

Nutrition

The food consumed in Switzerland is produced in increasingly globally oriented production chains, where imported food, animal feed and production resources play an important role. This relocates a considerable portion of the environmental impact abroad. Site-adapted agriculture and moderate diets with a higher share of plant-based food can help significantly reduce the environmental impact.

Food not only provides energy and vital elements to humans, but also represents a source of pleasure, identity and tradition. A wide range of food and beverages, however, also means high energy and resource consumption along the entire production chain (→ Production and consumption as drivers). Agricultural production, industrial food processing and packaging, distribution, preparation and consumption are all embedded in global material cycles. It is therefore necessary to view their interactions from a system perspective. Article 104a of the Federal Constitution concerning food security, which was approved by the Swiss population in 2017, takes this holistic view into

account. It calls for the federal government to create the conditions required to conserve resources in the production, trade and consumption of food.

Food production and supply

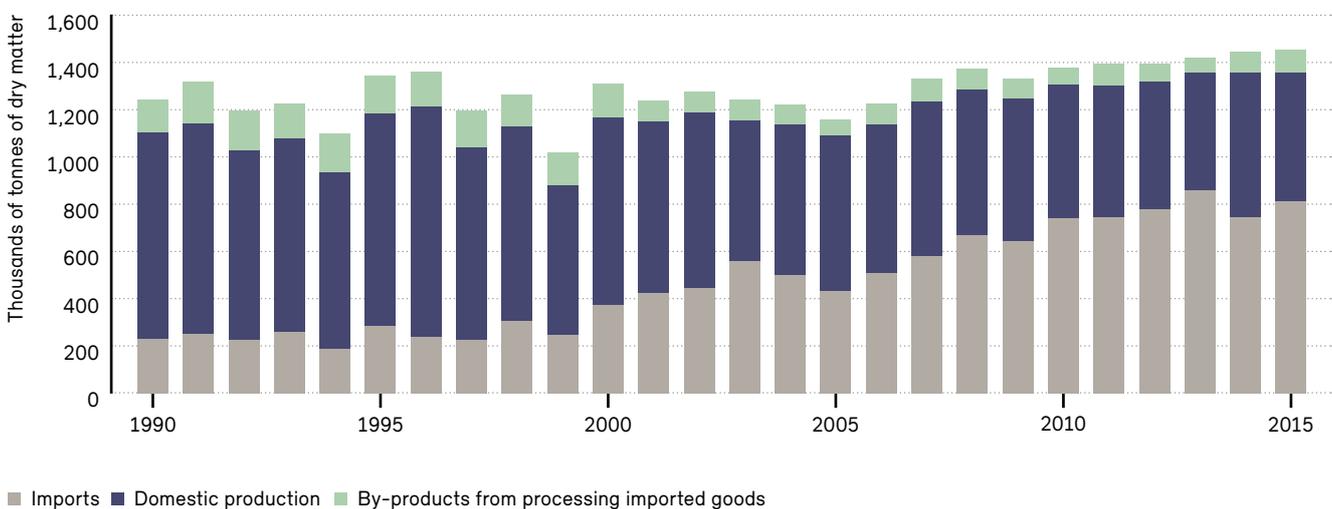
In recent decades, ever larger harvests have been achieved in Switzerland’s shrinking agricultural areas. The use of production resources (fertilisers, plant protection products, etc.) and the development of higher-yielding varieties have in particular contributed to this situation. **Agriculture** adapted to the locality, however, should not exceed the **carrying capacity of ecosystems**. Due to the current livestock numbers and the predominant use of mineral fertilisers and plant protection products, agriculture is harming biological diversity, air and water quality, and the climate. Thus, it is exceeding the limits of the ecosystems’ carrying capacity. Action must be taken in particular with respect to nitrogen (ammonia, nitrate), climate-relevant greenhouse gases (methane, nitrous oxide), soil fertility and biodiversity (Federal Council 2016e). With its limited supply of arable soil

Figure 13

Origin of concentrated feed for animal production

The volume of concentrated feed used increased by 17% between 1990 and 2015. The percentage of imported concentrated feed rose from around 20% to nearly 60% in the same period. The total volume

of animal feed used in Switzerland has stayed relatively constant at 8 million tonnes of dry matter since 1990.



