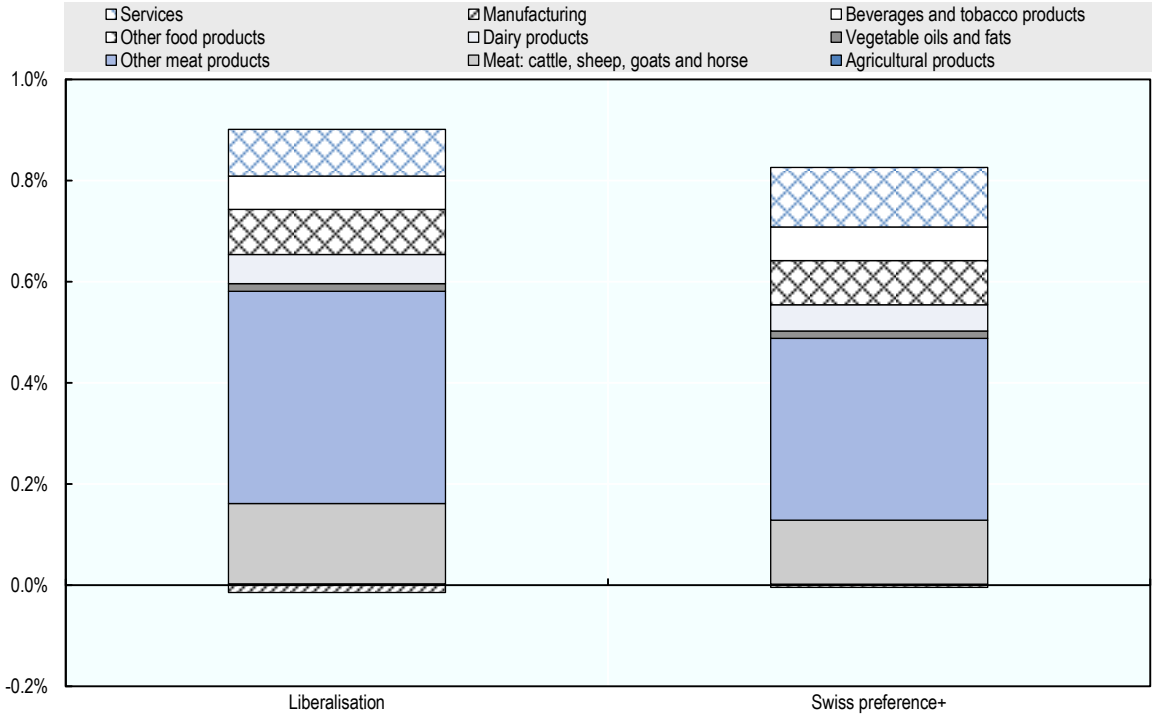
Note: Equivalent variation compares the situation with and without the policy change. It depicts the compensation which would be needed for households to reach the same utility level as after the shock, if the policy change would not occur.
Source: OECD estimates.

Food accounts for a small share of household expenditure in Switzerland. Even so, lower prices following trade liberalisation increase household incomes (Table 4.1), and household demand for food products also rises, reflecting an increase in choice, quality and quantity of food products consumed (Figure 4.5). Household demand for services (trade and transport) increases as well, as a result of the shift in demand to services that accompanies higher incomes. Prices fall by less under the **Swiss preference+ scenario**. As a result, the observed increase in household demand is lower than in the **Liberalisation scenario**.

9. The increase in exports may be overestimated as a result of Switzerland's system of preferential tariffs for inward processing (and re-export). To the extent that preferential tariffs (0%) for inward processing are captured in Switzerland's reported trade statistics, the applied ad valorem tariffs used in METRO will include these preferences. In this case, the inward processing tariffs reduce the applied tariffs on all goods (reducing the size of the liberalisation shock modelled), but the incidence of the tariffs is not differentiated between those firms that import intermediates only to export transformed products and those that also import intermediates to serve the domestic market. This may therefore overestimate the impact on exports under trade liberalisation as for some exporters there will be no change in tariff costs. The extent of this bias is unknown as detailed trade statistics in this respect are not taken into account within the current version of the model. Nevertheless, exports will increase following trade liberalisation for the reasons discussed above.

10. Unilateral trade liberalisation increases imports. To maintain the macroeconomic equilibrium, and as savings equal investment, the exchange rate depreciates under both scenarios (**Liberalisation** 1.3% and **Swiss preference+** 1.1%) to increase exports and thus balance the current account (which is fixed).

Figure 4.5. Effects on household demand, by sector



Notes: Other meat products include pig and poultry meat, and egg products. Vegetable oils and fats are processed oils and fats for final consumption. The sector includes sunflower seed oil, olive oil and rapeseed oil.
Source: OECD estimates.

4.1.1. Costs of border protection

Switzerland's high levels of border protection stimulate domestic production by limiting imports to maintain a price differential between the domestic prices and the international ones. Together with direct support payments, this has enabled domestic production to remain at a high level without the necessity of responding to market changes or increasing efficiency. Following trade liberalisation, Switzerland's level of gross food production, measured in calories, decreases by 15% under the **Liberalisation scenario**, and by 8% under the **Swiss preference$^+$ scenario**, compared with its current level. On these grounds, border protection is relevant for the capacity of the agricultural sector to make a major contribution towards ensuring food supplies for the population. That said, it is important to emphasise that the agricultural sector will still supply over 85% of current production, even under full trade liberalisation.

The results indicate that the decline in Switzerland's gross food production is largely driven by lower production in a small number of agro-food sectors, mainly meat sectors (both primary agriculture and processing) following trade liberalisation – simulations with the OECD's METRO model indicate that domestic meat and livestock production would be around 26% to 50% less as a result of lower prices following the abolishment of border protection, depending on Swiss consumers' preferences for Swiss agricultural and food products. But trade liberalisation also results in production increases in other agro-food sectors. This suggests that growth in some sectors is constrained by border protection. In turn, this raises costs in other parts of the Swiss economy, most notably for final consumers and down- and upstream users (the food industry and feed suppliers). In

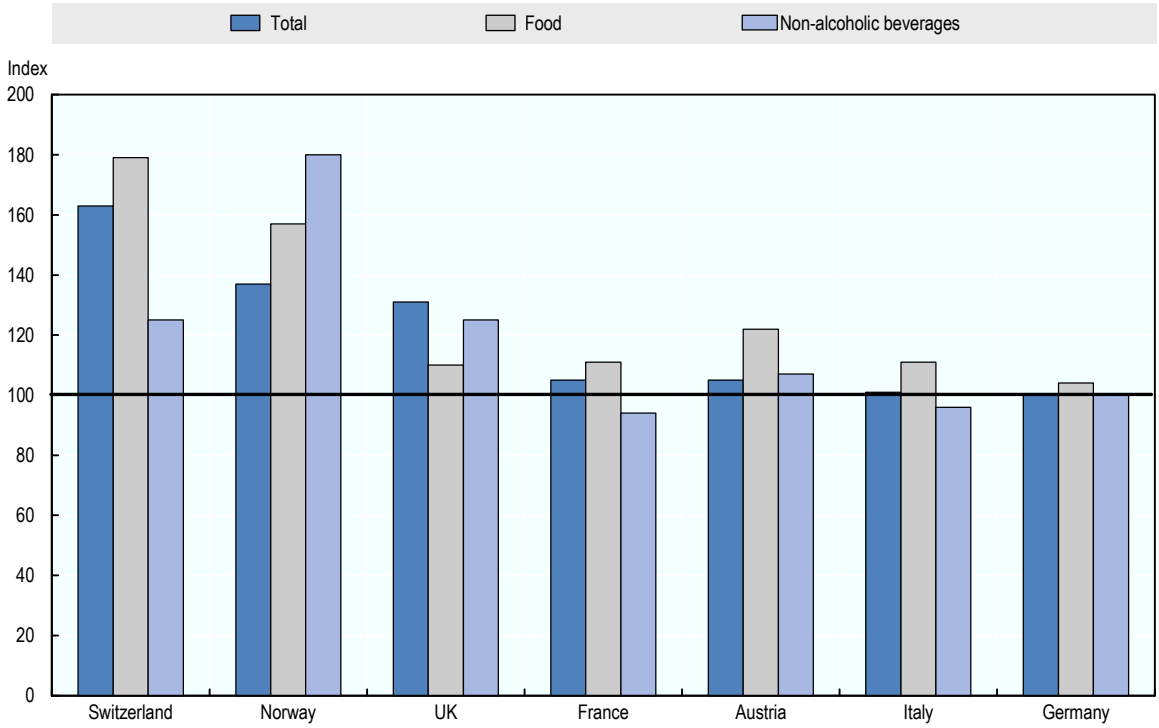
particular, the following effects can be identified from the model results and analytical framework:

1. High domestic prices for consumers and producers
2. High production costs as inefficient structures are kept in place
3. Costs occurring through higher price volatility

High domestic prices reduce producers' competitiveness and disadvantage consumers

Border protection raises domestic food prices by limiting imports to maintain a price differential between domestic and international prices. These high prices are then passed on through the value chain, raising the cost of intermediate inputs to downstream processing sectors and feed suppliers (who rely on imported grains and feedstuffs). This is a significant cost driver in the production of food products from livestock commodities (including meat, eggs and milk), placing industries that rely on agricultural products as an input to production at a competitive disadvantage – this includes the food, tourism and services industries (DEFR, 2016). Abolishing border protection would therefore reduce costs of intermediate and input factors, and increase the competitiveness of Swiss producers at various stages of the value chain.

Figure 4.6. Price level indices for food and beverages, by country, 2015



Note: Relative to average price levels in the EU 28 (index = 100).
Source: Eurostat (2016).

Border protection also leads to higher prices for consumers. On average, food prices for consumers in the Swiss domestic market are 79% higher than international prices, while the price differential is even higher for some products – on average, Swiss consumers pay 2.5 times more for meat products than the average consumer in the EU (Figure 4.6)

(Eurostat, 2016). Beyond the findings of this evaluation, a number of studies report significant costs for consumers. Loi et al. (2016) found that the TRQ system reduced the welfare of Swiss consumers (in terms of higher retail prices paid and foregone savings from lower prices that would prevail in absence of the TRQ system). Similarly, several evaluations have found that trade liberalisation would significantly increase the welfare of Swiss consumers, offsetting any losses to producers (Jch-consult, 2016; Le Conseil fédéral, 2014; OECD, 2015a).

High production costs constrain more competitive sectors by constraining efficient resource allocation

High prices as a result of border protection encourage resources to stay in heavily protected sectors, so that inefficient structures in the value chain are kept in place (DEFR, 2016). Simulations with the OECD's METRO model indicate that following trade liberalisation, most agro-food sectors benefit from lower production costs and the reallocation of resources from formerly heavily protected sectors, such as the meat and wheat sectors, to sectors that were more lightly protected, such as sugar and oilseeds.[11] Moreover, in some sectors production levels increase. This suggests that the current structure of border protection (tariffs and TRQs) disadvantages potentially competitive sectors by encouraging resources to stay in the heavily protected sectors.

Switzerland's agro-food sectors have the potential to adapt to a more competitive market environment following trade liberalisation – the opening of the Swiss cheese market to EU competition demonstrates that Swiss producers can compete on open markets (Le Conseil fédéral, 2017). As an example, a recent analysis of the Swiss raw milk and dairy sector using the CAPRI model found that the sector could be internationally competitive and export-oriented. However, the sector is currently uncompetitive and unable to expand production as a result of high domestic support and border protection. Even though border protection is high, domestic prices for raw milk continue to decline in order to bring domestic supply and demand into equilibrium, in part because the sector has limited access to foreign markets. As a result, the gap between domestic and international prices is shrinking, reducing the competitiveness of Swiss producers further without giving them the opportunity to respond to market signals. Opening the raw milk and dairy market would improve the situation of the domestic producers.

