

GAZDASÁG & TÁRSADALOM

Journal of Economy & Society

TARTALOM

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2021/1

Gazdaság & Társadalom

14. ÉVFOLYAM

2021.

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Supply of organic soy from EU production for more sustainability

*Caspar von der Crone*¹

ABSTRACT: The volume of organic production of processed animal products is steadily increasing in Germany and other EU countries. The EU Commission expects a quota of up to 30 percent by 2030. This has positive effects on the environment, climate, biodiversity and animal welfare. An increase in organic farming also has a direct impact on reducing and eliminating the use of non-organic fertilizers, pesticides, fungicides, genetically modified organisms and the use of antibiotics.

Egg production in particular is experiencing high growth rates in the organic sector, while other processing sectors have so far only been able to come up with small shares. In the case of fattening poultry and pigs, this is still well below 2%, while eggs have already reached over 15%, and the trend is upwards.

Protein requirements are met primarily by soybeans, but other protein sources such as legumes and, above all, sunflowers and rapeseed have now also become increasingly important.

Sustainability and CO₂ reduction are at the center of public interest. The origin of soy from European cultivation is therefore of great importance. This significantly reduces the impact on the climate. The previous main suppliers in South America are waiting with smaller market shares. This mainly affects the organic sector, while conventional processing continues to rely on non-European origins for cost reasons.

KEYWORDS: CO₂ reduction, sustainability, organic farming, climate protection

JEL Codes: D18, D20, E23, Q01, Q50

Content

The content specifications of this work focus on the availability of soy worldwide and especially in the countries of the western hemisphere. The main focus is on organic farming, sustainability and the reduction of CO₂.

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In other words, topics that are currently strongly in the focus of the public. The associated structural change, renunciation or restriction of imports from third countries and the promotion of production to meet the increasing demand for protein-containing feed components within Europe is associated with higher costs, which must be implemented on the market.

Consequently, conclusions arise as to the extent to which the use of soy from European production actually leads to higher production costs and rising prices. Sustainability and CO₂ reduction undoubtedly have positive effects on the environment, but the question arises to what extent food retailers support the initiative for more soy from European origin and the associated additional costs are supported by the consumer.

Structure and methodology

The target group, implementation and evaluation of the specifications are oriented to the entire supply chain, see details *Table 1*. First and foremost is agricultural production and here it is important to observe comprehensible specifications for cultivation, the use of fertilizers, pesticides and fungicides. In organic farming, EU regulations and national provisions impose restrictions that must be observed and require regular monitoring by neutral certification bodies. This also affects the conventional sector to some extent, although the specifications are less restrictive.

Compared to conventional cultivation of protein sources such as soybeans, sunflowers or legumes, this means higher costs, which ultimately have to be accepted by consumers. To meet the increasing demand, a re-orientation of production in terms of ecological standards is necessary.

In second place are processing, animal finishing, marketing, the food retail trade and ultimately the consumer as a buyer, who is increasingly critical in his purchasing behavior.

As a result, this has implications for the entire supply chain. Currently, there is a high supply potential, especially of soy from South America at comparatively lower prices. Although the proportion from organic production is still very low, this makes it difficult to use from EU origins.

In the evaluation, the added value is importance, combined with the question to what extent higher prices in the interest of sustainability, conservation of environmental resources and CO₂ reduction actually offer sustainable market potentials.

Table 1: Methodology

	Requirements	Objectives
Target group	Agriculture, food trade, consumers	cultivable land, availability, resources
Basic	Agriculture, foreign trade, processing, animal welfare	Increasing self-sufficiency from EU-cultivation at the expense of third country origin
Implementation	Reorientation of cultivation, foreign trade, animal processing	Higher prices through sustainability
Evaluation	Implementation of the targets	Impact on production, added value

Source: Own research (2022)

Market overview oilseeds Germany

The tables below provide an overview of the protein and organic market in Germany, see *Table 2*.

