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Modernisation of agricultural statistics

The role of imports on farmer's income

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1. Background and objectives of the project

European Court of Auditors raised the question about the role of imports in the Special Report 01/2016 among other questions.

Citation: The Commission has to date not adapted the EAAs to the new standards for national accounts and has not used the full potential of the EAAs by developing them further to provide information on the role of imports, developments in demand for agricultural products (domestic or foreign), supply to the food industry, final consumption by households, special treatment of agriculture in the tax systems or use for non-food purposes such as production of bioenergy (ECA, 2016).

The role of imports on farmers' income is still an open question. The project is set up to find necessary data and to set up calculation methods to answer the question. Expanding input and output tables by adding other available data and introducing new calculation methods shall allow getting more in-depth information from EAA.

This project is designed to show how with existing statistical data and additional data the role of imports on farmers' income can be estimated.

To answer the question the project is split into four parts:

- Part 1: Description of imports and their usage in German agriculture. This allows identifying goods, which are important for supply and having impacts on farmers' income or others without impact on agricultural income. The usage of goods with impacts has to be defined for the next step.
- Part 2: Which imported goods in the scope of the Economic Accounts for Agriculture (EAA) are of single- or multi-purpose for intermediate consumption in agriculture? Which quantities and values do these goods have?
- Part 3: Search for information and data to estimate the impact of imported intermediate goods on agricultural production value. Modelling calculation methods for further use.
- Part 4: Comparison with other MS (incl. CH) with data from these MS.

The question concerns the role of imports in relation to the generation of agricultural income. In order to answer the question, it is necessary to distinguish between imported goods by competing goods, i.e. goods that are also supply by domestic producers, intermediate goods, i.e. goods that are used to increase agricultural value added and 'neutral' agricultural goods which not compete with final agro-food products 'made in Germany' or 'domestic produced goods'. The imported agricultural goods are assigned to these categories in a first step. As a result, a list of foreign trade goods is drawn up. In this list, the goods are classified in the above-mentioned categories 'competitive', 'intermediate', 'neutral'.

After the assignment, the competing goods are examined for their use as intermediate consumption. Goods are classified in the categories 'single uses' or 'direct consumption' and 'multiple uses'. Their quantities and values are assigned to the respective groups of goods.

In the third step, the impact of goods of the category ‘competing’ on the domestic price level is examined. For this purpose, the available data from foreign trade and domestic producer prices are first compared. The aim of the analysis is to describe the effect or the relationship of imports on the level of producer prices in a given year. The result should be a computational model and an analysis model, which can be used for regular work.

Subsequently, the intermediate goods feed and fertilisers are examined. For this purpose, necessary computational models have to be developed and necessary basic data will be determined. The basis of this work are national supply balances, especially for animal products and feed. In addition, a comparison is made for fertilisers between the yield level of conventional agriculture and organic farming. The working hypothesis is that fertilisers allow an increase in production, which is not achieved by the renunciation of fertilisers in organic farming. Total use of fertilizers can be divided in domestic produced and imported products. The share of imported fertilizers has to be determined and the impact on farmers’ income calculated. As a result, the necessary key figures for the calculation should be determined and the calculation models supplied.

A final step is to show how the developed models can be used in other MS. For this purpose, the required data is sent to the MS and asked if this data is available in the respective MS.

At the end of the work, a model for determining the role of imports and the impact of imports on the income of agriculture emerges.

Authors of part 1 of the project are PhD Inna Geibel (Thuenen Institute) and Uwe Platz (BLE).

1.1. Introduction

The German agricultural sector plays a crucial role in the country's economy, contributing to food security, employment, and rural development. As an export-oriented economy, Germany has become increasingly integrated into global supply chains, leading to a growing reliance on imported intermediate products in various industries, including agriculture. This report aims to analyze the role of imports as intermediate products in income generation for German agriculture and assess the implications of this dependence.

1.2. Data Base GTAB for a first approach

To analyze the role of imports in German agricultural and food sector, Thuenen Institute utilized a combination of quantitative data analysis. The main source of data stems from the most recent Global Trade Analysis Project (GTAP) Data Base 11, see AGUIAR et al. (2022). This data base is a fully documented, publicly available global database containing complete bilateral trade information, transport and protection linkages. The GTAP Data Base represents the world economy and is utilized by thousands worldwide as a key input into most applied general equilibrium (AGE) analysis of global economic issues. While this data base represents 141 countries and 19 aggregated regions together with 65 sectors for each country or region, it also shows the bilateral trade relation between the countries/regions covered.

For this report, the focus is on the demand for intermediate goods in German agriculture from domestic and international sources. The GTAP database distinguishes 12 individual activities for agriculture.

1.2.1. Imports of agricultural goods compared with Domestic Output of German agricultural and food sector

Preamble: GTAB database includes data on trade with agricultural products done by companies in food sector. This is the reason for a higher than zero value of output of rice.

Table 1 shows the share of imports in the value of output and illustrates the different degrees of import dependence for the 12 agricultural sectors included in the GTAP database. In 2017, the value of agricultural production reached USD 54.2 billion and the value of agricultural imports USD 34.6 billion. Imported agricultural goods accounted for 64% of the value of agricultural production, with clear differences between the various agricultural production activities.

Table 1: Agricultural Imports and Gross Output Value in Germany, 2017, in mill USD

	Imports	Value of Output	Share of imports in value of output
Paddy rice	76.1	47.6	160%
Wheat	1,220.7	3,891.7	31%
Cereal grains nec	1,462.2	3,049.0	48%
Vegetables, fruit, nuts	13,264.0	7,944.4	167%
Oil seeds	3,797.6	1,653.5	230%
Sugar beet	28.3	1,139.8	2%
Plant-based fibers	221.5	103.1	215%
Crops nec (not elsewhere classified)	10,650.9	4,104.2	260%
Bovine cattle, sheep and goats	177.3	4,758.3	4%
Animal products nec	3,568.0	15,320.9	23%
Raw milk	26.7	12,091.9	0%
Wool, silk-worm cocoons	95.7	98.2	98%
Total agriculture	**34,589.1**	**54,202.6**	64%

Source: AGUIAR et al. (2022)

Import dependence is particularly high for paddy rice (no domestic production), fruit, vegetables and nuts, oilseeds, plant-based fibres and the Crops nec (not elsewhere classified) or oil-seeds and crops, which include tubers and bulbs of various plants, shrubs, bushes, spices, tea, coffee and forage plants. The share of imports in the production value of these agricultural products is over 100%, exceeding domestic production. The relative importance of imports, as indicated by the ratios, is particularly high for crops nec (260%)

and oilseeds (230%). In absolute terms, the highest value of imports in 2017 was for fruits, vegetables and nuts, at USD 13.3 billion.