High price volatility

In general, international trade has a role in stabilising prices as production shocks are pooled across individual markets (Brooks and Matthews, 2015). Yet countries also run the risk of importing price instability from international markets. It is in response to this risk that some countries implement border measures to increase self-sufficiency in staple foods (for example, developing countries) or to ensure more stable conditions for agricultural production, as is the case in Switzerland.

11. Note that these sectors also receive significant support in the form of direct payments. In the case of sugar, market price support accounted for 13% of gross farm receipts on average in 2013-15, with other single commodity transfers accounting for a further 26% of gross farm receipts (OECD, 2016a).

Box 4.1. CAPRI analysis of the impact of liberalising the Swiss raw milk and dairy market

The dairy sector is important in Switzerland. Nearly half of Swiss farms are milk producers and more than 20% of the total value of agricultural production is based on milk production. Nearly 90% of the domestically produced milk is processed in Switzerland into cheese, butter, yoghurt, milk powder or other milk products (Le Conseil fédéral, 2014).

Over the last 15 years, Swiss milk and dairy market regulations have been revised to reduce market support, abolish the milk quota, and liberalise the cheese market. This has resulted in improvements in the production conditions for dairy farmers; a stable export surplus; full trade liberalisation for cheese and a slight improvement in farm incomes. Nevertheless, the Swiss raw milk sector and parts of the dairy sector are not competitive in world markets. Domestic production is decoupled from developments in world markets of high border protection and domestic support.[1] Limited access to foreign market and high domestic prices constrain the capacity of producers to expand sales volumes, including into export markets. As a result, domestic prices for milk have declined despite high border protection. The reason is that although there is a supply surplus in Switzerland (a net-exporter), the sector cannot expand its exports at a competitive level (Le Conseil fédéral, 2014).

The Federal Council evaluated the impact of liberalising the Swiss raw milk and dairy market using the CAPRI model (Le Conseil fédéral, 2014). Abolishing border protection and additional production support payments would improve market access for Switzerland in its main export markets (namely EU) and increase the competitiveness of the whole supply chain. While domestic production would decrease by around 5.7%, the domestic milk price would decrease by 25% – but still be around 5% higher than the EU price. Moreover, gains to consumers would be significant, offsetting producer losses, such that welfare would increase overall even if additional support was provided to producers to compensate for lower incomes.

Note

1. A more recent study by the Federal Council found that the average price of Swiss milk is strongly influenced by the evolution of EU prices. Other exogenous factors are also found to play a role, such as the exchange rate between the Swiss franc and the euro, and European policy measures (Le Conseil fédéral, 2017).

Source: Le Conseil fédéral (2014), *Gegenseitige sektorielle Marktöffnung mit der EU für alle Milchprodukte* [Impact of a liberalization of the Swiss raw milk and dairy market].

Border protection can decrease the price volatility faced by agricultural producers (due to instability in international markets) by stabilising *farm prices*. This appears to be the case in Switzerland, where border protection contributes to ensuring stable conditions for agricultural production, as per its technical objective (Loi et al., 2016). However, it may increase domestic price volatility for *consumers* that results from domestic supply shocks (Brooks and Matthews, 2015). In addition, price transmission between world and domestic markets depends on the extent to which imports fill quota volumes, as domestic price volatility is generally higher the closer a quota is to being binding (Abbott and Paarlberg, 1998). When quotas are binding or overfilled, movements in international prices will also be reflected in domestic prices. Exchange rate variations may further exacerbate volatility.

The situation regarding consumer prices is less clear in Switzerland. Loi et al. (2016) found that Swiss prices were more stable than foreign prices for all products and at all the levels of the supply chain, with the exception of consumer prices for beef and

strawberries. They also found that more restrictive administration of the pork TRQ in 2009 resulted in Swiss consumer and wholesaler prices for pork becoming less stable than foreign prices, as domestic supply shocks were not offset by imports. Nevertheless, it is likely that Swiss consumers would be better off on-balance from lower prices.

4.1.2. Discussion

Keeping current domestic production conditions in place through high domestic prices leads to a high level of domestic production. The analysis of removing border protection shows that Switzerland's level of food production on a calorie basis would decrease relative to current levels if border protection was abolished, although the extent depends on Swiss consumers' preference for Swiss agricultural and food products. As current production levels are very close to the target rates for gross and net food production on a calorie basis, this implies that the target would not be met. However, consumers and less protected sectors in the economy would benefit from higher supply (from some agro-food sectors), lower prices and more efficient allocation of resources.

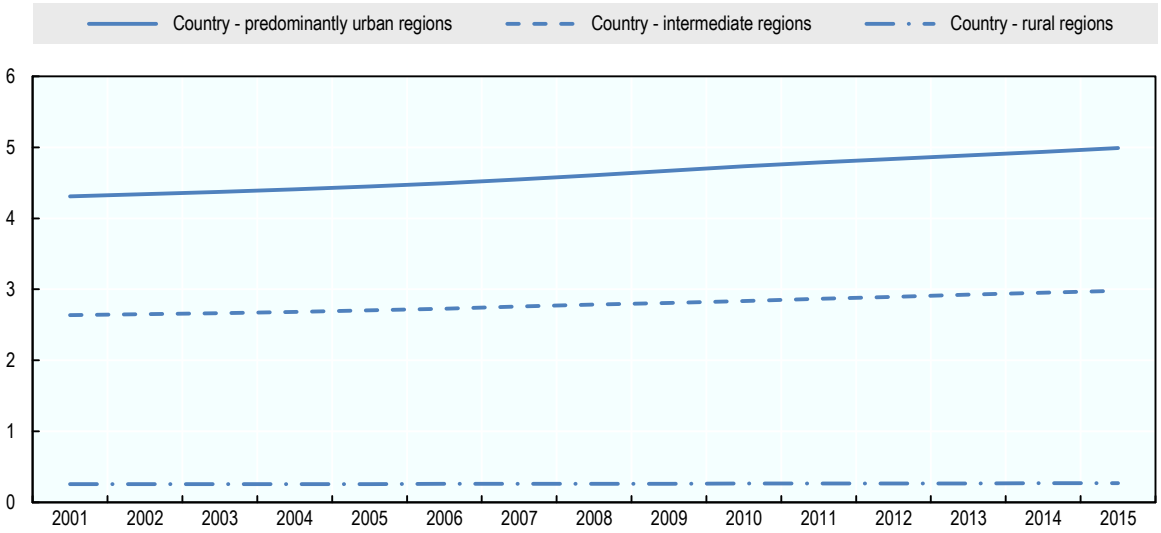
Therefore, the question needs to be raised whether a lower level of gross production would be considered sufficient. Model simulations suggest that the agro-food sector would produce more than 85% of Switzerland's current level of production following trade liberalisation, and more than 92% if Swiss consumers have a strong preference for Swiss agricultural and food products. However, if lowering production is not acceptable, alternative and non-distorting policy instruments need to be developed to support the overarching agricultural policy objective that agriculture makes an essential contribution towards ensuring food supplies for the population – for example, investments to improve the productivity and competitiveness of Swiss agriculture.

4.2. The relevance of border protection for encouraging decentralised settlement to help maintain rural areas

Decentralised settlement of a country's population is a primary condition for rural development and the maintenance of rural areas. A small and slowly declining share of the Swiss population is living in rural areas (Figure 4.7). In 2016, 3.2% of the population was living in rural regions and an additional 36% in regions that are intermediate between rural and urban. In comparison, across the OECD, the average share of the rural population amounts to about 25%.

The Swiss constitution tasks agriculture with encouraging decentralised settlement to help maintain rural areas. Decentralised settlement can be seen as a non-commodity output of agriculture because of the link between agriculture and the economic and social viability of rural areas and communities. Rural areas are, to a high degree, characterised by an agricultural imprint. Agriculture is a source of rural employment and income, and can have flow-on effects to other businesses in rural areas. Moreover, the presence of agriculture can contribute to the attractiveness of rural regions as residential, business and leisure areas. As a first step in determining the potential role for agricultural policy and the relevance of border protection, it is necessary to consider this link between agriculture and the decentralised settlement of rural areas – that is, the nature and degree of jointness between agriculture and the economic and social viability of rural areas and communities.

Figure 4.7. Trends in Switzerland's population (millions)



Source: OECD.stat (2016). http://stats.oecd.org/Index.aspx?DataSetCode=REGION_DEMOGR.

4.2.1. Jointness of agriculture production and decentralised settlement in rural areas

The source of jointness between agriculture and the economic and social viability of rural areas is the non-allocable input, labour.[12] Commodity outputs and rural employment are produced simultaneously when agricultural labour is used for agricultural production. If agriculture accounts for a significant share of a region's employment, then a decline in agricultural production may affect the stability of communities. Agriculture may also contribute to the economic and social viability of rural areas through its broader income-generating effects, including flow-on effects to other businesses in rural areas.

There is some evidence that agricultural employment is important in some regions in Switzerland. Past studies by Buchli, Kopainsky and Rieder (2005) and Flury, Giuliani and Buchli (2008) found that agricultural employment was important for decentralised settlement in a small number of communities[13] – in particular, small communities where agriculture made up a large share of the workforce.

Despite these findings, the authors concluded that jointness is weak between agriculture and the economic and social viability of rural areas in Switzerland. First, only a small part of Switzerland's population – 2.6% – was found to live in vulnerable communities where agriculture contributed significantly to settlement (Buchli, Kopainsky and Rieder, 2005). Second, agriculture's contribution to the economic and social viability of rural areas via flow-on effects to other businesses was limited in such communities, as a larger share of consumer expenditure and farm purchases of agricultural inputs and other services

12. Non-allocable inputs are those inputs that cannot be divided between commodity and non-commodity production. A non-allocable input contributes to multiple outputs simultaneously, so that it is non-rival for one output when used to produce another (OECD, 2008).

13. In Buchli, Kopainsky and Rieder (2005), agriculture was considered to contribute significantly to decentralised settlement if a community was vulnerable to collapse in the absence of agriculture as a source of employment.

occurred elsewhere. In contrast, agriculture's relationship to the rural economy was stronger in regions with more diversified economies, because a larger share of consumer expenditure and farm purchases took place within the region. Yet in these communities, agriculture was less important for the economic and social viability of rural areas because there were other opportunities for employment and the sector accounted for a smaller share of value added (Flury, Giuliani and Buchli, 2008). Finally, both studies concluded that rural employment could be created at a lower cost outside of agriculture, compared with the cost of maintaining labour in agriculture through border protection – that is, rural employment is separable from agriculture.

As noted earlier, the presence of agriculture can contribute to the attractiveness of rural regions as residential, business and leisure areas. A recent study by Ecoplan and HAFL (2016) analysed the contribution of agriculture and agricultural policy to decentralised settlement via their effect on the attractiveness and vitality (or sustainability) of rural areas in Switzerland, distinguishing between the plain, hilly and mountain areas. Table 4.2 provides an overview of the ways in which agriculture contributes to attractiveness and sustainability of regions.

Table 4.2. Contribution of agriculture to the attractiveness and sustainability of regions

Attractiveness	Sustainability
…as a residential location	**Social sustainability**
Preserving natural resources	Agricultural tradition
Appearance of the landscape	Agricultural population
Work and education possibilities	
Noise emission	
…as a business location	**Economic sustainability**
Economic variety	Employment impact on all three economic sectors
Income impact, tax payments	Diversification
	Economic structures
…as a leisure area	**Environmental sustainability**
Range of touristic possibilities	Biodiversity
Tourist infrastructure	Land loss
Appearance of the landscape	Maintenance of cultivated landscape
	Emissions (e.g. ammonia, phosphorous)

Source: Ecoplan and HAFL (2016).