Table 2: Global overview Soy and organic production

Oilseed market	2017	2018	2019
Share of food market (%)	5,20	5,30	5,70
Cultivation of oilseeds (ha)	13 100	17 800	18 800
of this sunflower	3 200	3 500	5 600
Rapeseeds	5 100	7 100	4 000
Soybeans	4 100	5 900	7 800
Organic production (t)			
Pigs	19 275	22 425	23 175
percentage share	< 1	< 1	< 1
Beef	27 600	29 500	31 150
percentage share	2	3	3
Poultry	15 199	17 978	19 001
percentage share	1	1	< 2
Eggs (million pieces)	1 468	1 556	1 636
percentage share	11	11	12

Source: AMI, CD Consulting (2021)

The share of protein components (soy, rapeseed, sunflower, etc.) is currently just under 6%, but with an upward trend. Soy and sunflower have the highest growth rates, while the share of rapeseed is shrinking. Figures on the share of organic cultivation are not available, but this is likely to be very low and in the low single digits compared to the total cultivation of oilseeds. To reach the EU’s required organic target of 30% by 2030, strong annual growth is needed, but this appears unrealistic at present.

In the area of animal processing, only the production of eggs from organic farming has been showing growth rates for years, see *Table 3*. Despite significantly higher prices, demand is increasing, which is obviously also due to the assessment of greater animal welfare. This is because the production specifications and husbandry conditions in organic production go far beyond those in conventional production and even clearly exceed animal welfare standards in certain segments, which on the one hand explains the increasing demand (von der Crone, 2020). On the other hand, sustainability and the absence of pesticides, i.e., also health aspects, play a major role.

Table 3: Supply balance Poultry, Germany

Egg sector	2018	2019	2020
Laying hen stock (million)	46,8	48,0	49,2
of this organic	5,7	6,0	6,3
Egg production (million pieces)	13 614	13 339	14 421
of this organic eggs	1 556	1 636	1 800
Imports of shell eggs (million pieces)	6 640	6 460	6 100
Consumption			
Eggs per capita	234	235	239
of this organic eggs	26	27	30
Fattening sector			
Chicken (Broiler) for fattening (1 000 t)	1 025	1 041	1 071
kg per capita	14,3	14,4	14,8
of this organic	0,5	0,8	1,0

Source: AMI, CD Consulting (2021)

As with beef and pork, organic production has not yet been able to establish itself in broiler chickens. This is mainly due to the significantly

higher production costs and prices, which are a barrier in contrast to eggs. The added value apparently cannot be communicated to the food trade and consumers.

Environmental and resources protection

For all products, organic products have a better carbon footprint than conventional products. This applies above all to regional production and, to a limited extent, also to conventional products if they originate from regional production. Regionality and organics thus clearly stand for a better climate balance.

A comparison of the mean values shows a drop of 9% in greenhouse gas emissions for regional conventional production, 25% for organic and 31% for organic regional production (Greenpeace Study Climate and Food, 2021), see *Figure 1*.

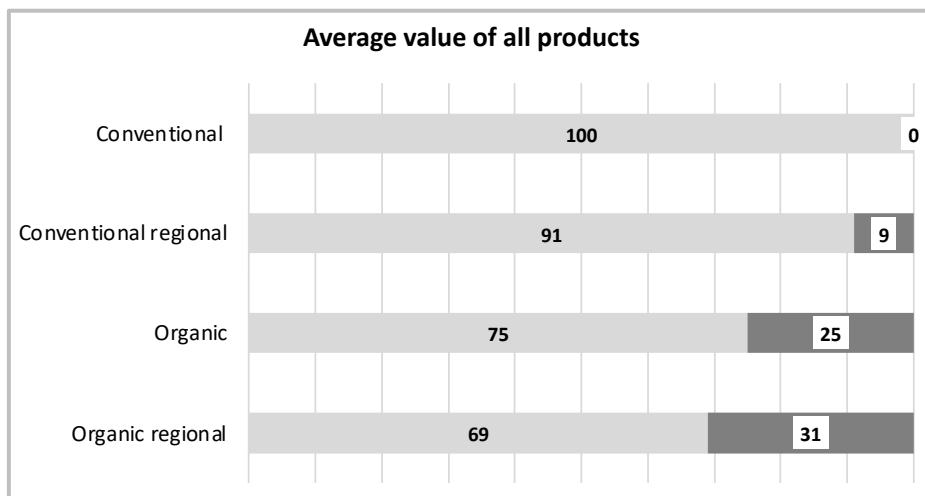


Figure 1: Climate impact Greenhouse emissions

Source: Greenpeace (2021)