Imports account for between 20% and 50% of the total value of production of wheat, other cereals (oats, rye, barley, maize, etc.) and poultry and pig farming. Although domestic production is predominant in these sectors, imports also play an important role and account for a significant proportion of the production value.

Imports play a minor role in ruminant farming, raw milk and sugar beet production, accounting for less than 5% of domestic production value. Raw milk in particular is rarely traded due to its rapid perishability, leading to an import share of approximately 0% in this sector.

With regard to the importance of imports relative to domestic production, the following categorizations of agricultural activities can be made:

Neutral goods:

- Paddy rice
- Vegetables, fruits and nuts, depending on product and season
- Oil seeds, depending on product
- Plant-based fibres
- Crops nec

In all these agricultural activities, imports exceed the value of agricultural production. However, it should be noted that these agricultural sectors include many goods. A detailed classification of the goods at HS8 code level can be found in the Excel file "Concordance_Cronos_HS.xlsx". In general, however, it can be said that these five agricultural sectors are primarily goods that cannot be produced in Germany, or not in sufficient quantities, for climatic reasons.

However, the fruit, vegetables and nuts sector in particular, as well as the oilseeds and other crops sector, comprises many different goods, many of which cannot be produced in Germany, but some of which can. The oilseed sector includes soya, rapeseed, sunflower seeds and other oilseeds. In the other crops sector, spices, tea and coffee in particular also lead to high import values, but this sector also includes some goods such as alfalfa or ryegrass, which are also grown in Germany. The same applies to the fruit, vegetables and nuts sector. This also includes goods such as bananas and coconuts, which cannot be grown in Germany, but also goods such as potatoes or apples, which are widely produced in Germany. This categorization of the sectors should therefore only be regarded as a rough indication and requires refinement.

Competitive goods:

- Wheat
- Cereal grains nec
- Animal products nec
- Wool, silk-worm cocoons

Imported competitive goods are in direct competition with domestic products as they fulfil similar needs or functions. However, the GTAP sectors include different commodities with different characteristics. For example, the cereals grains nec sector includes rye, barley, oats, corn and buckwheat. A detailed description of the sectors can be found in the attached Excel file "Concordance_Cronos_HS.xlsx".

In this section, a rough categorization of neutral and competitive goods was made. The following section deals with the role of intermediate imports.

1.2.2. Total Intermediate Demand in German Agriculture

The following Table 2 illustrate the relevance of intermediate demand in German agriculture. This table gives an impression of the importance of imported inputs in the value agricultural output and in agricultural value added.

In 2017, imported intermediate inputs contributed 21% of the total value added to the aggregated primary agricultural production in Germany. The figures in the GTAP database show clear differences between the individual sectors. While the shares are two-thirds or higher in the production of sugar beet or plant-based fibers, other agricultural sectors such as wheat and cattle, at 30% each, have significantly lower shares.

In 2017, German agriculture used almost USD 26.7 Billion worth of inputs. Around USD 5.7 Billion of this was accounted for by imported inputs and USD 21 Billion by inputs from domestic sources. The production of animal products used more than 62% of these inputs.

As GTAB includes agricultural and food sector, intermediate demand includes not only demand of farmers and agriculture but also parts of processing industry. Paddy rice is an example. Paddy rice is imported to and processed in Germany. It is also un-processed and processed exported.

Table 2: Intermediate Demand and Gross Output Value in Germany in agriculture and food sector, 2017, in mill USD

	Intermediate Demand		**Value Added**	**Value of Output**	Share of imp. Intermediate Demand in Value of Output	Share of imp. Intermediate Demand in Value Added	Share of Imports in total Intermediate Demand
	domestic	**imported**			(in per cent)		
Paddy rice	25.4	8.5	13.7	47.6	18%	62%	25%
Wheat	1,127.0	640.7	2,124.0	3,891.7	16%	30%	37%
Cereal grains nec	1,333.0	481.2	1,234.8	3,049.0	16%	39%	27%
Vegetables, fruit, nuts	1,879.8	438.5	5,626.0	7,944.4	6%	8%	19%

Oil seeds	599.6	237.9	816.1	1,653.5	14%	30%	29%
Sugar beet	661.7	200.7	277.4	1,139.8	18%	72%	23%
Plant-based fibers	56.3	18.8	28.1	103.1	18%	67%	24%
Crops nec	1,927.0	461.3	1,715.9	4,104.2	11%	27%	18%
Bovine cattle, sheep and goats	2,509.5	517.3	1,731.5	4,758.3	11%	29%	17%
Animal products nec	7,413.6	1,836.8	6,070.5	15,320.9	12%	23%	19%
Raw milk	3,469.1	842.4	7,780.4	12,091.9	7%	10%	20%
Wool, silk-worm cocoons	37.5	17.3	43.3	98.2	18%	40%	31%
Total agriculture	**21,039.5**	**5,701.5**	**27,461.6**	**54,202.6**	**11%**	**21%**	**21%**

Source: Aguiar et al. (2022).

In order to understand which intermediate goods are particularly important in which agricultural activities, a differentiated analysis of the demand for individual input goods from domestic and imported sources is required.

Intermediate Demand of Specific Inputs in Agriculture

In **general**, the following general intermediate goods are relevant for income generation in German agriculture:

Unprocessed agricultural inputs:

- Coarse grains in animal production, esp. for pork and poultry
- Sugar beet seeds in sugar beet production

Processed food inputs:

- Feed milk in animal production, esp. for production of cattle and for pork
- Compound feed in animal production, esp. for cattle

Industrial products:

- Chemicals in almost all agricultural activities
- Basic pharmaceutical products in livestock production
- Plastic and mineral products in livestock production
- Other manufactured goods, mainly for transport for arable crop production

Basic inputs

- Electricity predominantly in livestock production
- Construction predominantly in arable crop production

Services

- Trade and other services in all agricultural sectors
- Business services in all agricultural sectors with high cost shares arable crop production

In the case of **imported intermediate goods** with a cost share of over 5% (based on GTAB), the following sectors play a particularly important role:

Imported intermediate goods (over 5% cost share):

- Other crops
- Chemical products
- Pharmaceutical products

The 'other crops' sector includes fodder crops and accounts for 5% of the cost share of cattle farming. Other important imported intermediate goods are also supplied by the 'chemical' sector. The 'chemical' sector includes various chemicals, including nitrogen, phosphorus and potash fertilizers, and accounts for a high proportion of costs, particularly in crop production. The share of costs in relation to value added is particularly high in sugar beet (22%), but it is also between 10% and 12% in cereals excluding wheat, oilseeds and 'other crops' (forage plants, spices, etc.). For wheat, chemicals account for 5% of the costs.