According to Ecoplan and HAFL (2016), the main driver of the decentralised settlement of the population is the attractiveness of regions as a residential or business location, and as a leisure area. Overall, the study found a negative correlation between the prevalence of agriculture, considered as agricultural output per resident, and the attractiveness of a region. This was not a result of the presence of agricultural production itself, but rather that regions characterised by agriculture tend to rate poorly across the range of factors that determine the attractiveness of a region. Rather, rural settlement is concentrated in the *urbanised* areas of rural regions – areas that are attractive residential and business locations, and leisure areas – where fewer agricultural activities take place.

Looking first at the attractiveness of a region as a residential location, the study found that factors such as the availability of basic public services, work and education possibilities, biological and cultural variety, income levels, and the tax burden, are important determinants. In general, the hilly and mountain areas of Switzerland are seen to be attractive residential locations. Availability of public service and the level of income in the region were found to be weaker in regions strongly characterised by agriculture.

Economic location factors, including the availability of qualified workers and essential infrastructure, are important determinants of the attractiveness of a region as a business location. Due to the existing infrastructure Switzerland's plain areas are seen to be a more attractive business location than the hilly and mountain areas. Predominantly agricultural regions were found to be less attractive as a business location because they have poor accessibility, a small potential labour force and limited employment opportunities. Structural variables (topographical and geographical) are therefore determining factors.

The hilly and mountain areas of Switzerland were seen to be attractive leisure areas. The attractiveness of a region as a leisure area depends on its accessibility and the opportunities for tourism (and the availability of tourism-related infrastructure). In general, areas characterised by agriculture are less attractive – again, not because of the presence of agricultural production, but because those regions are less accessible via public transport and offer fewer leisure activities than the more urbanised parts of rural areas.

The sustainability of regions is another important driver of the decentralised settlement of the population. Sustainability incorporates three dimensions – social sustainability (reflecting the demographic structure of the population, cultural life and a sound living together, a healthy and well situated population); economic sustainability (competitiveness); and environmental sustainability (a healthy and resilient eco-system). Overall, the study found that regions with high levels of agricultural output were more sustainable on average, mainly driven by environmental sustainability. Switzerland's hilly and mountain areas are more sustainable than the plain areas. This was because cropping mainly takes place in the plain areas, and the study found that cropping regions were less environmentally sustainable. The study found a positive correlation between social sustainability and the prevalence of agriculture and its services (agricultural traditions, way of life) in a region, reflecting the contribution of agricultural production towards maintaining agricultural traditions and the population. On the other hand, economically sustainable regions have a lower prevalence of agriculture.

4.2.2. Discussion

The preceding analysis indicates that jointness between agriculture and the non-commodity output, decentralised settlement, is weak. The studies by Buchli, Kopainsky and Rieder (2005) and Flury, Giuliani and Buchli (2008) suggest that in most rural communities, agricultural employment is not a determining factor for the economic and social viability of rural areas – agriculture is only one source of rural employment, and one that has declined in importance. Moreover, while agriculture contributes to rural development through its broader income-generating effects, these tend to be stronger in more diversified rural economies, where agriculture accounts for a small share of employment and value added.

Similarly, the Ecoplan and HAFL (2016) study also suggests that jointness between agricultural production and decentralised settlement is weak. The study did find a strong link between the presence of agriculture and social sustainability, which may increase the attractiveness of a region. However, the majority of other relevant factors are negatively correlated with agriculture (the attractiveness of a region and the economic sustainability of a region) or the effects varied between regions (environmental sustainability).

Overall, regions more strongly characterised by agriculture are less attractive for rural settlement. This is not due to the presence of agricultural production but agricultural regions tend to rate poorly on *non-agricultural* structural variables that are essential for

attracting settlement. Those include the availability of basic public services, infrastructure, and employment opportunities. As an exception, regions characterised by agriculture could be a more attractive location for agribusinesses, and the potential for farm exits from an area would have implications for the choice of regions for agribusinesses to locate.

Taken together, this means that agricultural policy – and border protection as an instrument of agricultural policy – has limited relevance for achieving the overarching objective of 'decentralised settlement to help maintain rural areas'. When there is only a weak link between agriculture's commodity and non-commodity outputs, the OECD framework for analysing multifunctionality in agriculture emphasises that agricultural policy has limited relevance for ensuring the provision of the non-commodity output. Instead, a policy intervention that targets the production of the non-commodity itself will be more efficient and effective than an intervention that is linked to agricultural activities. As decentralised settlement in Switzerland is mainly influenced by structural factors, broader, non-sectoral policies and investments for rural- and regional development should be considered (Ecoplan and HAFL, 2016; Flury, Giuliani and Buchli, 2008).

Of course, agriculture may be important in some small, agrarian communities. Without agriculture – and the employment and incomes it generates – these communities might be vulnerable to collapse or receive fewer public services, further reducing their attractiveness as a residential or business location. In this respect, it is likely that border protection has played some role in maintaining agricultural production in these communities, and hence employment, by inflating the returns to labour. Regardless, agriculture cannot be counted on for employment creation in Switzerland. Similar to other OECD countries, agriculture's share of employment in Switzerland has declined over time, as a result of technical and structural trends in agriculture, as well as developments in part-time farming, and diversification of income sources (Box 2.1). On these grounds, it can be concluded that border protection has limited relevance for the decentralised settlement of Switzerland.

4.3. The relevance of border protection for maintaining a cultivated landscape

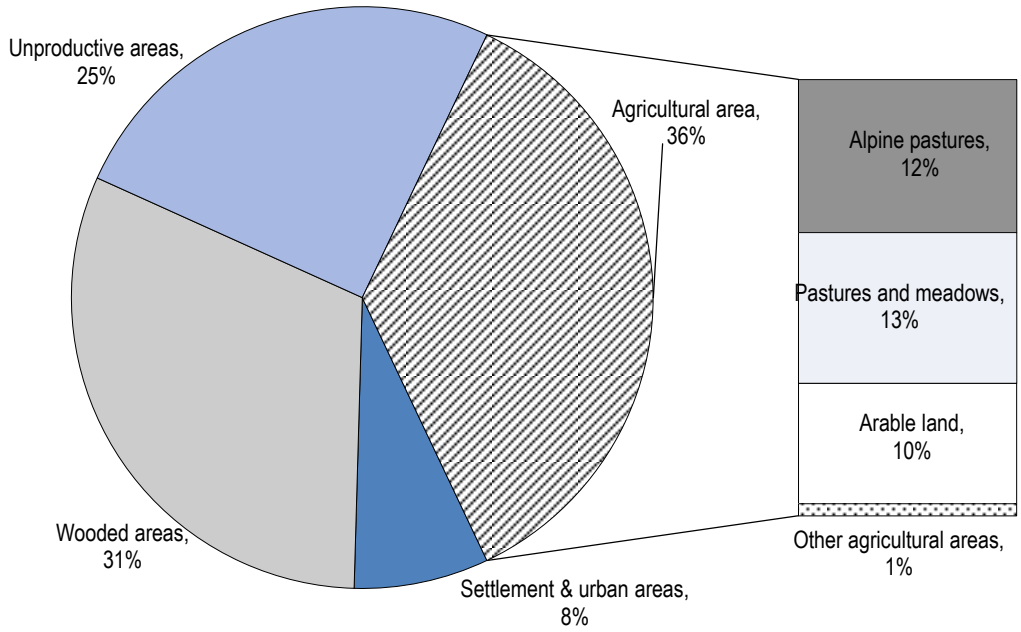
Land use in Switzerland is dominated by agriculture. Land use statistics provide four broad designations: settlement and urban areas, agricultural areas, wooded areas and unproductive areas (such as lakes and rivers, unproductive vegetation, rocks and screes, glaciers and perpetual snow). Agricultural areas (including arable land, pastures and meadows, alpine pastures and other agricultural areas) account for 36% of Switzerland's land area (Figure 4.8) (BfS, 2016a).

However, the agricultural area is declining as a result of increases in settlement and urban areas, as well as land abandonment and poor cultivation practices, leading to a loss of farmland to wooded and unproductive areas (Kienast et al., 2013; Roth et al., 2010). Between 1996 and 2015, the total arable land declined by 3% a year on average. In comparison, the countries that comprise the EU28 experienced a 6% reduction in arable land of the same period. (Eurostat, 2016) As farmland is scarce is in Switzerland, there is a strong incentive to manage agricultural landscapes instead of leaving them to wilderness (Flury, Giuliani and Buchli, 2008).

Beyond their importance for agricultural production, Switzerland's agricultural areas are highly valued by society for their contribution to the quality of life for the population, and as the basis for a flourishing tourist industry, which is an important asset of the national

economy (OECD, 2015a). The Swiss constitution tasks agriculture with taking care of the landscape as a way to contribute to the quality of life for the population. While there is a clear link between the maintenance of a cultivated landscape and agriculture, it is necessary to explore the nature and degree of jointness to determine the role for agricultural policy – and therefore border protection as an instrument of agricultural policy.

Figure 4.8. Land use in Switzerland, 2004–2009



Source: BfS – Arealstatistik (2016a).

4.3.1. Jointness of agriculture and maintenance of a cultivated landscape

Jointness between agricultural production and the maintenance of a cultivated landscape appears to be strong in Switzerland. The source of this jointness is the non-allocable input,[14] farmland. Commodity outputs and 'maintenance of a cultivated landscape' – the non-commodity output – are produced simultaneously when farmland is utilised for agricultural production. In other words, the use of an area for agricultural production inevitably generates a contribution to landscape maintenance, since the area in question is kept open (Flury, Giuliani and Buchli, 2008). On the other hand, a change in the commodity output will lead to a change in land use and, in turn, the extent to which the landscape remains under cultivation. As shown by Flury, Giuliani and Buchli (2008), a reduction in the scale of agricultural production in Switzerland leads to a reduction in land use. The authors analysed land use in four Swiss mountain regions under different policy scenarios. In the event that all direct payments and market price support measures

14. Non-allocable inputs are those inputs that cannot be divided between commodity and non-commodity production. A non-allocable input contributes to multiple outputs simultaneously, so that it is non-rival for one output when used to produce another (OECD, 2008).

were abolished, and producers were exposed to world prices, the utilised land area would fall by 70% compared with the reference scenario.[15]

Strong jointness between agricultural production and a cultivated landscape suggests there is potentially a role for agricultural policy. However, it is also necessary to explore the *nature* of jointness and whether landscape maintenance can be provided separately from agricultural production. If separation is possible, and there are no economies of scope – that is, no cost advantage from maintaining the landscape in conjunction with agricultural production – then non-agricultural provision may be more efficient. If the link between agricultural production and landscape maintenance cannot be changed, or there are economies of scope, there may be a role for agricultural policy.

In the first instance, separately providing non-commodity outputs that are tied to agricultural land is difficult, but possible. As noted by the OECD (2001), non-agricultural provision is only possible if providers are granted access to the land and if the services they perform do not conflict with agricultural activities.

The second requirement is the existence of economies of scope. Studies by Huber (2008) and Flury, Giuliani and Buchli (2008) suggest that economies of scope in agricultural landscape maintenance arise from more efficient biomass disposal, rather than from the maintenance costs themselves. While non-agricultural providers may have lower maintenance costs due to scale effects (such as for mowing and mulching areas), integrating biomass disposal into the agricultural production cycle was a more efficient method of disposal (Huber, 2008). As argued by Flury, Giuliani and Buchli (2008), unless new and more efficient technologies are developed, non-agricultural providers can only contribute to landscape maintenance in a small way due to the high disposal costs generated by industrial utilisation of biomass.

Taken together, the above discussion suggests that the overarching policy objective 'maintenance of cultivated landscapes' is best achieved through agricultural activities, due to jointness in production and the presence of economies of scope.

4.3.2. Market failure in providing the non-commodity output 'maintenance of a cultivated landscape'

A further condition for government intervention is the presence of market failure in the provision of landscape maintenance. If the current state of agricultural landscapes is adequate – that, is supply and demand balance – then a market failure may exist if land goes out of production altogether when border protection is abolished (Cahill, 2001).