Agriculture must therefore be geared even more strongly than before to resource efficiency and sustainability. This includes protecting natural resources such as soil, water and air, reducing negative impacts on the environment and climate, and increasing positive environmental impacts.

Climate change poses major challenges for agriculture, as it is directly affected by rising average temperatures, changes in precipitation distribution, higher CO₂ concentrations in the air, and more frequent and intense weather extremes. This particularly affects arable farming (Klößner et al., BMEL).

To supply soy in the EU, 12 million ha of cropland are needed in North and South America. In the years 2000 to 2016, 5.3 million ha were deforested in the Amazon region and Cerrado alone (Fromwald, Donau Soja, 2021). The development has not ended until today. The EU has reacted, and at the European level, the political direction is significantly influenced by the so-called Green Deal as the innovation and growth strategy of the EU Commission. Central elements of the Green Deal are the “Farm to Fork” strategy and the EU Biodiversity Strategy 2030, which must be dovetailed with the measures of the Common Agricultural Policy – CAP (EU Commission, 2021). The “Farm to Fork” strategy aims to shape a food supply that is beneficial to consumers, producers, climate and the environment, to ensure food security. The share of organic production is to be increased to 30%.

The EU Commission also plans to impose import restrictions on soybean or palm oil if forest has been cleared for the cultivation of agricultural land. In the future, geodata from the cultivation areas in combination with satellite images will ensure that the products do not come from areas that were still forested at the beginning of 2021.

Environmental protection and resource conservation

Demand for organic products in Germany is on the rise. The German organic market as a whole grew by 22 percent in 2020 to 14.99 billion euros. However, it can only be partially satisfied by German organic products. In 2019/20, for example, an estimated 15 percent of organic cereals, 28 percent of organic drinking milk and 27 percent of organic pork came from abroad. There is market potential here, particularly for small and medium-sized farms in Germany.

The strategy for the future defines the political framework for this. It opens up options for action for domestic agriculture that can significantly improve its participation in the growth potential of the organic market. This applies to Germany as well as to Europe and the world (Klößner, BMEL, 2020).

The following graph, *Figure 2*, on soybean cultivation is intended to show consumption in animal production. The poultry industry has the largest share. Soy is by far the most important protein carrier in the animal finishing sector and is particularly essential in pig and poultry farming. Measured by the total consumption of 3.2 million tons of soy, chickens are in first place with 1.1 tons. This corresponds to about 95% of the total demand followed by pigs with 27% dairy cows 23% and laying hens 11%.