Various pharmaceutical products have to be imported and mainly supply the livestock sectors. In the cattle farming and the poultry and pig farming sectors, pharmaceutical products account for 7% of the costs in relation to the value added. In addition, in the dairy cattle sector imported pharmaceutical products accounts for 2% of the costs.

The cost shares are calculated with results of GTAB with data status of the year 2017.

There are other sectors with lower cost shares of 1% to 5%. Most of these goods have already been categorized as competitive goods, but certain imported goods from these sectors also supply inputs to other agricultural sectors.

Imported intermediate goods (cost shares of 1% to 4%) (GTAB, 2017):

- Wheat and other cereals in pig and poultry farming
- Fruits, vegetables and nuts in cattle and dairy cattle farming
- Other crops including fodder crops in pig and poultry farming, dairy cattle farming, but also sugar beet production
- Vegetable oils and fats including flours and meals of oilseeds in dairy cattle farming
- Feed milk in pig farming and cattle farming
- Other foods including processed feeds in cattle farming, pig and poultry farming and dairy cattle farming

2. Work package 1

2.1. WP 1.1 Classification of Imported Goods[1]

The effect of imported goods on agricultural income and value added depends on the type of imported good. In this project, a distinction is made between competitive, intermediate and neutral goods.

Competitive imported goods: Competitive imported goods compete directly with domestic products by fulfilling similar needs or functions. Consumers can choose between imported and domestic options based on factors such as price, quality and other characteristics. Competitive markets are characterized by a large number of sellers and consumers (SU and ANG, 2013).

Neutral imported goods: Neutral imported goods are goods that are not in direct competition with domestic products because they cannot be produced domestically in sufficient quantities to meet domestic demand at the prevailing world price, adjusted for transport costs and in the absence of trade barriers (PETER GRAY, 1986). A country imports such goods if these goods cannot be produced domestically or cannot be produced in sufficient quantities domestically for climatic, geological or other natural reasons, but there is a demand for such goods. The same considerations apply to manufactured goods; certain countries may not be able to meet demand through domestic production, e.g. because they lack technical expertise (ROSE and SAUERNHEIMER, 2015).

Neutral, non-competitive goods require specific factors of production in their production process. According to PETER GRAY (1986) there are four categories of non-competitive imports:

Category 1: These goods cannot be physically produced domestically because a necessary natural resource is lacking. Domestic consumption is entirely dependent on imports, unless a domestic source is discovered or acquired in the future.

Category 2: These goods have some domestic production but with zero elasticity of supply at the current price. Imports bridge the gap between domestic supply and demand, particularly in densely populated countries with limited resources.

Category 3: Similar to category 1, these goods cannot be produced domestically due to the unavailability of a specific factor, which could be proprietary technology or industry-specific human capital. However, it is expected that these goods will eventually be produced domestically as technology becomes accessible or human capital develops.

Category 4: These goods may not be able to compete with foreign production because the domestic market is too small to achieve economies of scale.

Neutral, non-competitive imported goods differ from competitive imported goods produced with available factors of production and may require special conditions or development to enable domestic production.

[1] PhD Inna Geibel, Thuenen Institute

Intermediate imported goods: Intermediate imported goods may include raw materials, intermediate products, or inputs integrated into the production process of domestic goods. These imported goods may not be directly sold to end-consumers but play a crucial role in the supply chain of domestic production (SIEBERT and LORZ, 2006).

2.1.1. Problems in assigning categories

Intermediate imported goods are not necessarily assigned to one use. In EAA is a clear distinction between different types of use of a product. All crops harvested and sold or processed at farm contribute to production value. All products accounted as intermediate product assign to intermediate products.

In foreign trade this distinction is not given. For example cereals, seeds are distinct between for sowing and other use. For cereals for sowing CN-code and data are available. Other cereals are not further distinct between use for human nutrition, industrial use or fodder.

Comparing price levels needs prices in EAA and foreign trade. EAA has no prices for cereals for sowing, as no statistics are available. Foreign trade has a mixed price for all qualities of imported cereals. EAA can show prices for different kind of use of cereals.

According to this fact, a wider approach then comparing price levels between EAA and foreign trade is necessary to describe the role of imports on farmer's income. In case of intermediate products, it is important to follow the chain of value addition. Therefor the use of an imported product has to be clarified. For example piglets imported will be fattened by farmers and sold to slaughterhouse. Value addition is on farm and needs the imported intermediate product. It is permissible to assume that production would not happen without imported piglets. It is a situation of yes or no.

Animals imported for use like heifers and cows or pure-breed animals are more complex in their contribution to farmer's value addition. The products delivered by these animals are not in the same period as the import. They serve for more periods. A model and assumptions about the possible annual contribution may show the role on farmer's income.

Seeds are also difficult to estimate in their impact. Foreign trade do not answer the question whether the seed imported is for breeding or certified seed for intermediate consumption. The effect is huge. Certified seed multiplies with usual factor from seed to harvest. Seed for breeding has more stages of propagation and higher multiplication on their way to final harvest.

Fertilizers are even difficult to estimate in their impact on farmer's income. Depending on the level of availability and price, they will be used more or less in different crops. To decide for which crop fertilizer will be used in higher quantity is extremely difficult. This project tries to make some efforts.

2.2. WP 1.2 Concordance table between CRONOS-Code and HS-Code

For further analysis is it necessary to integrate data from foreign trade into EAA. In a first step a concordance table is drawn up to show, which goods correspond with CRONOS-Code of EAA.

The concordance table is expanded by categories “competitive”, “neutral” and “intermediate”. This allows analyzing whether HS-Codes have enough information about the products for further work or not.