Studies by Flury, Giuliani and Buchli (2008) and Freshwater (2008) suggest that some form of government intervention may be necessary to ensure the maintenance of a cultivated landscape. In part, this reflects the low production potential of some Swiss agricultural land. As argued by Freshwater (2008), most land that faces abandonment has been farmed for centuries, but under modern production conditions has too limited productivity to be economically sustainable. And as described earlier, if all of Switzerland's direct payments and market price support measures were abolished, and

15. Reference scenario is the agricultural policy framework from 1999 (Flury, Giuliani and Buchli, 2008). Although agricultural policy has been reformed since then, the height of the applied direct payments has not decreased since 2008 (OECD, 2015a). Therefore, the findings in Flury, Giuliani and Buchli (2008) on the link between maintaining a cultivated landscape and the amount of direct payments are still relevant.

producers were exposed to world prices, it is likely that the utilised land area in mountain regions would fall significantly (Flury, Giuliani and Buchli, 2008).

Nevertheless, the role of border protection warrants closer attention. The study by Flury, Giuliani and Buchli (2008) suggests that support provided through border protection is not needed to maintain agricultural landscapes in a state of cultivation. The authors estimated the payment per hectare required to ensure that 95% of the utilised land area in the case study regions remained under cultivation when farmers faced world market prices. They found that the overall level of direct payments was in fact 30% to 40% lower than in the reference scenario, where farmers received direct payments and market price support.[16] This suggests that support received through border protection does not play a role in encouraging producers to continue to cultivate land in unfavourable agricultural areas.

4.3.3. Discussion

The preceding analysis suggests that the overarching policy objective 'maintenance of cultivated landscapes' is best achieved through agricultural activities, due to jointness in production and the presence of economies of scope. Moreover, the analysis suggests that there is a need for government intervention. The studies by Flury, Giuliani and Buchli (2008) and Freshwater (2008) suggest the existence of a market failure, in that 'cultivated landscapes' may be undersupplied in the absence of government support, as a result of agricultural land being taken out of production or abandoned.

However, direct payments provide sufficient remuneration to producers to ensure that agricultural landscapes are maintained in a state of cultivation. As shown by Flury, Giuliani and Buchli (2008), direct payments are sufficient to maintain agricultural landscapes in a state of cultivation even when farmers are exposed to world market prices. In this respect, border protection and its technical objectives are not relevant for achieving the overarching policy objective 'maintenance of cultivated landscapes'.

In any case, border protection is not the most efficient policy intervention. As outlined in section 3.2.3, the appropriate policy intervention will be targeted geographically unless the non-commodity output is associated with all or a large percentage of agricultural land. In this case, the intervention should be targeted to low productivity areas with the potential for abandonment, and agricultural areas in regions that also have leisure value and attract tourists. In contrast, border protection is untargeted geographically and primarily benefits larger producers and producers in plain areas (because it is linked with commodity production and producers in plain areas earn a larger share of revenue from the market). Moreover, while supporting farm revenues may encourage farmers to continue production in unfavourable areas, by inflating the returns to land, the income transfer efficiency of border protection is low,[17] limiting its effectiveness. A larger share of support delivered through direct payments is captured by producers than is the case when support is provided through border protection.

16. Flury, Giuliani and Buchli (2008) determined that a payment of CHF 2 200 per hectare was required to ensure that 95% of the utilised land area remained under cultivation in the Albula region. Applying this payment to the other regions analysed, the overall level of direct payments was 30% to 40% lower, depending on the region.

17. The OECD (2003b) estimates that of each extra dollar (or euro) transferred through market price support, the amount that arrives at the farm in the form of increased income can be as low as 25 cents.

A final consideration concerns the opportunities for non-governmental provision, specifically, through exclusion mechanisms that allow farmers to be remunerated for providing landscapes services by those who benefit from them. The Swiss constitution tasks agriculture with taking care of the landscape as a way to contribute to the quality of life for the population. However, the tourist industry is also a major beneficiary of agricultural landscape management. As such, it is efficient for the tourism industry to also contribute to its provision. In fact, agri-tourism in Switzerland and elsewhere offers examples of private transactions between farmers, tourists (for example, for farm stays) and other tourism businesses.

For example, the Flåm tourist train in Norway was a collaboration between a group of farmers, a private railroad company, a local government organisation and a landscape management firm over the period 2000-02. Under this initiative, farmers were compensated for providing a positive externality to the users of the Flåm Railway – by letting goats graze near the railway track, the travellers could enjoy an even more magnificent view of the landscape through the windows of the coaches while the train slowly made its way up the mountains (van Tongeren, 2008).

4.4. The relevance of border protection for preserving natural resources

In 2008 the Federal government identified the main environmental challenges facing Swiss agriculture, and established agri-environmental targets for achieving environmental objectives and ensuring the preservation of natural resources in the long-term (OFEV et OFAG, 2016). To support progress towards meeting agri-environmental targets, the system of direct payments was reformed in the framework for agricultural policy, AP 2014-17. The current system provides payments to farmers on a voluntary basis, conditional on cross-compliance with environmental and sustainability criteria. These payments include:

- *Farmland payments to maintain open landscape*: area payments to maintain farming in especially difficult conditions and to maintain a cultivated landscape in mountainous areas and on alpine summer pastures;
- *Biodiversity payments*: payments targeted to specific outcomes or farming practices; especially the enhanced quality of the ecological compensation areas is expected to improve the habitat and the possibilities for dispersal of target and indicator species in agriculture;
- *Payments for landscape quality*: payments for preservation and promotion of landscape diversity (including more diverse crop rotation, flowering fields and traditional agricultural practices);
- *Payments for production systems*: payments providing incentives for nature-oriented, environment and animal-friendly production systems (e.g. organic farming).
- *Resource-efficiency payments*: payments providing incentives to use specific production techniques (for example, certain manure spreading methods and soil conservation methods like no-till) (OFEV et OFAG, 2016; OECD, 2016).

Box 4.2. Switzerland's progress towards achieving agri-environmental targets

A 2016 report by the Federal Office for Environment (OFEV) and the Federal Office for Agriculture (OFAG) outlines the targets for achieving Switzerland's environmental objectives, including targets for the agricultural sector. It assessed the sector's progress across a range of agri-environmental indicators over the period 2008 to 2016, finding that most targets had not been met. Switzerland's agri-environmental targets and the sector's progress towards meeting them are summarised below.

1. Biodiversity

Agriculture is to make a significant contribution to the conservation and promotion of biodiversity in Switzerland. This includes: species diversity and diversity of habitats; genetic diversity within species; and functional biodiversity. The target for the agricultural sector is that 16% of the total agricultural area should be ecological compensation areas (targets vary between geographical areas, from 10% to 45%). Targets for ecological compensation areas on agricultural land have generally not been met.

For Switzerland as a whole, the proportion of intact and nature-oriented areas has reached a historical low level, and of many natural habitats, only remainder areas exist. (Delarze et al., 2013) The status of biodiversity in Switzerland shows that efforts over recent decades have had a positive impact locally, but neither stopped nor slowed the reduction at a national level (Fischer et al., 2015). Reasons for the reduction in biodiversity include expanding settlement areas, increasing utilisation of biodiversity by the agricultural sector and climate change.

2. Landscape

The target is the preservation, promotion and development of diverse cultural landscapes, with their specific regional characteristics and their importance for biodiversity, recreation, identity, tourism and the attractiveness of locations, by: 1) maintaining landscapes through adapted cultivation (to reduce the decline in the agricultural area to less than 1000 ha a year, and reduce the loss of alpine agricultural land to forest by 20%); 2) keeping up the diversity of sustainable and perceptible cultural landscapes (65 000 ha of land set aside as ecological compensation areas in the plain area); and 3) conserving, promoting and developing the region-specific, characteristic, natural and structural elements. While these targets have not been reached, the *Farmland payments to maintain open landscape*, *Biodiversity payments* and *Payments for landscape quality* are expected to result in progress towards meeting the targets.

3. Riverine Zones

The target is to recreate the riverine zone in a way that natural functions are intact, supporting flood control. This target is currently not met, but the Federal Council expects that this will change in the next 5 to 10 years.

4. Greenhouse gas emissions

The target for the agricultural sector is to reduce carbon dioxide, methane and nitrous oxide emissions by at least one third by 2050, compared to levels in 1990 (equivalent to a reduction of around 0.6% per year under a linear lowering path).

Between 1990 and 2014, greenhouse gas emissions by the agricultural sector reduced by 10%, compared with a target of 13.3%. The share of the agricultural sector in Switzerland's greenhouse gas emissions was almost 14% in 2014. (OFEV et OFAG, 2016). The report stated that additional efforts were necessary.

5. Ammonia emissions

The target for the agricultural sector is to limit ammonia emissions to a maximum of 25 000 tonnes a year.

Switzerland aims to reduce ammonia emissions by 40% compared to their level in 2005. The agricultural sector accounts for 93% of the total ammonia emissions in Switzerland and as such is essential for achieving the defined target for nitrogenous air pollutants. This target has not been met – in 2014, ammonia emissions were 48 000 tonnes. The report concluded that without additional efforts in the agricultural sector, the target would not be achieved in the near future.

6. Diesel exhaust particulates

The target is that diesel exhaust emissions from agriculture amount to a maximum of 20 tonnes a year.

Currently, diesel exhaust emissions amount to 226 tonnes a year, and account for 20% of total diesel exhaust emissions in Switzerland. While the target was not met in 2015, the implementation of stricter regulations is expected to result in the target being achieved by 2040.

7. Nitrate pollution

The targets for the agricultural sector are: a maximum of 25mg/litre of nitrate in water intended for use as drinking water and where the inflow areas are mainly used by agriculture; and a reduction in land-related nitrogen inputs in water by 50% compared with levels in 1985.

In 2013, the targets had not been achieved in 45% of measuring points in areas characterised by crop production, and in 15% of measuring points in areas characterised by meadows and livestock farming.

8. Animal health agents

The target is that veterinary medicine products that originate mainly from livestock production systems shall not cause harm to the environment. Indicators and data on the impact of animal health agents on the environment are missing.

9. Soil erosion

The targets for the agricultural sector are that: critical values for erosion and prevention of erosion on arable land are not exceeded; there is no impairment of soil fertility caused by erosion on agricultural land; and there is no impairment of water bodies and near-natural habitats as a result of flooded soil material from agricultural areas.

Soil erosion in Switzerland is mainly caused by cultivation practices that are not adapted to conditions in agricultural areas. Examples of this are poor cultivation practices and excessive pasturing of hillside areas. The legal maximum annual erosion rate is 2-4 t/ha. Representative data for the whole of Switzerland is lacking, meaning that a general conclusion on the target cannot be reached. However, OFEV et OFAG (2016) report that the target was not achieved in only 7% of sites tested.

10. Soil compaction

The target is to avoid the permanent compaction of agricultural land. Information on the extent and distribution of soil compaction is missing.

11. Phosphorous, pesticides and pollutants

The targets for phosphorus balance (maximum of 20µg/l), pesticides (maximum of 0.1µg/l) and soil pollutants were not achieved at all sites tested in 2016.

Source: OFEV et OFAG (2016).

In 2016, the Federal Office for the Environment (OFEV) and the Federal Office for Agriculture (OFAG) jointly published a report on the status of the environmental objectives for agriculture based on existing legal requirements (Box 4.2). The report considered biodiversity, landscape and riverine zones, climate and air, and water and soil, and documented progress across a range of environmental indicators between 2008 and 2016 (OFEV et OFAG, 2016). It found that nearly all of the agri-environmental targets were not achieved completely, with the distance from meeting the target ranging from low (for example, the ecological compensation areas in plain areas should account for 40%, in 2015 37% was reached) to high (for example, nitrate pollution in water was to be reduced by 50% since 1985, in 2015 a reduction of only 25% was reached) (OFEV et OFAG, 2016). Key challenges related to biodiversity, soil fertility, greenhouse gas emissions and ammonia emissions. For example, the report found that greenhouse gas and ammonia emissions have not decreased since 2000.