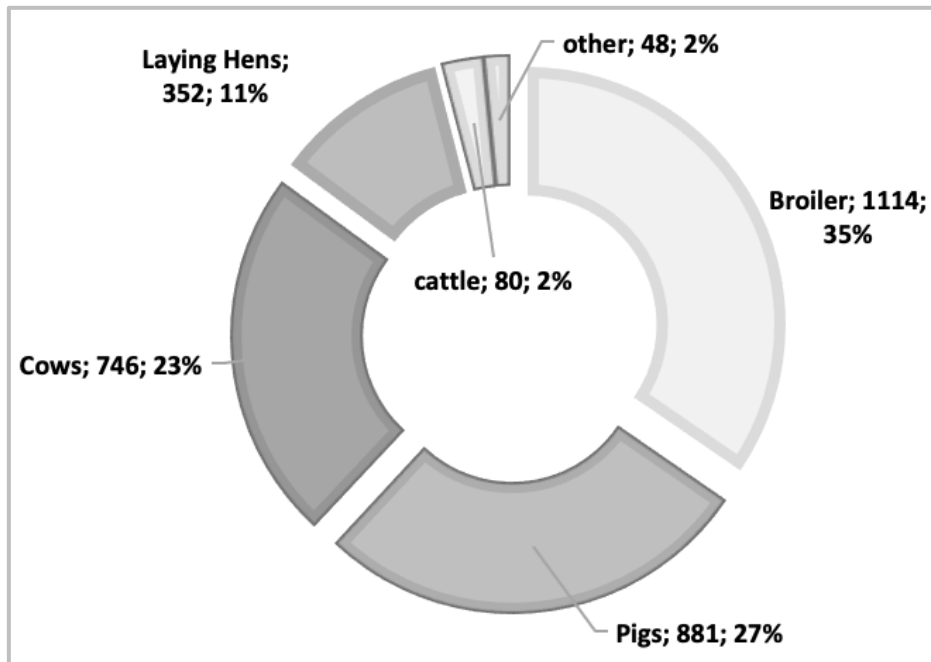


Figure 2: Soy Consumption for animal processing 2018 (1 000 t)

Source: Deutsche Umwelthilfe e.V. (2020)

Agricultural land by type of use in Germany

In recent years, the cultivation of legumes for animal finishing has steadily increased, see *Figure 3*. This applies to both soybeans and field beans, which are primarily intended for animal processing. There are no concrete figures on the share from organic cultivation. However, as it is difficult to obtain organic soy from third countries, this is likely to account for a high proportion, with an upward trend.

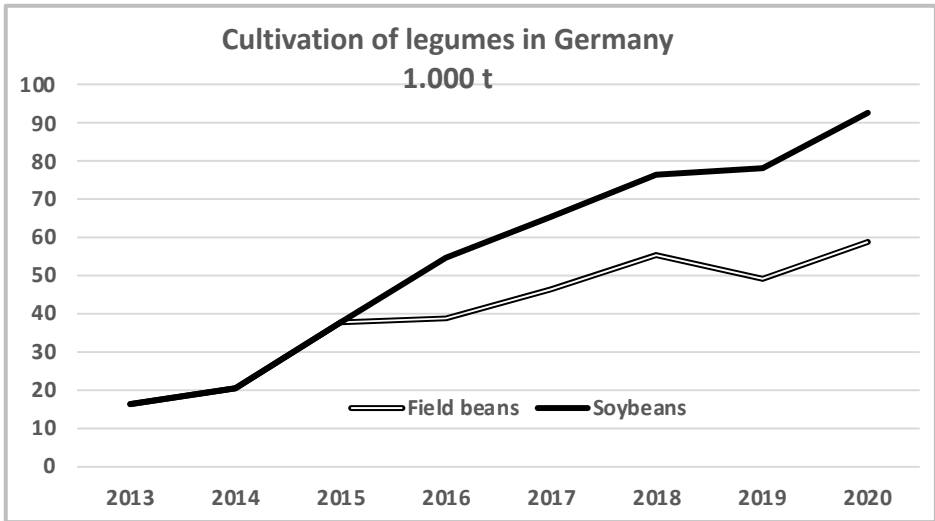


Figure 3: Soybean cultivation

Source: Stat. Bundesamt, BMEL (2021)

In Germany, 11.7 million hectares are used for arable farming, which is 70 percent of the arable land used for agriculture, see *Figure 4*. The remainder is divided between grassland (25 percent) and permanent crops. This makes arable farming a cornerstone of food security.