Source: SFU – Animal feed balance

and the many meadows and pastures of its hilly and mountainous regions, Switzerland offers favourable conditions for milk and meat production with livestock that consume roughage (grass, hay, silage, straw). However, dairy cows bred for high productivity compete with humans when it comes to food, since they depend on high-energy, mostly (nearly 60%) imported concentrated feed (cereals, rice, soybean, fats and oils) (SFU 2011, FSO 2017j) (→ Figure 13). Thus, the potential of Swiss pastures is harnessed less and less and the nutrients removed from the soil in the countries producing the concentrated feed then impact Switzerland’s environment.

Food and beverage **processing** and their **international trade** have become more significant in recent decades. While approximately CHF 7.5 billion worth of food, beverages and tobacco were imported in 2000, this quantity rose to CHF 10.6 billion by 2016. The increase was even more significant in exports, whose value more than doubled in the same period from around CHF 3.4 billion to CHF 8.6 billion (FSO 2017k). Swiss food industry sales amounted to CHF 17.7 billion in

2012. At 18%, meat products held the largest share of the sales (FIAL 2013).

As **food markets globalise**, the environmental impacts shift from Switzerland to abroad. More than 50% of the environmental impacts generated by the production and the supply of food to the Swiss population occur abroad (FOEN 2018a). Examples include the destruction of natural ecosystems to open up new areas for farming (e.g. for palm oil plantations or soybean fields) and the overuse of water resources (for example, for the production of rice, nuts, sugarcane or beef) (WWF 2010).

Changes in demand

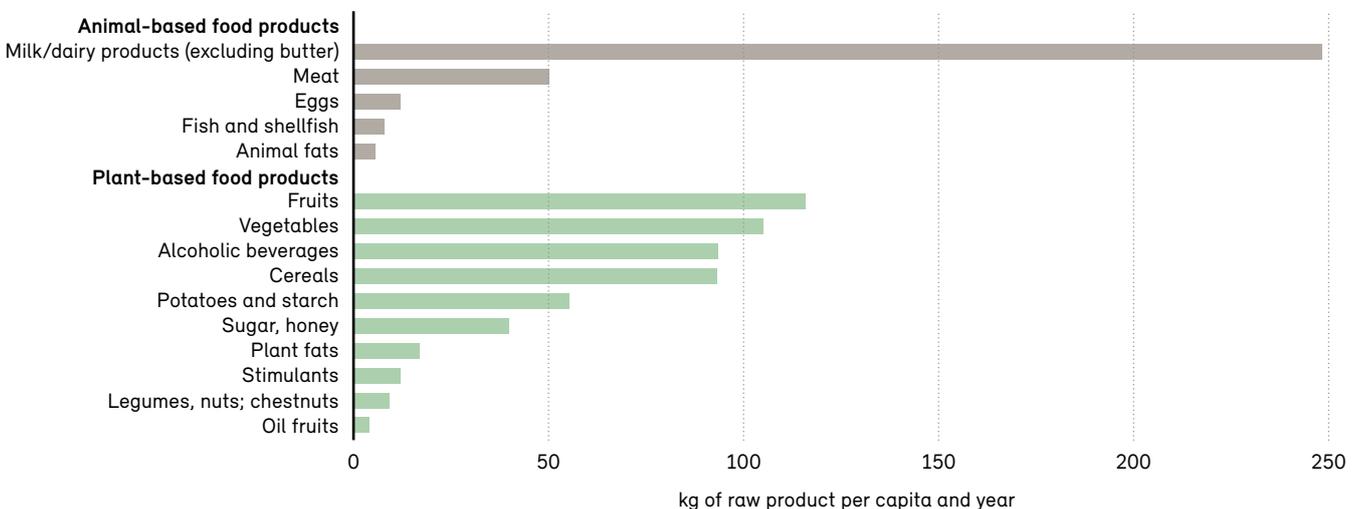
In 2015, Swiss households spent an average of around 12% of disposable income on food (FSO 2017l). Eating habits have changed recently, both in terms of menu composition and the location where food is consumed.

In fact, the higher living standard allows for the consumption of more expensive **foods** that often also have an above-average **impact on the environment**, such as

Figure 14
Food consumption¹, 2015

In 2015, around 865kg of food was consumed per capita and year on average. 543kg was of plant origin and 322kg was of animal origin. Milk and dairy products make up by far the largest share of the

quantity of food consumed in Switzerland. Average per capita meat consumption has varied from year to year by 1 to 2kg and is 50kg per capita, while the total volume has hardly changed since 2000.