4.4.1. Jointness of agriculture and the preservation of natural resources

Environmental externalities of agriculture, such as those outlined in Box 4.2, are strongly associated with agricultural activities (OECD, 2001). The OECD review of agricultural policies in Switzerland found that trends in the environmental performance of Swiss agriculture, both positive and negative, depended on aspects of agricultural production such as:

- land use decisions – for example, the shift from arable land to grassland, particularly in the plain region, and the allocation of land to ecological compensation areas;
- choice of farming system – for example, the choice of more extensive crop and livestock production systems;
- choice of farm practices – for example, inorganic fertiliser and pesticide use, and livestock manure management (OECD, 2015a)

Similarly, the study by Ecoplan and HAFL (2016) found a strong positive correlation between environmental sustainability and extensive agriculture in Switzerland. In contrast, regions characterised by intensive agricultural production or with limited agriculture were less environmentally sustainable.

The nature of jointness indicates a role for agricultural policy. The environmental effects of agricultural production are directly associated with farm input use, farming technologies and practices, and the composition of commodity outputs (crops and livestock). Some externalities – such as greenhouse gas and ammonia emissions, and nitrate pollution – are closely linked with agricultural production, whereas others – such as biodiversity – may compete with commodity outputs for land and other resources. Changing land allocations, farming systems or practices may alter the relationship between commodities and the non-commodity output. However, because most environmental effects are tied to agricultural land use decisions, separation from commodity production will not be possible.

4.4.2. Market failure in the preservation of natural resources

The environmental benefits and costs of agriculture are often not reflected in market returns, suggesting a potential market failure. This includes external effects – such as agriculture's impact on air and water quality – as well as those affecting the productivity of farmers' own resources in the long term (OECD, 2001). Turning to the Swiss context (Box 4.2), this suggests that without government intervention, negative externalities of

agriculture, such as pressure on biodiversity, greenhouse gas and ammonia emissions, nitrate pollution and soil erosion, would be higher than is socially optimal, increasing pressure on natural resources in the long term.

In Switzerland, this potential market failure has been addressed to some extent by existing environmental regulations and the system of direct payments, which provide direct incentives targeted to environmental outcomes and specific farming systems and practices. The OECD found that the shift from price support to direct payments (conditional on cross-compliance with environmental and sustainability criteria) was instrumental in improving the environmental performance of agriculture, including farmland biodiversity and nitrate and phosphorous pollution of surface waters (OECD, 2015a). However, gaps in the current environmental performance of the sector (relative to the agri-environmental targets established by the Federal government in 2008, in OFEV et OFAG (2016) suggest that further adjustments to policies may be needed.

4.4.3. Discussion

The preceding analysis indicates that the overarching objective of 'preserving natural resources' is best achieved through agricultural policy (more specifically, agri-environmental policy). The environmental challenges placing agriculture's natural resource base at risk in the long-term are strongly joint with aspects of agricultural production. Moreover, it is likely that the negative externalities of agriculture will be overprovided without government intervention.

In evaluating the relevance of border protection, it is necessary to consider how lower domestic prices would affect those aspects of agricultural production that determine environmental outcomes, and whether any changes in environmental outcomes would align with the objectives of society.

A key issue is whether removing border protection would encourage the intensification or extensification of agricultural production. Elsewhere, the OECD has found that on balance, agricultural trade liberalisation is beneficial to the environment, in terms of the scale and intensity of input use, pesticide use, nitrogen uptake and offload, and greenhouse gas emissions. For countries that provide high levels of support to farmers, trade liberalisation is likely to reduce these pressures on the environment (OECD, 2006).

The model simulations of the effects of abolishing border protection discussed in section 4.1 do not provide an insight into this. However, other studies point to a potential reduction in the agricultural area in the absence of border protection (for example, Flury, Giuliani and Buchli (2008)). This may reduce both positive and negative environmental outcomes from agricultural production. Nevertheless, past policy reviews suggest that border protection encourages more intensive production, particularly in the livestock sector. For example, in its 2015 review, the OECD found that the shift from price support to direct payments reduced the intensity of inorganic fertiliser and pesticide use, reducing environmental pressures related to production intensity. The review also found that a policy-induced expansion of the livestock sector (which receives the highest protection through border measures) reversed the gains of earlier reforms, leading to higher nutrient surpluses and greenhouse gas emissions (OECD, 2015a).

The technical objective of border protection is to support domestic production by limiting imports to maintain a price differential between the domestic prices and the international ones. But price support is a second-best instrument for addressing problems associated with the market failures that arise when social and private preferences diverge. Because

border protection stimulates domestic production, it can increase the production of *negative* externalities, such as those outlined in Box 4.2, while there is no certainty that the desired amounts of any *positive* environmental externalities will be reached (van Tongeren, 2008). This is because support provided through border protection is not targeted to the aspects of agricultural production that determine environmental outcomes, or to environmentally sensitive areas (for example, hillsides or riverine areas).

Instead, the negative environmental externalities of agricultural production are better addressed through measures targeted to environmental outcomes and to the farming systems or practices that trigger those outcomes, rather than through border protection or measures that influence commodity production (OECD, 2001). In fact, this has been the Swiss experience, whereby targeted incentives (direct payments in conjunction with cross-compliance conditions) have been instrumental in driving improvements in environmental outcomes.

4.5. The relevance of border protection for guaranteeing animal welfare

Ethical aspects of animal welfare are an important concern raised by Swiss society, which expects livestock production sectors to provide high standards of welfare for animals that are born and raised in Switzerland. Reflecting this, Switzerland's animal welfare regulations, as set out in the Protection of Animals Act (LPA) and the Ordinance on Animal welfare (OPAn), are more stringent than those of most of its trading partners. These regulations set out minimum requirements for animal husbandry that are binding on all livestock producers (as well non-producers), and are more stringent than those of most of Switzerland's trading partners. Imported animal products that do not meet Switzerland's minimum requirements for animal husbandry must respect specific declaration requirements.

Since the mid-1990s, a system of direct payments has been in place to encourage livestock producers to meet more stringent voluntary standards for animal-friendly production systems, paid per animal. The BTS programme (**B**esonders **T**ierfreundliche **S**tallhaltung) provides direct payments to livestock producers who meet requirements for particularly animal-friendly stabling and housing systems, while the RAUS programme (**R**egelmäßiger **AUS**lauf im Freien) provides direct payments to livestock producers who regularly keep animals outdoors (hereafter, the BTS/RAUS programmes). These direct payments were introduced to compensate for a part of the additional costs incurred to implement the BTS/RAUS standards, such as to rebuild stables or to adapt production processes, and payment rates vary according to the animal species. There is an expectation that producers will be remunerated for costs not covered by direct payments through higher prices for livestock products produced according to higher welfare standards (OFAG, 2016b).

Participation in the voluntary programmes varies by programme and by animal category. In its 2015 review, the OECD reported that around 30% of all animals were kept in particularly animal-friendly conditions (BTS programme) and 60% had regular outdoor exercise (RAUS programme) (OECD, 2015a). In 2015, 53.5% of livestock enterprises, covering almost 56% of livestock,[18] had implemented the BTS programme. In contrast, by 2015 83.7% of livestock enterprises, covering 75% of livestock, had implemented the RAUS programme. Under the AP 2014-17, FOAG aims to increase participation in the

18. Calculated as an average of all animal categories, weighted according to livestock unit.

BTS and RAUS programmes, with a particular emphasis on increasing participation in the RAUS programme to cover 80% of livestock.

4.5.1. Jointness of agriculture and animal welfare

Aspects of animal welfare are strongly joint with agricultural activities – the issue of animal welfare would not exist in the absence of livestock commodity production. More specifically, animal welfare is associated with the choice of farming system, on-farm structures and buildings, and farm practices. This includes factors such as the choice between extensive or intensive production systems, the buildings in which the animals are housed, opportunities to access outdoor areas, and feeding, transportation and slaughter practices (OECD, 2001).

4.5.2. Market failure in standards of animal welfare

Livestock production systems can have negative effects on animal welfare, which creates a negative externality for (some) consumers and for society as a whole. As a general principle, problems of animal welfare are addressed through measures that are directed at the production methods that cause the problem, such as regulations to impose minimum standards or incentives to implement animal-friendly production systems (OECD, 2001; van Tongeren, 2008). This is the case in Switzerland, where societal concern for animal welfare is addressed through stringent mandatory requirements, and a system of direct payments for production systems to compensate for the higher costs of meeting more stringent voluntary standards.

As in the preceding section evaluating the relevance of border protection for preserving natural resources, the issue is whether removing border protection will result in a market failure in standards of animal welfare. In the first instance, compliance with mandatory regulations – which address societal concerns for animal welfare – will not be affected by the removal of border protection.

However, there is also concern that removing border protection will reduce participation in the voluntary BTS/RAUS programmes, or at least, lower the likelihood of additional livestock producers joining the programmes, reducing standards of animal welfare overall. This might be the case if farm income levels are a factor in producers' decision to participate. Even so, this is not a market failure. Producers will participate in the voluntary BTS/RAUS programmes because the market awards a premium to livestock products produced according to higher welfare standards. Stalled participation rates suggest that this is not the case – for some producers the extra costs of implementing the requirements of the BTS/RAUS programmes are less than the expected market return. In fact, current very high prices overall as a result of border protection may discourage consumers from paying a premium for livestock products produced according to higher welfare standards. Lower prices overall may create an opportunity for producers to differentiate on the basis of animal welfare and receive higher prices, thereby encouraging higher levels of participation in the BTS/RAUS programmes.

4.5.3. Discussion

The preceding analysis indicates that while animal welfare is strongly joint with livestock commodity production, there is no market failure that requires government intervention. The overarching policy objective of 'protection of animal welfare' is achieved through stringent mandatory requirements, coupled with direct payments to encourage participation in the voluntary BTS and RAUS programmes. If current mandatory

standards of animal welfare are considered insufficient, then the appropriate policy response will be to strengthen existing regulations.

While there may be a weak link between farm income levels and participation in the voluntary BTS and RAUS programmes, this does not mean there is a role for border protection, despite its effect on farm incomes. Support provided through border protection is untargeted to animal welfare, and there is no guarantee that it will deliver the desired level of animal welfare (in the absence of conditionality provisions). This is because such problems can only be reduced through changes in production systems and through better management. In any case, and as argued in section 4.3, the income transfer efficiency of border protection is low, limiting its effectiveness as an instrument for increasing farm incomes.

Most importantly, stalled or declining rates of participation in the voluntary programmes do not constitute a market failure. Farmers will participate in voluntary schemes because meeting such standards is rewarded by the market. In fact, this expectation is set out in AP 2014-17. Following trade liberalisation, lower overall price levels for livestock products may increase the incentive to meet higher welfare standards by creating an opportunity for producers to differentiate on the basis of animal welfare, and capture a market premium.

4.6. Conclusions

Border protection creates favourable conditions for the production and sale of agricultural products through raising and stabilising domestic prices. In countries that use border protection to support their agricultural sectors – as Switzerland does – domestic production is higher than would be the case if resources were allocated in line with their comparative advantage, because of the stimulus provided by higher prices. Border protection may also support higher farm incomes through its effect on agricultural producers' revenues, and contribute to more stable production conditions by reducing price volatility. However, border protection increases costs for domestic consumers and intermediaries – significantly in Switzerland –, reduces consumer choice and economic welfare, and constrains growth in less protected and more efficient sectors, including in agriculture.

For Switzerland, an important policy question is whether border protection contributes to achieving the overarching objectives for the agricultural sector – whether creating favourable conditions for the production and sale of agricultural products helps ensure that agriculture makes an essential contribution towards:

- the reliable provision of the population with foodstuffs
- the conservation of natural resources
- the upkeep of the countryside
- the decentralised population settlement of the country
- guaranteeing animal welfare.