In Excel-file “Concordance_Cronos_HS.xlsx” HS-Codes are assigned to CRONOS-Codes of EAA. The list of CRONOS-Codes is reduced to goods, which can be analyzed at EAA-level and do not need further input from National Accounting. Goods belonging to services or capital formation are not included in the concordance table.

2.2.1. Results of analyzing accordance between CRONOS- and HS-Codes

The Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization (WCO).[2] Harmonized System is designed for international trade. Depth of categories of goods is not corresponding to depth of EAA calculation model. At the level of the CRONOS codes, the HS code can match, but does not always have to. An example is soft wheat and spelt (CRONOS-Code 01110, HS-Code 10019900), which is included in both code lists. Soft wheat and spelt includes wheat for nutrition like for flour production in mills, animal feed like for compound-feed production or direct consumption on farms and for industrial use like starch production. At the level of usage different qualities can be of importance for product price. These aspects cannot be analyzed at HS-Code level. It is only possible to get the quantity and value from foreign trade and from EAA for further investigation.

These restrictions limit the possibilities of analyzing the role of imports on farmers’ income. Nevertheless, it is possible to compare unit values at aggregate level instead of price at product level.

The distinction between “competitive” and “intermediate” is difficult for some goods at CRONOS- and HS-Code level. As described above soft wheat and spelt is used for nutrition and industrial use and in these uses a competitive product at farmers’ level. It is also used as fodder either in compound-feed production or directly at farms. For this use, it is an “intermediate” good. In Germany in EAA compilation, it is possible to distinguish between wheat for nutrition, industrial use or fodder. Quantities and prices are available. HS-code cannot give information at that level of detail.

A problem for analyzing whether a good is “competitive” or “neutral” is seasonality of products. Fresh fruit and vegetables grow in Germany during spring, summer and autumn with a peak in summer. During growing period, imported goods compete with domestic production. Outside growing season, imported goods have the status “neutral”.

Some European Member-States have possibilities to grow plants that are not possible to grow in other Member-States. Examples are banana, citrus and olive. These fruits are “neutral” products in Germany because they do not compete to domestic production. At European level all crops in EAA tables grouped by CRONOS-codes are competitive products. The status of a neutral product is only possible for a few agricultural products that are not grown in a Member-State.

[2] https://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx, 2024-08-28

In Europe, the span of growing season is very wide. In the north of Europe, growing season is restricted to late spring, summer and early autumn. In southern Europe climate allows even in winter the production of fruits and vegetables. Member-States have to check whether the German assignment of goods to the categories suits or not for their agricultural production. Results may differ depending on the assignment following agricultural production at Member-State level.

Processed products of agricultural basic products reported in HS-system can influence domestic price levels. These products do not directly assign to CRONOS-codes and are not part of this project. In processed products, value added is included and processing is one or more steps behind agricultural production. To find out which effect imports of processed goods have in domestic market, an equilibrium model is necessary. In such a model, quantity and price of food-industry supply has to be regarded and additional industrial production costs. Industrial production costs are independent from agricultural production and price of agricultural products. According to this fact, processed products are excluded from this study. These products are not directly competing at the level of agricultural products.

2.2.2. Comparison of unit values

In EAA products at CRONOS-code level are aggregates of native products. Quantities and production value are also aggregates. Division of production value and quantity calculates a unit value for the products at CRONOS-code level. In foreign-trade, the same calculation is necessary to get a unit value. Direct comparison between products sold by farmers and products in foreign-trade is not possible.

Foreign-trade distinct products by HS-Codes. HS-codes include one or more native products. For example wheat with HS-code 10019900 wheat and meslin (excl. seed for sowing, and durum wheat) includes quality for milling and quality for animal feed. Prices for the qualities differ. Data in foreign-trade database sum up all qualities recorded under this code. A price resulting by division of value by quantity is the respective unit value.

In EAA CRONOS-code 01110 includes the same qualities of wheat as HS-code 10019900. As for HS-code, for CRONOS-code only unit value can be calculated. Both unit values are at the same level of aggregation and are comparable.

It is not possible to construct for all CRONOS-codes equivalent aggregates of HS-codes. A good example is wine. Wine in EAA sums all growing areas of a Member State. Wine is distinct between table wine and quality wine. There is no distinction between kinds of packaging like bottle size, bulk or other. HS-codes are available for different growing areas, bottle size and bulk. Wine in bottles is only a part of all sales of wine producing farmers. Manufacturers buy must or wine, prepare wine, fill it in bottles and sell it domestic and international. Manufacturers do not belong to agriculture in EAA. This makes it necessary to exclude wine from manufacturers in foreign-trade when building aggregates. However, there is no possibility to find out whether a bottle of wine is from an agricultural unit or from a manufacturer. Another problem is the value of the bottle, which is included in the sales price of wine. The bottle price depends on the type of bottle and varies. This makes a comparison between EAA unit value and foreign-trade unit value nearly impossible.

A first step is to compare unit values of products in EAA at CRONOS-code level with import and export prices. Therefore, products in foreign-trade have to be grouped by HS-codes according to concordance list. As products in foreign-trade are more disaggregated sum of quantity and value is necessary to calculate unit value for the group of products.

Some products are easy to group and compare. For other products, assumptions are necessary about whether a product will fit in the group or not. A third type of products is incomparable by unit value of EAA and traded goods. To compare prices, goods in foreign-trade assigned to CRONOS-code have in some cases to be split into parts, which can be compared, and others, which cannot be compared.

Comparing prices allow showing, whether unit value in EAA is higher or lower than in foreign-trade.

2.3. Work package 1.3: Definition of categories of usage[3]

In the following a definition for the classification of imported intermediate goods is presented as part of task 1.3. Intermediate inputs are divided into two categories:

Intermediate inputs used for single use: These are inputs primarily used for a specific production activity. They have a specific task or are tailored to a specific process. In general, the use of this input in other activities is not feasible or not efficient compared to other inputs with similar functions.

Intermediate inputs with multiple uses: These are inputs that are used in several production activities. They are resources that can be allocated to different tasks or processes within the production system.

In agriculture, most intermediate inputs are used in different sectors of production. Among the most important imported inputs are chemical products such as plant protection products and fertilizers, which are used in various areas of arable farming, particularly for sugar beet production, but also for other crop sectors such as wheat and cereal cultivation, horticulture, oilseed cultivation and other crops. Pharmaceutical products play a particular role in livestock farming and account for a relatively large proportion of costs compared to the value added in cattle farming, dairy farming and pig and poultry farming. Forage and processed animal feeds are used in various areas of animal husbandry, e.g. in cattle, dairy, pig and poultry farming.