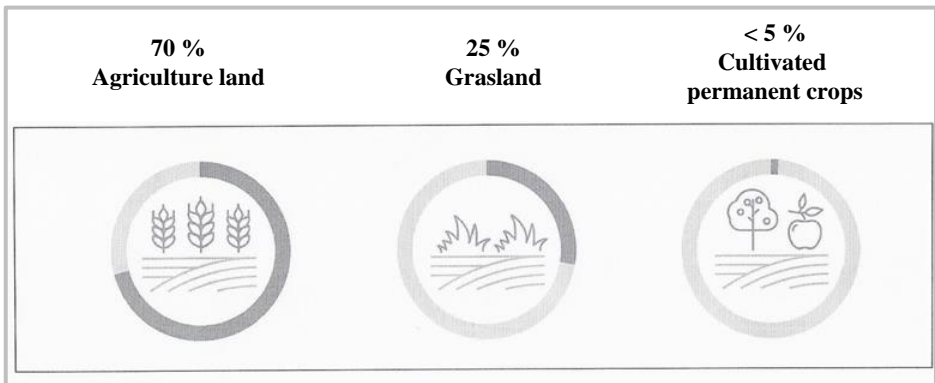


Figure 4: Cultivation areas in Germany

Source: Stat. Bundesamt (2020)

Production in Europe

Within the EU, Ukraine and Russia are the main producers of soy, followed by European countries with a total of just under 1 million tons, *Table 4*. Although the statistics presented show a slight decline in some countries, there should be further significant growth rates in the medium and long term. The cultivation area in the Danube Delta region is particularly interesting. There is extraordinarily great potential here, especially in Romania.

Table 4: Soybean production in Europe

Country	2019	2020	y/y change
<i>Ukraine</i>	1 590	1 446	-9,0%
<i>Russia (only European part)</i>	1 508	1 540	2,1%
<i>Italy</i>	273	290	6,1%
<i>Serbia</i>	229	240	4,6%
<i>Romania</i>	179	150	-16,1%
<i>France</i>	163	171	4,9%
<i>Croatia</i>	80	80	-
<i>Austria</i>	69	63	-1,7%
<i>Hungary</i>	60	58	-3,8%
<i>Germany</i>	28	33	14,2%

Source: Donau-Soja (2021)

The cultivation area of the farms that fall within the scope of the „Danube Soy” initiative mainly covers Central and Eastern Europe. Italy, Germany, Poland and Ukraine are only partially located in the Danube region.

For the production of one kilogram of animal products, large amounts of soy are used. Eggs and poultry meat account for the highest share, but these figures must be put into perspective in terms of slaughter weight. However, the diagram shows the high importance of soy in feed formulations. The production of 1 kilogram of chicken meat requires 575 g of soy, and 307 g for eggs. Pigs and cattle, on the other hand, require only 263 and 173 g per kilogram of meat, respectively, and thus significantly less than poultry (Hoste–Bolhuis, 2010).

This is also illustrated by the *Figure 5* below on the development of legume harvest volumes, which have increased significantly in recent years.

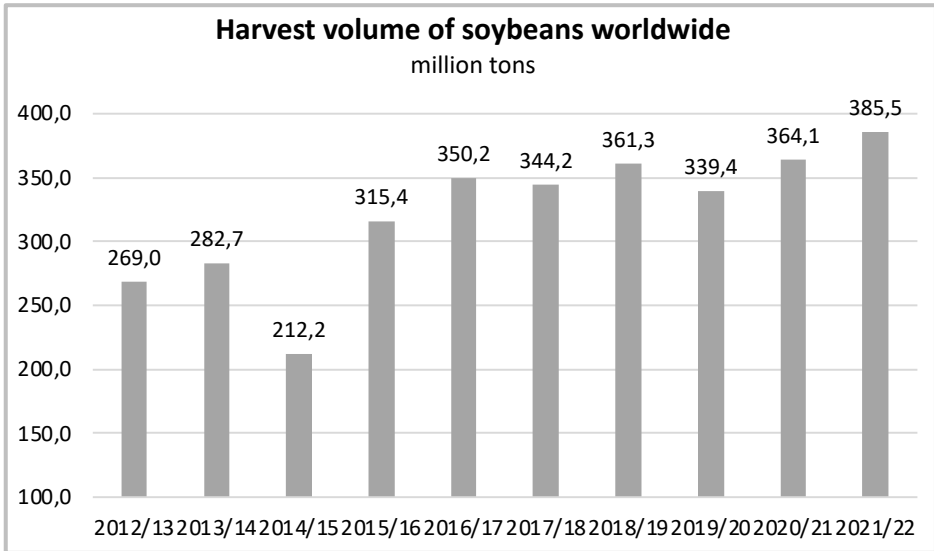


Figure 5: Production of soybean

Source: Statista (2021)