The evaluation determined that border protection is not relevant for achieving the overarching objectives of Swiss agricultural policy, with one exception. By stimulating domestic production, high levels of border protection ensure that Switzerland meets its target rate of gross food production. On these grounds, border protection is a determining factor in agriculture making a contribution towards ***ensuring food supplies for the population*** – although the sector would still supply over 85% of Switzerland's current

level of production (in calories) if trade was liberalised, and more than 92% if Swiss consumers have a strong preference for Swiss agricultural and food products.

In contrast, border protection is not relevant for the other overarching objectives, which are concerned with the non-commodity outputs and externalities of Swiss agriculture. This does not mean that border protection has not affected the supply of some non-commodity outputs. As long as there is some degree of jointness between a non-commodity output and agriculture – specifically, with the level of output or a factor of production – it is likely that border protection has had an effect, because it stimulates production. Rather, key considerations included whether there is a role for agricultural policy – and therefore border protection as an instrument of agricultural policy – in achieving the objectives, and the dimensions of the appropriate instrument of agricultural policy in the event that government intervention is needed.

Agricultural policy has limited relevance for achieving the overarching objective of ***decentralised settlement of the population***. The evaluation found a weak link between agriculture and the economic and social viability of rural areas. Agriculture and the employment and incomes it generates may be important in some remote and sparsely-populated agricultural communities, and it is likely that border protection has played some role in maintaining agricultural employment in such communities, by inflating the returns to labour. However, agriculture is not a determining factor for the economic and social viability of the majority of rural areas. In most communities, agriculture accounts for a small share of employment and value added.

The evaluation also found only a weak link between agriculture and the features of regions that drive the decentralised settlement of the Swiss population: namely their attractiveness and sustainability. This is because *non-agricultural* structural variables, such as the availability of basic public services, infrastructure, and employment opportunities and accessibility, were more important determinants of a region's attractiveness and economic sustainability. This suggests that broader non-sectoral policies and investments for rural and regional development are more important for achieving this objective.

For the remaining overarching objectives, the evaluation determined that there is a role for agricultural policy. There are close links – jointness – between agricultural activities and the non-commodity outputs defined by these objectives, and the potential for market failure in the absence of government intervention.

Government support is necessary to ***maintain agricultural landscapes in a state of cultivation*** (particularly in less favoured areas and regions that also have leisure value and attract tourists). However, support provided through direct payments is sufficient to ensure that agricultural land is utilised.

Regarding the objective of ***preserving natural resources***, the evaluation found that the environmental challenges placing agriculture's natural resource base at risk in the long-term are strongly joint with aspects of agricultural production, including farm input use, technologies and practices, and commodity outputs. To some extent, these are addressed by Switzerland's environmental regulations and the cross-compliance conditions attached to direct payments, but gaps in the environmental performance of the sector suggest a further role for agricultural policy. However, the evaluation determined that border protection is not relevant to achieve this objective, as it has encouraged more intensive production, which is associated with negative environmental outcomes in agriculture.

Finally, the evaluation found that ***animal welfare*** is strongly joint with livestock commodity production, which *a priori* suggests a role for agricultural policy. In Switzerland, this takes the form of mandatory minimum requirements for animal husbandry, coupled with direct payments to encourage participation in the more stringent voluntary BTS and RAUS programmes. It is possible that border protection has also been a factor in some producers' decisions to participate in the voluntary programmes, to the extent that higher farm incomes offset any implementation costs not covered by the direct payments. However, it is more likely that that border protection has reduced the incentive for producers to differentiate their production on the basis of animal welfare, by raising overall food prices to very high levels. This may discourage consumers from paying a premium for livestock products produced according to higher welfare standards.

While border protection has had some effect on the provision of non-commodity outputs, it is an ineffective and costly instrument for delivering the outcomes desired by Swiss society. This is because support provided through border protection is:

- *Not conditional on delivery* of non-commodity outputs, such as improved environmental outcomes and animal welfare;
- *Untargeted towards the activity or factor of production* most strongly related to the non-commodity output, for example, farming systems and practices that preserve natural resources or meet a higher level of animal welfare; and
- *Untargeted to regions* with value for producing non-commodity outputs, for example, land at risk of abandonment or in areas favoured for recreation and by tourists.

Further, while higher incomes may compensate producers for the costs associated with supplying non-commodity outputs, such as a higher level of animal welfare, border protection is an inefficient instrument for raising farm incomes.

Moreover, interdependencies between the overarching objectives mean that border protection may lead to conflicting outcomes across the overarching objectives. This is a result of its effects on production and prices. By raising domestic prices above international ones, border protection stimulates domestic production. As noted above, this is a determining factor in agriculture making a contribution towards ensuring food supplies for the population. But this may also increase production of *negative* environmental externalities – as discussed in section 4.4.3, border protection encourages more intensive production, particularly in the livestock sector. Similarly, raising domestic prices increases farm incomes, and may have played a role in maintaining agricultural employment in some remote and sparsely-populated agricultural communities. However, overall high domestic prices may limit opportunities for producers to differentiate their production to capture market premiums, such as on the basis of animal welfare, reducing incentives to meet higher (voluntary) welfare standards.

Given this conclusion – that on balance, border protection is not relevant for achieving the overarching objectives of Swiss agricultural policy – the Federal Office for Agriculture (OFAG) may look to alternative instruments to border protection to achieve the overarching objectives. The following chapter proposes a number of alternative policy instruments, building on the recommendations in the OECD review of agricultural policies in Switzerland (OECD, 2015a); the guidelines for optimal policy design in the OECD's framework for analysing multifunctionality in agriculture (OECD, 2003, 2008a); and the findings of this evaluation.

5. Alternative policy instruments for Switzerland

The analysis in the preceding chapter has shown that on balance, border protection is not a relevant instrument for achieving the overarching objectives of Swiss agricultural policy. As an instrument of agricultural policy, border protection targets farm incomes by maintaining a price differential between domestic and international prices. It does not address the range of market failures – the negative environmental and social externalities of agricultural production, and the potential undersupply of agriculture's non-commodity outputs – that are of concern to Swiss society. And while border protection helps ensure that Switzerland meets its current target rate of gross food production by creating favourable conditions for production and sale, it does so at a high cost to consumers and more efficient agro-food sectors.

In place of border protection, a more effective and efficient set of policies is needed to achieve the overarching objectives of Swiss agricultural policy. This chapter develops recommendations for alternative policy instruments, building on the recommendations in the OECD review of agricultural policies in Switzerland (OECD, 2015a); the guidelines for optimal policy design in the OECD's framework for analysing multifunctionality in agriculture (OECD, 2003, 2008a); and the findings of this evaluation. These have shown that specific and tailored instruments are necessary to address the social, environmental *and commercial* objectives of Swiss agriculture. Reflecting this, the alternative policies proposed below target the non-commodity outputs of Swiss agriculture, with a view to also improving the productivity and competitiveness of the sector and meeting the objectives at a lower cost to consumers and taxpayers.

Six alternative policy instruments are outlined in the following sections. To a great extent, Switzerland already has the instruments in place, both to achieve the overarching objectives and to manage the transition to a more open market. For this reason, the proposed policies are classified into two groups. The first includes instruments that are already in place, but could be better structured according to the target of the policy. The second group consists of new instruments. The main advantages and disadvantages of each instrument are identified compared with border protection. It is also important to note that it is not a complete assessment. The discussion does not offer details on the actual design and implementation of the proposed instruments. Moreover, it does not consider the broader, non-agricultural policies that are required to address some overarching objectives, including 'decentralised settlement to help maintain rural areas' and 'preservation of natural resources'. For these objectives, other policy areas will have to be considered, including rural development policy and environmental policy. The chapter concludes with some thoughts on the sequencing of reform.

5.1. Group 1 – Existing instruments newly structured

The first group of policy instruments are defined according to the recommendations in OECD (2015a). Taking those recommendations as a starting point, the following sections propose a restructuring of existing instruments so that they are more in line with the overarching policy objectives and, as a consequence, help the agriculture sector adjust to a more open market. Specifically, existing policies would be restructured to become more targeted and tailored to policy objectives, potentially leading to lower costs, including

direct payments, administrative costs and transaction costs. The first group has the following policy instruments:

- Regional differentiation of direct payments.
- Stronger environmental standards.
- Consumer information system.
- Sustainable productivity matrix.

5.1.1. Regional differentiation of direct payments

The evaluation in chapter 4 found that government support will be necessary to ensure the provision of some non-commodity outputs if border protection is abolished. In particular, the evaluation determined that there would continue to be a role for agricultural policy in ensuring the ***maintenance of cultivated landscapes***, and that agriculture would continue to place pressure on ***natural resources*** even if border protection was abolished. However, the evaluation also found that this potential market failure is specific to certain areas. To maintain agricultural landscapes in a cultivated state, government support should be targeted to low productivity areas with the potential for abandonment, and agricultural areas in regions that also have leisure value and attract foreign tourists. Similarly, environmental challenges, and the payoffs to environmental measures –for example, setting aside land as ecological compensation areas to enhance biodiversity – are likely to differ between regions.

In its 2015 review, the OECD recommended a differentiated direct payment system to secure the provision of non-commodity outputs demanded by society, such as cultural landscape and biodiversity. Specifically, the system of direct payments could be restructured to link even more explicitly with the overarching policy objectives. Currently, only 34% of direct payments are regionalised to reflect conditions and objectives in different areas (OFAG, 2016b).[19] This means that 66% of payments are untargeted to production situations and geographical conditions, leading to inconsistencies between implemented policies and the various outcomes targeted by those policies (in terms of the overarching objectives). This suggests that there is considerable scope to improve the targeting of support to site-specific non-commodity outputs.

The existing system of direct payments, and the non-regionalised share in particular, could be restructured to differentiate between the geographic locations of producers, in order to better reflect differences in production situations, the potential to supply non-commodity outputs, and environmental challenges (Figure 5.1). For example, funding could be reallocated among existing payment categories, and some payments restricted to certain regions. This would ensure the provision of non-commodity outputs for which demand and supply differ by area, such as ‘maintenance of cultivated landscapes’.

The main advantages of restructuring direct payments to differentiate between areas are:

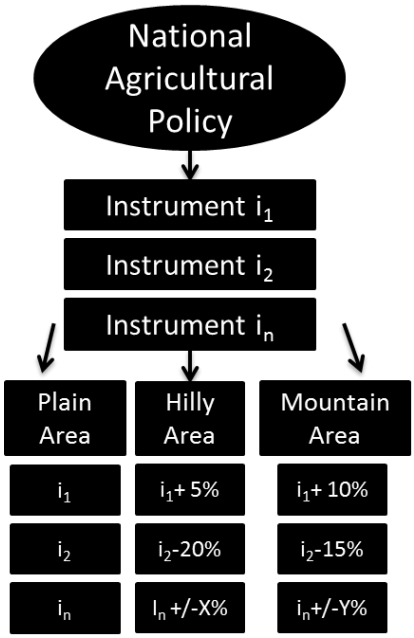
- They are more target-oriented.
- They better match to relevant production conditions.
- Better targeting of direct payments will lead to efficiency gains. As a result, the total sum of direct payments can be reduced in the long term, reducing the burden on the budget.

19. Note that around 33% of direct payments are for ensuring food supply, and 15% for animal welfare and transitional payments.

The main disadvantages of restructuring direct payments to differentiate between areas are:

- From an administrative perspective, the design of the system of direct payments becomes more complex, which could increase administrative costs.
- Identifying which direct payments can be regionalised will generate additional administration costs in the short term.

Figure 5.1. Regional differentiation of national direct payments



Source: Derived from OFAG (2016) on regional differentiation of direct payments.

5.1.2. Strengthen environmental standards

Agriculture plays a key role in the national sustainable development strategy. Yet, even though 98% of producers comply with environmental regulations, most of the agri-environmental targets for the sector have not been met (Box 4.2), and remaining challenges highlight the need to improve the sector's environmental performance.