¹ Corresponds to potentially available food products. Actual consumption is lower due to losses (e.g. unsold or spoiled food).

meat and dairy products, fish, coffee, chocolate or exotic fruits. Fluid milk sales have been falling for several decades, whereas cheese, butter, yogurt and meat levels have remained relatively stable (SFU 2017) (→ Figure 14). The production of **animal products** is particularly resource and energy intensive in comparison to plant products (FOAG 2015). The environmental impact of nutrition can be reduced by one-fifth just by decreasing the amount of meat consumption (“flexitarians”) (ESU 2015) (→ Figure 15). At this time, 5% of the Swiss population lives on a meatless diet (3% of men, 7% of women). The percentage of vegetarians in the 18-to-34 age group is disproportionately high (FSVO/ FOPH 2017). Moderate consumption of animal products can be considered positive not only from an ecological perspective, but also from a health perspective (FSVO 2017).

As buying power has increased, the demand for **near-naturally produced and environmentally-friendly food** has increased as well. For instance, the percentage of **organic products** in food and beverage spending

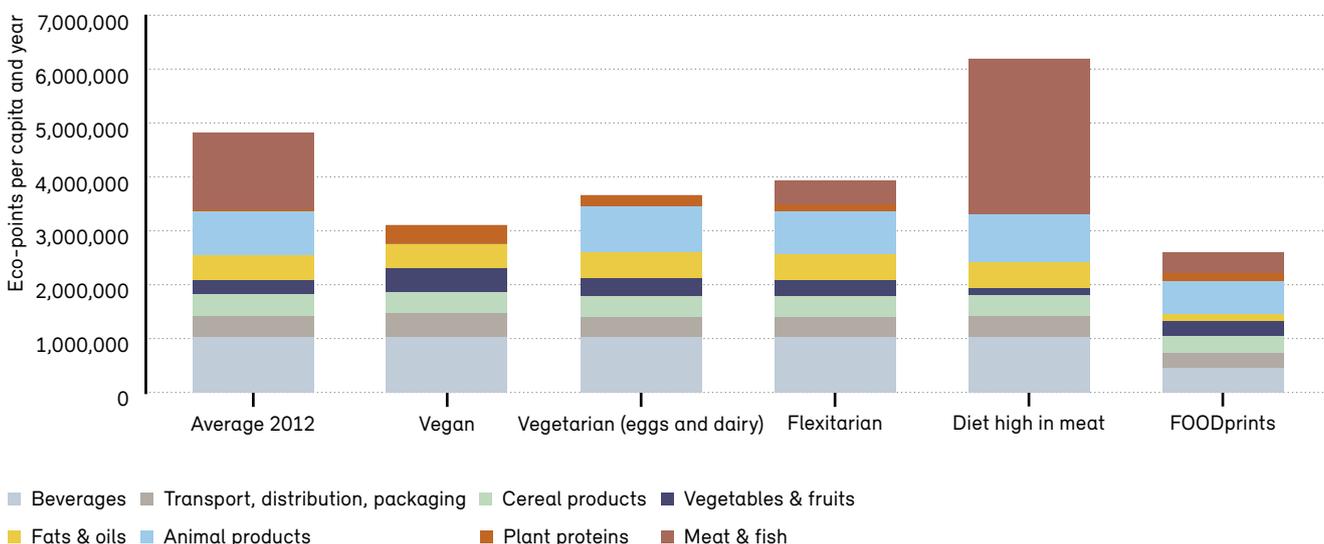
has more than doubled since 2000 and amounted to about 9% in 2015 (FSO 2018d). This trend has been recognised and promoted by wholesalers, which have created their own labels and taken extra marketing measures. Product lines that set themselves apart through sustainable production or a regional origin are showing significantly above-average growth rates (Coop 2017, Migros 2017).

In 2015, around 40% of food spending was on **meals consumed outside the home**, with two-thirds of those meals being consumed in full-service restaurants. The remaining one-third of spending on meals outside the home was divided up between self-service restaurants, take-out restaurants, canteens or meals eaten in private settings (FSO 2017l). As home, work and recreation are often located far apart, time-saving food solutions are widely popular. **Disposable packaging** is a staple component of many fast food meals. It contributes to greater amounts of waste and exacerbates the problem of litter in public spaces.