2.4. Work package 1.4: List of goods by categories of usage

Imported goods for intermediate consumption in some cases can be of single possible use and in other cases of multipurpose use. Typically, goods for direct consumption are products with one possible use. Seeds for sowing or eggs for hatching are good examples for goods with one possible use. In Germany, the impact on farmer's income can only be estimated. Essential data for calculation are missing in HS-code.

2.4.1. Seeds for plant production

In HS-code, seeds are not distinct between different stages of development. Regarding seeds, a distinction between pre-basic seeds, which need further propagation and certified

[3] PhD Inna Geibel (Thuenen Institute)

seeds for sowing, is not possible due to missing distinction in HS-code. Imported pre-basic seeds need further domestic propagation before selling to farmers. A small quantity of seed has a high impact on farmer's income two years after import. The impact correlates to the factor of output after propagation.

To estimate the impacts of imported seeds on farmer's income some assumptions are necessary. First, it is important to set the extreme values at both sides of the estimation interval. One assumption is that all imported seeds are pre-basic seeds. The other is that all imported seeds are certified seeds. Seed imports are between these extremes of estimation interval. Second important estimation is the factor of propagation. Quantity of seed per hectare can be taken from guidelines for production for respective plants. Quantity of harvest should be equal to harvest of this kind of plants in the regarded year. Usually, not the complete harvest of a propagated variety is accepted. A reduction on harvest quantity is necessary. The factor is not available in agricultural statistics and is estimated.

Estimation is easily possible for cereals or potatoes by using known data about quantity of seed and quantity of harvest per hectare. Other plants like sugar beet or vegetables are much more difficult to estimate. Seed and agricultural product are not the same. Quantity of harvested seed do not correspond with quantity of product in final production.

2.4.2. Role of imported goods in animal production

Soft-wheat for fodder is an example for multipurpose use. Farmers can buy soft wheat at the market and use it at the farm for feeding animals (directly or in on farm produced compound-feed). Compound-feed industry can buy soft wheat for fodder as intermediate product for compound-feed production.

To estimate the quantity of direct use on farms and indirect use via industry, data about industrial input and direct use on farms are necessary. In Germany, these data are available from national supply balance.

Animal production depends on domestic produced fodder or by additional imported goods. Imported fodder can reduce costs of intermediate consumption or it allows expanding animal production beyond the domestic production limits given by fodder availability. Both cases have impacts on farmer's income. Cheaper animal feed reduces production costs and allow a higher profit in animal production. Additional quantity of animal feed makes a larger production possible. Farmers profit from larger quantity.

To find out whether imports only reduce fodder costs or allow expanding the animal production it is necessary to calculate the national fodder supply and fodder consumption. For this study, an old approach of calculating national fodder supply is used.

2.4.3. Limits of investigation in intermediate products

Plant products used as intermediate products can in certain cases be competitive products too. In those cases a distinction of imported quantities is necessary. In HS-codes this distinction is not given. In one HS-code all kind of quality for all kind of usage are summarized. This does not allow to further investigate when regarding unit values for defined kind of usage.

For example wheat is used for nutrition, industrial use and as fodder or for compound feed production. To estimate the role of imported wheat an approximate calculation is required. In this approximation, the sales of agriculture to users are determined first. Those quantities shall be deducted from the consumption of those users. In parallel, these quantities shall be deducted from the quantity available from domestic production. Exports and final stocks are also deducted from the quantity available from domestic production. The remaining amount is distributed among the users in the order of food, industry, and feed. The remaining demand quantity corresponds to the import quantity. The quantities of the domestically produced product not available in the respective uses limit the production of products in that use.

This consideration includes assumptions about the order of use. These limit the statement of the calculation results. In addition, no statement about prices is possible with this method. The model can only be used for quantitative considerations.

2.5. Work package 1.5: Examination of the price level for defined goods. Comparison of producer price, import price and export price

2.5.1. Cereals

To compare cereals price level it is necessary to compare unit value of EAA and unit value of foreign trade. As described above in foreign trade all qualities are summed up in one value. Unit value in EAA is at the same level.

For soft wheat Pearson coefficient is 0.98 between EAA and import as well as export. Wheat market is a transparent market and prices do not differ. Foreign trade influences domestic market and import price determines domestic price.

Durum wheat is different to soft wheat. Pearson coefficient of import is 0.80 and of export 0.55. Durum production in Germany is small and depends on weather conditions and it can happen that larger parts of harvest are not of sufficient quality. Exports may be determined by re-exports of imports done by trading companies.

Grain maize shows a Pearson coefficient of 0.95 in comparison with import and 0.97 with export. Influence of import price on domestic price is like wheat.

Rye and meslin show different correlation. Pearson coefficient of imports is 0.98 and of exports 0.76. Price in foreign trade is significantly higher than in EAA. A reason can be, that in EAA price higher quality for nutrition and lower price for fodder is included. It seems that in foreign trade, rye for fodder has only low quantity and most of the traded rye is for nutrition.

Barley includes in foreign trade quality for fodder and for brewery or nutrition. The same is in EAA. The Pearson coefficient of import is 0.87 and of export 0.95. Import and export price is always higher than EAA price.

Oats and summer cereal mixtures show a Pearson coefficient of 0.51 in import and 0.59 in export. For oat, it can be assumed that foreign trade price has no or low impact on domestic price.

Triticale, which is in Germany reported under ‘other cereals’ has a correlation of 0.97 in import and 0.92 in export. Here it seems also to be a dependency between foreign trade price and domestic price.

2.5.2. Raw tobacco

To compare raw tobacco between domestic market and foreign trade need an assumption. Raw tobacco has to be dried after harvest to be storable. This is a kind of preprocessing. The assumption is that imported and exported raw tobacco is at the same level.

Import price is two or three times higher than domestic price. Pearson coefficient is at 0.49. This level is too low for assuming an impact of import price on domestic price. It may be that raw tobacco in import is more processed than farmer’s products.

Export price shows a Pearson coefficient of 0.24. At this level no impact of export price on domestic market can be assumed. As mentioned before, it may be a different understanding of raw tobacco between EAA and foreign trade.