The evaluation in section 4.4 determined that border protection is not relevant for achieving the objective of ***preserving natural resources***, because it encourages more intensive production. This is associated with negative environmental outcomes in Swiss agriculture (OECD, 2015a). Abolishing border protection is expected to reduce the negative environmental externalities of agricultural production. However, persistent gaps in the environmental performance of the agricultural sector mean that further adjustments to policy are needed to achieve the objective of preserving natural resources. This is despite current high levels of direct payments – 33% of gross farm receipts on average in 2013-15 – that provide direct incentives targeted to environmental outcomes and specific farming systems and practices.

In its 2015 review, the OECD recommended that agri-environmental policies be strengthened by incorporating current cross-compliance requirements into mandatory regulations, to provide a baseline for new and more stringent cross-compliance requirements linked to support payments (OECD, 2015a). Moreover, through targeting

cross-compliance conditions geographically – for example, by varying the stringency of conditions according to the nature of environmental challenges in a region – the environmental performance of agriculture would be improved more effectively and at a lower cost.

The advantages of strengthening environmental regulations and implementing more stringent and targeted cross-compliance requirements are as follows:

- The effectiveness and efficiency of environmental regulations would be increased. Agri-environmental targets could be met at no additional budgetary costs.
- More stringent and targeted cross-compliance requirements are relatively easy to establish from an administrative point of view, as the system is already in place.
- The increase in the administrative burden would be limited as the current system of direct payments already targets certain farming systems and practices, and uses some geographical differentiation.

The main disadvantage is that farmers may incur higher costs to comply with strengthened environmental regulations, as some environmental and sustainability criteria would no longer be voluntary or linked to direct payments.

5.1.3. Consumer information system – influencing consumer preferences

Abolishing border protection will expose Swiss producers to world prices and increased competition from imports in the domestic market. However, lower overall food prices may create an opportunity for Swiss producers to differentiate their production and capture a market premium based on a range of attributes, including: higher food standards, more sustainable and animal-friendly production systems, and better taste. In particular, this may help producers offset the additional costs of ***guaranteeing animal welfare*** through implementing more stringent voluntary programmes.

Switzerland's consumers are willing to pay a premium for Swiss agro-food products. A recent study found that Swiss consumers were willing to pay more for Swiss products, on the grounds that they meet higher standards and taste better, and that it is a way to support domestic producers (Bolliger, 2012). This suggests that the Swiss agro-food sector can adjust to a more open domestic market and increased competition from imports by positioning itself as a competitive supplier of high quality products.

In its 2015 review, the OECD argued that the 'Swiss brand' image should be maintained and enhanced for domestic and foreign customers, to increase the competitiveness of Swiss food industries. Likewise, a 'Swiss brand' would allow the agriculture sector to differentiate itself from imported products and benefit from Swiss consumers' preferences for domestically produced products – in economic parlance, lower the substitutability of imports and Swiss products.

Switzerland has already developed legislation to strengthen and preserve the competitive advantage represented by the "Switzerland" brand. In January 2017, the Ordinance on 'Swissness' (HasLV) came into force, which defines the criteria that have to be fulfilled in order to use the Label "Swiss", and to use the label of the Swiss cross. For food and beverages two requirements have to be met: (i) 80% of the raw material or ingredients have to originate from Switzerland (100% for milk and milk products); and (ii) the processing of the products has to take place in Switzerland (for example, milk processing into cheese) (OECD, 2017).

Given that the Swiss brand sends a clear quality signal for consumers, there could be a high payoff to investments in generic (that is, agro-food sector wide) promotion of the "Switzerland" brand. Key steps would include developing promotions and marketing to inform consumers about the attributes of Swiss products, to help consumers make informed choices between Swiss and imported products. Key attributes would include aspects of animal welfare, as well as environmental sustainability and products with low carbon footprint. Central to this, the signal sent by this label to consumers must be *credible*. The 'Switzerland' label will need to be supported by efforts to further enhance the transparency of food value chains through fully developed traceability and systems audits.

The advantages of further developing Switzerland's consumer information system are:

- It enhances trust in the food system and educates consumers in domestic and export markets about the quality attributes of Swiss agro-food products.
- Customers are included in the information process.
- It enables a better match of supply of local products to demand.
- The government acts as an enabler of market solutions, not a regulator of markets.

Disadvantages:

- Additional administrative and transaction costs occur, including monitoring of compliance.
- In the event that the "Switzerland" brand is misused or misrepresentation by some producers, the Swiss agro-food sector as a whole may be harmed by association.

5.1.4. Sustainable Productivity Matrix

The performance of Swiss agricultural policy could be improved by more closely aligning policy instruments with objectives, including as they differ between regions. As discussed in the previous sections, government support will be necessary to ensure the provision of some non-commodity outputs if border protection is abolished – specifically, to ensure the ***maintenance of cultivated landscapes*** and to ***preserve natural resources***. However, support should be targeted to areas with the greatest value for non-commodity output provision and to the environmental challenges of specific regions. Equally, the objective of ***ensuring food supplies for the population*** may be best achieved through targeting investments to improve the productivity of Swiss agriculture to potentially competitive producers (mainly in the plain region).

This section proposes a *sustainable productivity matrix*, such as the representative matrix presented in Table 5.1, to better organise existing policy instruments, by structuring and targeting them according to the overarching objectives and their relevance to Swiss agricultural regions.

In practice, the matrix would distinguish between regions to reflect differences in the productive value of areas for commodity and/or non-commodity production. For each region, policy aims would be defined that align with the overarching policy objectives (to the extent that they are relevant). The matrix also includes a menu of policy programmes, where each programme would incorporate a number of instruments, including – but not limited to – existing instruments such as direct payments.

The *sustainable productivity matrix* also represents a practical way of implementing the recommendation from the OECD's 2015 review. Specifically, the OECD recommended a regionally differentiated, two-track system of policies:

- Under the first track, a differentiated system of direct payments to secure the provision of non-commodity outputs demanded by society.
- Under the second track, potentially competitive producers (mainly in the plain region) would be allowed more freedom to optimise their production and respond to market signals (OECD, 2015a).

Some possible policy programmes that could be included in the matrix are:

- Innovation programme.
- Rural development programme.
- Special services programme.

An *innovation programme* would aim to increase the productivity and sustainability of Swiss farms and the agricultural sector more broadly. It would include measures that foster knowledge generation and transfer, and support on-farm investments in innovation, including new technologies and sustainable management practices, as well as marketing and organisational innovations. Specific measures might include investments in agricultural research and extension, innovation allowances and credits, support to potentially competitive farmers to modernise their businesses.

A *rural development programme* would address those aspects of rural development for which agricultural policy is relevant, and impediments that restrict the ability of farm households to take advantage of new economic opportunities. It might include measures to support the economic diversification of agricultural households (for example, into farm tourism and ecosystem services), and the development of niche markets and on-farm value adding (OECD, 2003b). It would be important to coordinate any new measures with existing rural development frameworks, such as Switzerland's New Rural Policy (NRP, since 2008), which aims to foster investments in non-agricultural areas such as tourism (RegioSuisse, 2016).

A *special services programme* would target the non-commodity outputs of Swiss agriculture that are amenable to agricultural policy. It would include measures to maintain agricultural land in a cultivated state, and ensure the provision of other agricultural ecosystem services, such as biodiversity. Specific measures might include the current system of direct payments, including: farmland payments to maintain open landscape; biodiversity payments; payments for landscape quality; payments for production systems and resource-efficiency payments (section 4.4).

Other considerations would also inform the development of the *sustainable productivity matrix*, beyond what is shown in the representative matrix in Table 5.1. Access to some measures would be determined by the geographic location of producers. For example, payments to maintain a cultivated landscape (special services programme) would only be available to producers in the mountain area, whereas payments conditional on meeting certain ecological requirements would be available to producers in all areas. Similarly, some measures to support farm business modernisation and facilitate structural change (for example, investment support and exit strategies) may only be available to producers in the plain area. Moreover, access to some measures should be open to non-agricultural providers, for example, measures under the special services programme.

Table 5.1. Sustainable productivity matrix

Region and policy aim \ Policy programme		Innovation programme	Rural Development programme	Special Services programme	Policy programme *m*
Region 1	Aim 1	✓	✓	■	?
	Aim 2	✓	■	✓	?
	Aim *i*	■	■	✓	?
Region 2	Aim 1	■	✓	■	?
	Aim 2	■	✓	■	?
	Aim *i*	✓	■	✓	?
Region *n*	Aim 1	■	✓	■	?
	Aim 2	■	■	✓	?
	Aim *i*	✓	■	✓	?

Note: A check (✓) mark indicates a suitable programme for achieving identified future aim, a square (■) means less suitable.

The advantages of developing and implementing the sustainable productivity matrix are as follows:

- The policy design becomes more efficient as it would be more target-oriented
- It can lead to lower costs in the long term.
- Less efficient programmes may be more easily identified, revised or abolished
- More competitive producers achieve more freedom to optimise their production.

The main disadvantages are:

- In the introduction phase the matrix will appear more complex.
- Limited new implementation costs.

5.2. Group 2 - New instruments

In the absence of border protection, Swiss producers may experience greater price volatility as a result of exposure to international prices (section 4.1.1). This is already evident in the Swiss milk sector, where the volatility of Swiss domestic prices for raw milk has increased (Le Conseil fédéral, 2017). Greater price volatility may reduce producers' incentives to invest in productivity-enhancing innovations or to expand the scale of their operations. Going forward, this might affect the capacity of the Swiss agro-food sector to make an essential contribution towards ***ensuring food supplies for the population***. It may also reduce producers' incentives to invest in sustainability-enhancing innovations to help ***preserve natural resources***. New risk management tools will be important for helping improve producers' resilience to risks emanating from both domestic and international sources (Brooks and Matthews, 2015) and to provide a more stable operating environment for investment. This section proposes a set of instruments to help farmers cope with new market conditions.

5.2.1. Risk management

Risk management tools are essential to enable farmers to anticipate, avoid and react to shocks. Currently the Swiss agricultural sector has limited access to risk management instruments. Private insurance companies offer contracts to cover production risks (yield losses), but not income losses. There are intervention measures for providing *ad hoc* counter-cyclical payments to the meat and eggs sectors. The government also guarantees payments for a share of losses due to livestock disease outbreaks. Additional risk management tools have not been considered necessary, because border protection, in combination with high levels of direct payments, stabilises farm incomes and shields producers from market risks (Le Conseil fédéral, 2016b).

This section proposes two instruments to help farmers manage risk due to market volatility and disaster situations – a *Farm Risk Account* and *disaster payments*. These would be a first step in developing a systematic, comprehensive approach for handling risks to minimise potential damages and losses, as is the aim of the Federal Council (Le Conseil fédéral, 2016b). Going forward, the government could also consider opportunities to facilitate the development of market-based risk management tools, such as by providing information, regulation and training for the development of futures, insurance and marketing contracts (Box 5.1 and OECD, 2011).

Box 5.1. Agricultural risk management

OECD analysis of risk management in agriculture has identified three layers of risks which require different responses from government:

Normal risks are those that arise from variations in production, prices and weather. These do not require any specific policy response, but can be directly managed by farmers as part of normal business strategy, including through the diversification of production or the use of production technologies which make yields less variable. Income-smoothing through tax instruments for businesses is also part of normal risk management.

Marketable risks are those that can be handled through market tools, such as insurance and futures markets, or through co-operative arrangements between farmers. Examples of marketable risks include hail damage and some variations in market prices. There may be a role for government in providing information on climate and market risks to farmers and the private sector, to facilitate the development of risk management strategies and tools.

Catastrophic risks are infrequent but catastrophic events that are rare but cause significant damage to many farmers at the same time or over a wide area. Catastrophic risks will usually be beyond farmers' or markets' capacity to cope. Examples include severe and widespread drought or the outbreak and spread of a highly contagious and damaging disease. Governments may need to intervene in such cases.