Figure 15
Influence of different diets on the environment

Meat and other animal products have a considerable influence on the environmental impact of food. Thus, the environmental impact of a vegan diet without animal products is half that of a diet high in meat (2kg of meat per week). Indeed, more moderate meat consumption (“flexitarian” with 300g of meat per week) improves the person-

al environmental impact about as much as a purely vegetarian diet. The environmental impact could be reduced even further by adopting an ideal diet from both a health and ecological perspective (“FOODprints”) (SGE 2014).



Source: ESU-services

In addition, dealing with food as a valuable resource is often not fully reflected in its management: In Switzerland, around one-third of agricultural production is

lost between field and fork. In fact, Switzerland's **food waste** is about as much as the global average (FOAG/FOEN/FSVO/SDC 2015) (→ Waste and raw materials).

Effects of nutrition on air, water, climate, soil, biodiversity, landscape, biosafety as well as waste and raw materials

- **Air, water:** Ammonia emissions and nitrogen inputs caused by agriculture are well above the carrying capacity of the ecosystems. Although they fell between 1990 and 2000, they have since decreased only marginally and still amount to a high level. Due to agricultural activities, various lakes have excessive phosphorus levels and therefore lack sufficient oxygen. Plant protection products in excessive concentrations can be found in many smaller and medium-sized surface waters, particularly in regions with a great deal of arable farming and special crops (→ Challenge nitrogen, → Air, → Water).
- **Climate:** Food production and the land-use changes caused globally by nutrition contribute to the accumulation of greenhouse gases like CO₂, methane and nitrous oxide in the atmosphere. The greenhouse gases generated by food processing, storage (cooling) and transport also weigh in the balance (→ Climate).
- **Soil:** Heavy metals from plant protection products or farm manure pollute individual sites, thereby posing a risk to human health and the conservation of soil fertility (→ Soil).
- **Biodiversity:** The target for biodiversity priority areas in agricultural regions is met across Switzerland. However, significant deficits still exist at the regional level, and the quality and interconnection of these areas are not sufficient to stop biodiversity loss (→ Biodiversity).
- **Landscape:** Agriculture plays an essential role in landscape conservation and maintenance. Nevertheless, the landscape quality is worsening from the loss of structural elements such as shrubs or hedges in areas used for agriculture. The landscape experience is also adversely affected when agricultural land is transformed into settlement areas and when forests spread into abandoned farmland (→ Forest, → Landscape).
- **Biosafety:** A moratorium on the cultivation of genetically modified plants in agriculture is in effect until 2021. The role that genetically modified organisms (GMOs) will play in future domestic food production must be regulated for the time after the expiration of the moratorium (→ Biosafety).
- **Waste and raw materials:** In Switzerland, around 2.5 million tonnes of food waste is generated every year across the entire value chain, from field to fork. A large portion of the food waste is considered avoidable. In addition, time-saving solutions for meals (e.g. ready-made meals) and disposable packaging for fast food contribute to the volume of waste and exacerbate the littering problem.

Innovations

Bridging production and consumption – The globalised agricultural economy has made the food system more complicated and anonymous. In response, demand for near-natural production, transparency and traceability has grown. One response to this growing demand has been the emergence of many farm shops, where farmers market their products directly and provide insight into their farms. A similar method of bringing consumers and producers closer together is used in contract farming, where customers sign up to regularly receive seasonal products and occasionally work specific days on the farm. This also increases their understanding of the challenges posed by near-natural production methods. New possibilities for direct interaction between supply and demand are opening the doors to innovative Web applications (→ www.openolitor.org; www.kuhteilen.ch).

Weed control by robots – Residues from plant protection products in bodies of water are one of Swiss agriculture's major challenges. The use of plant protection robots may help, as they are capable of recognising and spraying weeds directly. Herbicide use could be drastically reduced in this way. Such devices were developed by a firm in western Switzerland. They work autonomously and can be monitored using a smartphone app. The robots weigh only about 130kg each, which offers additional advantages compared to conventional weed control methods in terms of soil compaction. In the field, they steer themselves using GPS, cameras and sensors and are powered by integrated solar cells (→ www.ecorobotix.com).