2.5.3. Wine

In introduction to this chapter, some problems about comparing unit value of wine in EAA and foreign-trade are shown. Wine shows some changes in the last years in HS-codes. Wine today is distinct between growing area, bottle size and bulk (larger than 10 liters). It is difficult to compare wine in bottles from defined growing areas with domestic produced wine. Consumers preferences play a crucial role for imports of wine from defined origins and especially for the import price.

A possible solution in Germany is, to compare wine in bulk. For this, it is not possible to stay at the level of CRONOS-code. Germany has a price reporting system for wine in bulk. These prices are comparable to wine in bulk (larger than 10 liters) in foreign-trade.

Price data for domestic sales of wine in barrel/bulk are available. These prices are used for the comparison with unit value in import and export. For Germany graphical analysis of unit value of wine in bulk for domestic sales, import and export show different price levels. Due to changes in HS-codes from the year 2016 to year 2017 a time-series is only possible beginning with the year 2017. Unit value of imports is lower than unit value of domestic sales in barrel/bulk. Unit value of exports is higher than unit value of domestic sales. The difference of imports to domestic sales is larger than between domestic sales and exports.

Trend lines are nearly parallel and with a nearly constant difference.

2.5.4. Animal production

For the animal species cattle, pigs, horses, sheep and goats and poultry (Cronos 11100 to 11500) the annual producer prices as unit values from the EAA were compared with the import and export prices for breeding and livestock animals for the period 2012 to 2023. Import and export prices were calculated from the foreign trade statistics (Destatis) as average unit values by dividing import and export values by the volume of trade. The corresponding commodity tariff numbers (HS code) were defined in work package 1.2 for the individual animal species. In work package 1.4 the classification was made into competitive goods, intermediate products and neutral products. The imported breeding and farm animals are in competition with comparable animals of domestic producers, but not on the

consumer level. Imported breeding and farm animals are used as intermediate goods for further production and are therefore classified as intermediate products.

2.5.4.1. Methodological note

When comparing import and export prices with the unit value as producer price, it should be noted, that those concern to different categories of animals. For example, the EAA for pigs in Germany is strongly dominated by sales of pigs for slaughter, while import prices relate to piglets and breeding sows. Imported slaughter pigs are not included in the EAA because they do not contribute to home farmers' income and are recorded in another account of the national accounts. For poultry, the import price refers to chicks or hatching eggs, while the unit value of the EAA is determined by the sale of slaughter poultry or consumer eggs. The same applies to the other animal species, with the exception of horses. In the case of cattle, sheep and horses, the number of animals imported for breeding and fattening is low in Germany. There is hardly any influence of import prices on producer prices or output value.

2.5.4.2. Results pigs

In the pig sector exists a strong link between the import prices of breeding and productive livestock - gilts and piglets - with the unit value in the EAA as producer price (*Excel file: Price comparison livestock; Sheet: Price comparison pigs*). The correlation coefficient for the period under review from 2012 to 2023 is 0.89. The correlation coefficients between the producer price and the import and export price of all pigs, including animals for slaughter, are even slightly higher, at 0.91 and 0.92 respectively. The annual change in foreign trade prices and producer prices for pigs in Germany is more or less aligned. On average between 2012 and 2019, the import price per ton for piglets (and gilts) was quite stable 30% above the producer price level. Between 2020 and 2023, fluctuations in the price difference have increased. This was probably triggered by factors such as coronavirus, supply bottlenecks, the war in Ukraine, high energy costs and structural breaks due to the sharp decrease in pig production in Germany and neighboring countries. However, the similar trend in prices over a longer period shows that the German pig market is strongly integrated into the European market of the neighboring countries. This indicates a high level of competition and market transparency. Due to the great importance of the German pig market in the EU, it is assumed, that the domestic price level normally determines import prices and not vice versa.

2.5.4.3. Results poultry

Millions of imported chicks into Germany have an impact on the domestic production of poultry meat and eggs. The comparison of import prices with producer prices (*Excel file: Price comparison livestock; Sheet: Price comparison poultry*) is limited because the prices for chicks per ton are many times higher than the producer prices for the final product of slaughter poultry. For total poultry, the correlation coefficient between unit value of EAA and import price is 0.65, including 0.26 for chickens and 0.71 for turkeys. In the period under review from 2012 to 2023, import prices for poultry chicks per ton roughly doubled, while unit value rose only a bit more than 30%. It is also striking that during the period under review poultry imports decreased by around 44% in number and weight, while exports grew by almost 40%. Since 2018, the export volume has exceeded the import volume. The formerly negative trade balance has become positive. Imports and exports with breeding (grandparent and parent female chicks of fowls) and direct usable chicks for fattening are the most important in terms of value. From the comparison of the EAA's external trade prices with the producer prices, it is initially not possible to deduce a strong correlation.

Import and export prices for live breeding animals are developing more dynamically and fluctuate more strongly than the Unit Value for slaughter animals. The import has an effect on the value of production not by price, but by quantity (see Work Package 1.6.)

2.5.4.4. Results cattle

Imports of breeding animals of the bovine species (excluding calves) have fallen continuously since the beginning of the period under review in 2012 (*Excel File: Trade data and prices; Sheet: Cattle and calves*). Over the past three years (2021 - 2023), they amounted on average only to 5,800 units worth 7.4 Million Euro per year. This compares with an average of 75,400 animals exported to the value of 119.6 Million Euro. Although the number of imported breeding animals of cattle is low, it is statistically possible to establish a link with the producer price from the EAA, the correlation coefficient for the years 2012 to 2023 is 0.94. Due to the low level of imports, an impact of import prices on the producer price and production value should be excluded.

2.5.4.5. Results calves

The same applies to imports of the bovine species weighing less than 80 kg, i.e. calves. Since 2018, this has amounted to only a few hundred animals per year *(Excel File: Trade data and prices; Sheet: Cattle and calves)*. The small number of units leads to strong fluctuations in the import price, which has no statistical connection with the unit value of the EAA, the correlation coefficient is -0.15 *(Excel file: Price comparison livestock; Sheet: Price comparison cattle)*. Significant exports of calves in Germany have a greater influence on the domestic producer price and production value. From 2021 to 2023, these amounted on average to 622,500 units a year, worth around 100 Million Euro. The development of the export price shows a certain connection with the producer price, the correlation coefficient is 0.69.