Source: OECD (2011), http://dx.doi.org/10.1787/9789264116146-en.

5.2.2. Farm Risk Account

The *Farm Risk Account* is a voluntary savings account. The objective is to encourage farmers to take on more responsibility for managing risks arising from normal variations in production, prices and weather, while providing protection from more extreme market-related shocks. It draws on the experience of other OECD countries in managing risk, such as Canada's *AgriInvest programme*, a government-matched producer savings account for moderate income declines or for making investments in farming operations to

mitigate risk (OECD, 2016a). By building producers' resilience to normal risks, the *Farm Risk Account* enhances the viability of Swiss farms and helps ensure the production of non-commodity outputs in the long-term.

The *Farm Risk Account* could operate as follows. A part of farmers' direct payments would be deposited in the account, to be drawn on in the case of income losses from operational risks (such as market volatility or unexpected weather conditions). To provide an incentive for farmers to save, deposits of direct payments could be deducted from farmers' taxable income, and do not have to be taxed when disbursed (in the case of losses) or at the closure of the account when used to supplement pension payments. Use of the *Farm Risk Account* would be mandatory in the event of a temporary shortfall in income from operational risks. Pay-out rules could limit access to the account to losses that lead to an income level below a certain percentage, for example 80%, of the reference income, with losses up to that level to be treated as a normal individual business risk.

In order for the *Farm Risk Account* to be effective, it must balance two incentives: the incentive to save; and the incentive to use the savings in case of a temporary income shortfall. Experience in other OECD countries, such as Canada, has shown that if the risk management instrument in place covers risks too comprehensively it increases 1) the incentive of farmers to specialise in riskier products; and 2) the crowding-out of other risk management programmes for handling marketable risks (for example, crop insurance), which can increase the cost for government (OECD, 2011). For this reason, the reference income level will need to be chosen carefully.

The *Farm Risk Account* could be introduced in Switzerland as a Private-Public-Partnership (PPP) between private banks, which would administer the accounts, and the Swiss government, which would define the conditions and might consider paying part of the administration costs. Agricultural producers would pay 100% of the premium through the direct payments.

The main advantages of the *Farm Risk Account* are:

- By implementing the instrument as a PPP the government can determine the conditions under which this instrument is implemented in the market, without crowding-out the private sector.
- The instrument could be used as a vehicle to reduce the direct payments over time, as farmers can use the *Farm Risk Account* to smooth their income from year to year through savings.
- No new payments are required as deposits will be taken from the direct payments.
- It encourages individual agricultural producers to take on more responsibility for managing risk.

The main disadvantage relates to the choice of a reference income level, as border protection has resulted in very stable incomes.

5.2.3. Disaster payments

Another instrument that is already in place but could be refined further is disaster payments. In contrast to the Farm Risk Account, these payments address catastrophic risks that are beyond farmers' or markets' capacity to cope, such as natural disasters, the outbreak and spread of a highly contagious and damaging disease, or a threat to food security. Effective policy responses to catastrophic events can help minimise the disruption to agricultural production, ensuring that sector is able to make an essential

contribution towards ***ensuring food supplies for the population***. The procedures, responsibilities and limits of the policy response – including explicit triggering criteria and types and levels of assistance – would need to be defined as precisely as possible. Similar systems already exist and function well in several OECD countries (Le Conseil fédéral, 2016b; OECD, 2011).

5.2.4. Transition period - phasing out of border protection system

A transition period will be necessary to manage phasing out high border protection and the move towards a more open market. A first step would be to lower the existing out-of-quota tariffs, and to expand quota levels. Tariff reductions and quota expansion could be introduced according to a schedule, which would increase access to the Swiss market, while allowing domestic producers to adapt to a more open domestic market – reducing the severity of the shock to the domestic market. This would be decided on a case-by-case basis and estimated at the farm level and with clear sunset clauses.

The advantages of such a transition instrument would be:

- No additional administrative costs, as the administration system for TRQs is already in place.
- The system would become more transparent.
- Quota-rents would disappear gradually, leading to potential benefits for consumers.
- Producers have time to adapt to the new market situation.

Disadvantages could be:

- Transition payments would establish new direct payments to producers.
- Low incentive to abolish tariffs completely.

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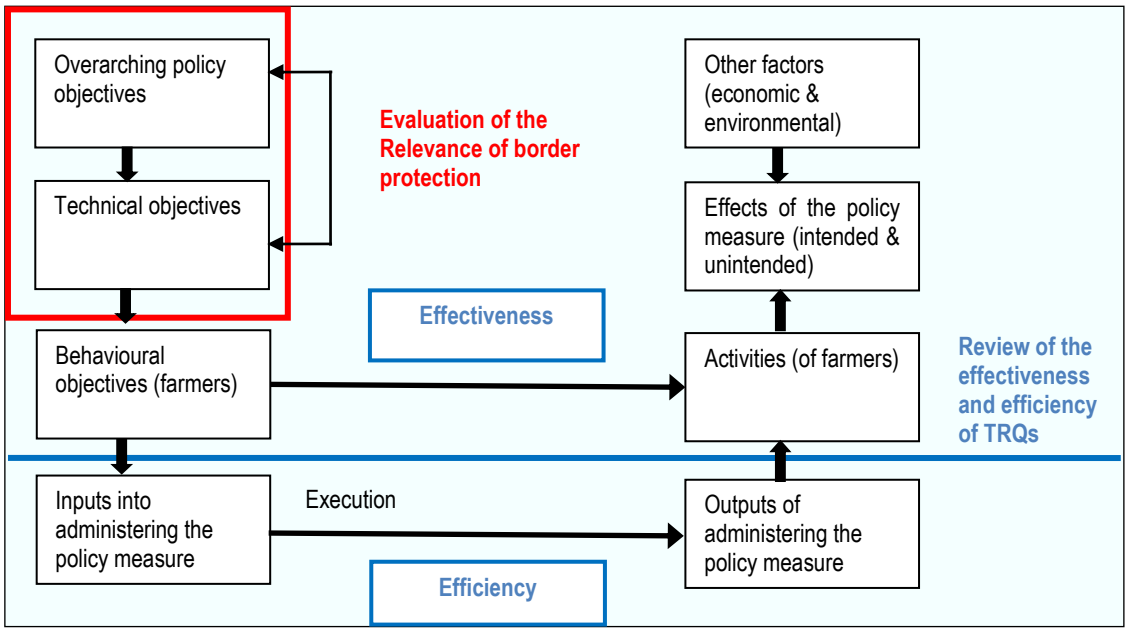
Annex A. Swiss intervention logic

Figure A.1. Swiss intervention logic



Annex B. The Metro model

The OECD METRO model is a static computable general equilibrium model (CGE) (OECD, 2015), wherefore population growth cannot be taken into account. The Model is derived from the Social Accounting Matrix (SAM) based CGE model GLOBE developed by Scott McDonald and Karen Thierfelder (2013).[20] As the model's name implies, CGE models rely on a comprehensive specification of economic activity within and between countries (and therefore the different inter-linkages that tie these together).

The novelty and strength of METRO lies in the detailed trade structure and the differentiation of commodities by use – commodities and thus trade flows are distinguished by use category (u), whether these are designed for intermediate use, use by households, government consumption as well as investment commodities.

Agents (depicted by the 4 use categories) consume composite commodities, which are formed as three level nested CES aggregate of imports and domestic goods following the Armington assumption of imperfect substitutability (Armington, 1969). At the third level imports from various sources form a CES aggregate while allowing for imports in small shares, which are aggregated at the second level to the other imports in fixed shares, forming aggregate imports. This small shares feature avoids large terms of trade effects for very small trade flows. On the first level domestic goods and aggregate imports are forming a composite commodity using CES technology. On the export side, METRO employs also the assumption of imperfect transformability using a 2 level CET structure: products are allocated to the domestic or export market depending on relative price changes employing CET technology, and are subsequently allocated to the different export destinations.

The underlying approach for the multi-region model is the construction of a series of single country CGE models that are linked through trade relationships. As is common in CGE models, the price system in the model is linear homogeneous, which directs the focus on relative, not absolute, price changes. Each region has its own numéraire, typically the Consumer Price Index (CPI), and a nominal exchange rate (an exchange rate index of reference regions serves as model numéraire). Thus, price effects inside a country are fed through the model as a change relative to the country's numéraire, and prices between regions change relative to the reference region. Finally, the Model contains a 'dummy' region to allow for inter-regional transactions where full bilateral information is not available, i.e. data on trade and transportation margins.

20. The original model and a detailed documentation are available at http://www.cgemod.org.uk/. Developing from the GLOBE model, the model is a direct descendant of an early US Department of Agriculture model (Robinson et al., 1990) and NAFTA (Robinson et al., 1993) and follows trade principles deriving from the 1-2-3 model (de Melo and Robinson, 1989; Devarajan et al., 1990).

Table B.1. Aggregations used in the METRO model

Regions	Sectors		Factors
Switzerland	Agriculture	Paddy rice	5 labour categories:
Germany		Wheat	-Technical and Assistant Professionals
France		Other Cereal grains (e.g. Barley, Maize)	-Clerks
Austria		Vegetables fruit nuts	-Service and shop assistants
Italy		Oil seeds	-Office managers and Professionals
Spain		Sugar cane/ Sugar beet	-Agricultural and other low skilled
BENELUX		Plant-based fibers	Capital
Rest of the EU		Other Crops	Natural Resources
USA		Cattle sheep goats horses (living)	Land
Canada		Other living animals	
Brazil		Raw milk	
Rest of Latin America		Wool silk-worm cocoons	
Australia and New Zealand		Forestry	
East Asia		Fishing	
South and South-East Asia	Food	Meat: cattle (beef and veal) sheep goats horse	
Rest of the World		Other Meat products (pork, poultry meat and egg products)	
		Vegetable oils and fats	
		Dairy products	
		Processed rice	
		Sugar	
		Other Food products	
		Beverages and tobacco products	
		Extraction industries	
		Manufacturing	
		Transport services	
		Services	

The database of the model is based on the year 2011. The reference year for the baseline as well as the scenario is 2011. The baseline includes trade agreements which have been ratified currently.

The model distinguishes activities which produce commodities. Activities maximise profits and form output from primary inputs (i.e. land, natural resources, labour and capital), combined using Constant Elasticity of Substitution (CES) technology, and intermediate inputs in fixed shares (Leontief technology). Households are assumed to maximise utility subject to a Stone-Geary utility function, which allows for the inclusion of a subsistence level of consumption. All commodity and activity taxes are expressed as ad valorem tax rates and taxes are the only income source to the government. Government consumption is in fixed proportions to its income and government savings are defined as a residual. Closure rules for the government account allow for various fiscal specifications. Total savings consist of savings from households, the internal balance on the government account and the external balance on the trade account. The external balance is defined as the difference between total exports and total imports in domestic currency units. While income to the capital account is defined by several savings sources, expenditures by the capital account are based solely on commodity demand for investment.

Thus, the model allows for a variety of macroeconomic setups, by defining how the markets and accounts mentioned above are cleared, e.g. the labour market, the capital

market and the government account. In this study the following standard setup is chosen: Following the standard norm, in the foreign exchange market, the current account balance is fixed to its base level and the exchange rate is floating. In the capital market the savings rate is a fixed share of household income and investment adjusts to balance the account. All tax rates are fixed and Governments are assumed to adjust spending to maintain the balance. In factor markets all factors, labour, capital, land and natural resources, are fully employed and mobile across sectors.

The METRO database derives from the GTAP V9 database (see Aguiar et al., 2016) and disaggregates imports based on use categories derived from OECD sources, as opposed to the widely applied proportionality assumption. For the purpose of this study the database is aggregated reflecting Switzerland and main trading partners in 16 countries and geographic regions as well as 26 sectors as detailed in Table B.1.

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