Global overview of soy

The European Union is the largest importer of soybeans. In recent years, the average import volume was 40 million tons, see *Figure 6*. Brazil accounted for the largest share with 39%, followed by Argentina and the USA. According to the European Soy Monitor, only 25% of imports were deforestation-free. This suggests that a very high proportion comes from regions that have been deforested. Therefore, it is important to limit the share of soy from such third countries and instead source more soy from the respective EU countries. This has a sustainable impact on CO₂ reduction. The use of soy from the Danube Delta has reduced the value by up to 41% (FibL, 2021).

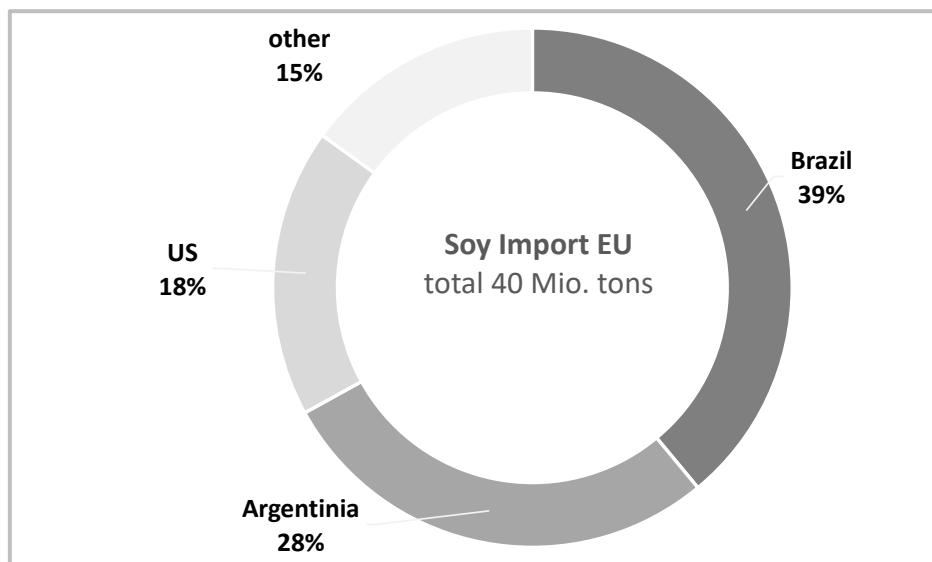


Figure 6: Import of Soy

Source: Donau-Soja (2021)

An interesting way of looking at this shows the vision of future production and consumption of soy in the coming years. The EU Commission wants to convert almost one third of the production of animal products to organic production by 2030. A vision that is hardly realizable from today's perspective. Looking at the development in the soy sector, it can be assumed that there will be a reduction in imports from the current main supplier countries, Brazil, Argentina and the USA. This is likely to reach a magnitude of one third. 50% of soy production is thus expected to come from European production in the future.

Soy of European origin is becoming more important

The European organic market has been growing for years, with growth rates in the plant sector in particular, while animal processing is still largely stagnating. With the exception of eggs, the share of animal products is still low, but the trend is moving in the direction of growth, not least due to the targets set by the EU Commission. Regional nutrient circles are thus moving more and more into the foreground. Marketers and

the food trade have also recognized this. The demand for animal production to be based on soy grown in Europe is increasing. This improves sustainability and enables greater transparency along the value chain and traceability back to the producers. Imports from Brazil, Argentina, the USA and other countries are associated with costs and high logistical effort. It is difficult to check for residues on site. This is especially true for GM soy, which dominates. Trade and consumers want sustainability, CO₂ reduction and no deforestation of rainforests. The organic sector therefore has high requirements, such as no use of genetically modified ingredients and a general ban on pesticides.