2.5.4.6. Results sheep and goats

The import of sheep and goats as breeding animals in Germany is limited to very few animals and does not matter. There is also no statistical correlation between import prices and the unit value from the EAA with a correlation coefficient close to zero. Imports of lambs are important. As a rule, those are not used for further production, but are imported as animals for slaughter. They don´t have a direct income effect for the domestic producers in the systematics of EAA.

2.6. Work package 1.6. Developing calculation models for analyzing the impact of foreign trade

A calculation model using available data from EAA and foreign trade is necessary for implementation of this analysis in regular work process of EAA. Two examples are given for the animal sector.

In the area of animal production, according to the price analysis in Work Package 1.5, imports of pigs and poultry have the greatest potential to affect the value of production or farmers income. In an initial calculation, an attempt was made to determine the contribution to production value.

2.6.1. Pigs

2.6.1.1. Import Piglets (HS 01039110)

Piglets, but also gilts, are imported into Germany for the production of fattening pigs. In order to calculate the importance of piglet imports, it is necessary to determine the difference in weight between the imported piglet and the finished pig for slaughter. The difference in live weight is multiplied by the producer price of the slaughter pig; one gets the increase in value per animal. The increase in value per animal has to be multiplied by the number of all imported piglets in a year. After taking into account a loss rate in the fattening period (assumption 3%), one obtains the added value through the piglet import and can calculate the share of the production value *(Excel file: Price comparison livestock; Sheet: Calculation import share pigs)*.

Example 2023 Germany:

> (Slaughter pig 123.88 kg - imported piglet 26.84 kg) x 1.88 Euro/kg Slaughter pig price = 182.18 Euro added value per import piglet.
>
> (182.18 Euro x 8.36 Million imported piglets) / 1.03 due to 3% loss rate fattening = 1.479 Billion Euro. The 1.479 Billion Euro account for a share of 16.5% of the total production value of 8.93 Billion Euro.

2.6.1.2. Import breeding pigs (HS 01031000)

In the case of imported gilts, it has to be determined, how many slaughter pigs such a sow produces on average per year. In Germany, after taking account of piglet losses (16%) 31 reared piglets per year are assumed (https://www.nutztierhaltung.de/schwein/sau-ferkel/). With 3% animal losses in fattening, around 30 pigs for slaughter are produced every year due to the import of a gilt. The number of imported sows is covered by HS Code 01031000 (Pure-bred breeding swine). However, this also includes boars as male breeding pigs. There is no clear distinction between boar and breeding sows, but the latter are clearly in the majority. For calculating the contribution of imports of breeding sows to the production value, the total number of imported gilts shall be multiplied with the number of slaughter pigs produced from them. To get the value, that figure has to be multiplied with the slaughter pig price.

Example Germany 2023:

> 20,700 imported breeding sows x 30 slaughter pigs produced from them = 621,000 slaughter pigs per year.
>
> 621,000 pigs for slaughter x 123.9 kg live weight x 1.88 Euro/kg live weight price = 144,7 Million Euro. This corresponds to a share of 1.6% of the production value of 8,93 Billion Euros.

2.6.1.3. Results pigs

Around one fifth of the EEA production value in Germany for pigs is based on the import of piglets and gilts *(Excel file: Price comparison livestock; Sheet: Calculation import share pigs)*. The average level between 2012 and 2023 was 20.2%, equivalent to 1.52 Billion Euro a year. It is striking, that over time the percentage share of imports of sows on the total production value has decreased from 6.2% to 1.6%, while the percentage of imports of piglets has increased from 12.8% to 16.5%. One reason for this is the sharp decline in the keeping of sows in Germany, which is more pronounced than the loss in the production of fattening pigs. The methodological approach for determining the importance of imports can also be applied to other EU Member States. There, if necessary, the parameters weights, prices or loss rates have to be adjusted to the country-typical level.

2.6.1.4. Poultry

For poultry as a whole, the export value of chicks and young chicken in Germany during the period under review is always higher than the value of imports *(Excel file: Trade data and prices; Sheet: Poultry)*. For some years now, the number of chicks or young animals exported has also surpassed imports. Nevertheless, importation is important for the production process and the income of agricultural producers. Calculating the import importance of breeding and productive livestock in poultry is sometimes complex. This is due to the importation of breeding and propagating chicks (grandparent and parent female chicks of fowls) for the production or use of parent animals that produce hatching eggs, which then produce broilers and laying hens. An imported parent chick is thus responsible for many hens producing broilers and laying hens.

There are few problems with the model for determining the import significance of chicks with a direct use for chicken fattening or egg production. However, animal losses and performance data have to be taken into account *(Excel file: Price comparison livestock; Sheet: Calcul. Import share poultry)*.

2.6.1.4.1. Calculation model chicken fattening (HS 01051199)

Number of chicks imported - loss rate fattening (3.5%) = broilers produced by import. Subsequently: (slaughter volume/ton – import weight chicks/ton) x price broilers/ton = value of production by import.

Result:

> In Germany, the production value of imported direct usable chicks for fattening in 2023 was 137.5 Million Euro, responsible for 6.2% of the total production value of chicken fattening in the EAA. On average between 2012 and 2023, this average was higher with 10.4% because imported quantities decreased over time.

2.6.1.4.2. Calculation model laying hens (HS 01051191)

Number of chicks imported - loss rate in the laying period (half of 7% i.e. 3.5% because not all die at the beginning) = producing laying hens through chicks import. Then: (Producing laying hens x laying capacity per year) x (average weight of egg) = egg production in ton. Egg production in ton x egg price/ton = value of production by import.

In addition, the proceeds from the meat marketing of laying hens are added, in Germany usually called soup chicken. To determine this, the number of producing laying hens from chick's imports shall be multiplied by the average slaughter weight and then multiplied by the price of soup chickens. One obtains the meat value of imported farm chicks of laying hens.

Result:

> In Germany, the production value of imported direct usable chicks for laying hens amounted to 181.0 Million Euro in 2023 and accounted for 7.1% of the production value for egg production, including soup meat *(Excel file: Price comparison livestock; Sheet: Calcul. Import share poultry)*. For the total period between 2012 and 2023 this average was significantly lower at 2.7%. In recent years, however, the volume of imports of laying hen chicks into Germany has increased significantly, reaching a record level of 3.85 Million in 2023, according to DESTATIS. One reason may be the ban on killing male chicks and a lack of pullets.