The EU organic regulation has clear specifications in this regard. In addition, EU regulations, but also the food trade and producers, demand consistent origin assurance and traceability along the entire process chain. Unauthorized residues in animal feed have repeatedly led to massive problems in the past. Regional cultivation and origins from European production not only stand for more sustainability, but also for more transparency. Certified cultivation requires controls via approved inspection bodies, which experience has shown to be more efficiently positioned locally to record and verify the legal and private-law requirements of the associations and institutions. Another important aspect is the preservation of agricultural structures. The promotion of soybean cultivation within Europe makes a significant contribution to preserving these. Therefore, importing from third countries is not an alternative in the long run.

Import requirements

Another extensively regulated area is the implementing rules for third country imports (Regulation (EC) No. 1235/2008). They are intended to ensure that agricultural products and foodstuffs from countries that do not belong to the EU are only freely marketed as organic goods in the EU if conforming or equivalent regulations apply in the countries of production, both with regard to production regulations and with regard to control measures.

The EU Commission has already reviewed and listed the production regulations and control systems in some third countries. By including these countries in Annex III of Regulation (EC) No. 1235/2008 (list of recognized third countries or list of third countries), the Commission has recognized that the production and control regulations of certain product

categories in these countries are equivalent to the regulations of the EU organic farming legislation.

As a consequence, only the listed products of these countries may be imported into the EU without a special marketing permit and may be advertised and marketed with a reference to organic farming. It is also a prerequisite that they have been inspected and certified by an EU-recognized or accredited inspection body.

Results and conclusions

The market for products from organic production is future-oriented. However, the question arises as to how far consumers are actually prepared to accept the higher prices in the long term in view of high inflation rates.

Animal husbandry and high meat consumption cause greenhouse gases. In order to increase regional food security and self-sufficiency, so-called non-governmental organizations (NGOs) have long been calling for a reduction in meat production. This is because it is the only way to free up land for the cultivation of plant-based foodstuffs directly for human use, and this has a positive impact on the climate.

A major role in climate change with a share of up to one third is associated with food according to estimates by the Intergovernmental Panel on Climate Change (IPCC, 2019) or up to 29% according to statements by the United Nations (United Nations, 2019). Animal products contribute the largest share of total global human-induced greenhouse emissions, up to 18% (FiBL, Klimaschutz und Ernährung, 2021).

According to this, a 50% reduction in meat, milk and egg consumption in the European Union would have a decisive effect on our environment. Nitrogen emissions would be reduced by 40%, greenhouse gas emissions also by up to 40% and the per capita use of arable land for food production by 23%. The EU could also become a net exporter of cereals, and demand for soy (primarily for animal feed) could fall by as much as 75% (Westhoek et al., 2014).

The EU Commission has therefore set with the so-called GREEN DEAL – strategies from producer to consumer and biodiversity. Climate change and environmental degradation pose existential threats to Europe and the world. According to the EU Commission wants to reduce green-

house gas emissions by at least 55% by 2030 compared to 1990. This includes, among other things, stopping deforestation and healthy soils. This can be achieved primarily in the organic sector, combined with conversion requirements for farms with crop production and the preservation and enhancement of soil fertility. This includes special soil cultivation and perennial crop rotations. Additive fertilizers and plant protection products may only be used if they are approved.

In the area of animal husbandry, this concerns conversion regulations for farms and animals of non-organic origin, area-based animal husbandry, feeding with organically produced feed, and maintaining animal health and promoting natural resilience. This also requires consistent measures in the conventional sector. However, all of this will come at a high cost, possibly leading to a reduction in consumption and, in turn, a reduction in acreage as demand shrinks.

The food retail industry supports the initiative for more soy from the EU in the interest of sustainability and avoiding unnecessary waste of resources. In doing so, clear accents are set, which primarily concern organic farming, but also the area of animal welfare.

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