2.6.1.4.3. Calculation model breeding and propagation chicks

Chicks are not only imported for the direct use in production, but also as female parents for the production of hatching eggs. In terms of value, the most important are the grandparent and parent female chicks fowls of the species Gallus domesticus of a weight of <= 185 g excluding laying stocks (HS 01051119) to produce fattening chicken. Their imports have recently increased sharply, reaching almost 7 Million animals each year in 2022 and 2023. Imports of grandparent and parent female chicks of fowls of the species Gallus domesticus laying stocks of a weight of <= 185 (HS 1051111) for egg production have also experienced strong growth recently. According to foreign trade statistics *(Excel file: Trade data and prices; Sheet: Poultry)*, a new record volume of 1,15 Million chicks was imported in 2023. The ban on the killing of male chicks and high prices for pullets are likely to have led to that increase.

2.6.1.4.4. Methodological problems

In the 8-digit goods nomenclature of foreign trade, grandparent and parent chicks of the breeders as well as for other chickens are only shown together. A distinction of quantities or values between breeding and propagating is not possible. In the model all imports are assumed to be parent chicks. Those propagating chicks are considered to produce a certain amount of hatching eggs as parent animals within the reporting year, which then become producing laying hens or broilers. A normal hatching rate and animal losses during the production process have to be taken into account. An imported propagating chick thus produces several productive laying hens and broilers. Appropriate multiplication factor have to be found for the assessment of imports of these animals.

2.6.1.4.5. Import breeding chicks for egg production (HS 1051111)

Assumptions: According to the breeding company Lohmann belonging to the EW Group (https://lohmann-breeders.com/de/strains/lohmann-brown/), its parent chicks in the area of laying hens can produce around 110 commercially viable female animals per parent animal for rearing pullets after the hatchery. Thereafter, 3% losses in rearing and 7% in the laying period (of which 50% are counted) must be taken into account. An imported parent chick produces about 103 laying hens a year. Their annual laying performance shall then be multiplied by the egg price in order to determine the contribution of the imported

propagating chicks to the production value of eggs. In addition, the value of produced soup meat should be taken into account as well.

Results laying hens

In the first half of the period from 2012 to 2017, a yearly maximum of 19.300 propagating chicks becoming parent animals were imported into Germany *(Excel file: Price comparison livestock; Sheet: Calcul. Import share poultry)*. According to foreign trade statistics, there were no imports at all in the years 2014 and 2016. The share of imported propagating chicks and the resulting laying hens in the total production value of eggs (including soup meat) ranged from zero to 3,6% in the different years. As of 2018, trade figures show a sharp increase in imported quantities to initially around 434.500 units. In 2023, the million mark was exceeded for the first time. Due to the multiplication effect (1 imported chick as parent = 103 laying hens), the resulting egg production and its share in the production value swelled to 70% in 2018 and then increased even higher at unrealistic values. This may be due to changes in the structural coverage of external trade, as indicated by the strong increase in imports from 2018 onwards. Also, some of the hatching eggs or chicks produced in this country by the imported parent animals may have been re-exported abroad and were not, as assumed, used for domestic production. Foreign trade data do not provide proper information on this. The assumption, that an imported propagating chick produces 103 laying hens as a parent animal, could be wrong. However, surveyed experts did not criticize that factor.

2.6.1.4.6. Import of breeding chicks for fattening (HS 01051119)

Assumptions: According to the Lower Saxony Chamber of Agriculture (Guide to Poultry Farming 2020), one chick used later on as an adult parent can produce 130 young broiler chicken for the start of the fattening process. Hatching results and losses up to that point have been taken into account. The Austrian Poultry Farm Cooperative (GGÖ) also reports 130 fattening animals (https://www.gefluegelmast.at/elterntiere/). According to the Deutsche Landwirtschafts-Gesellschaft (DLG) Merkblatt 406 p.23, the average loss in chicken fattening is 3,6%. An imported propagating chick with the production direction of fattening would thus produce about 125 broilers. Their slaughter volume multiplied by the producer price gives the production value by imported parent chicks.

Results fattening chicken

In the first half of the period under review from 2012 to 2017, around 3.9 Million propagating chicks were imported for fattening on average every year. With the assumed factor of 125 broilers per breeding chick, this import leads to an average annual value of 673 Million Euro and a share of the total production value of chicken fattening of 43%. Adding imports of farmed chicks directly destined for fattening, imports accounted for more than 50% of production value (*Excel file: Price comparison livestock; Sheet: Calcul. Import share poultry)*.

As for laying hens, the import of propagating chicks for fattening increased in the second half of the reporting period starting 2018. Most recently, the number rose to almost 7 Million animals per year. Because of the multiplier effect, the volume attributable to the import of parent chicks increases significantly. The calculated share of the production value for chicken

meat is now significantly higher than 80%. That is an unrealistically high level. As with laying hens, changes in the recording of external trade statistics, possible re-exports or the assumptions about the multiplier effect on propagating chicks may be the reason for the implausible results in the second half of the period under review. This must be examined in the further course of the project.

2.6.2. Summary and conclusion

2.6.2.1. Pigs

In order to quantify the importance of imports, first calculation models have been drawn up in Work Package 1.6 for the relevant sectors of pigs and poultry in Germany. In the case of pigs, it has been established that a distinction must be made between piglets and breeding sows in the import assessment. The piglet is intended for single use in the production process, the breeding sow for multiple use. Overall, it could be shown with plausible results, that around one fifth of the production value of pigs in the EAA is based on the import of breeding and productive pigs. One further result was, that over time the relevance of sow imports decreased, whereas it increased for piglets. The methodological approach for determining the importance of imports can also be applied to other EU Member States. In a next step, the importance of imports on pig farmers farm income could be examined in a more sophisticated model.

2.6.2.2. Direct usable chicks

In the case of poultry, the import of chicks is important for the production of meat and eggs in Germany, even if exports are higher. For chicks directly usable in chicken fattening or egg production, the model is quite simple: An imported animal is equivalent to a fattening animal or a laying hen. Animal losses and performance data must be taken into account. In Germany, imports of chicks for chicken fattening in 2023 accounted for 6.2% of the total production value of chicken fattening in the EAA. The share of laying hens reached 7.1%, taking also into account the marketing of soup meat.

2.6.2.3. Breeding chicks

For grandparent and parent female chicks, which are not shown separately in the external trade statistics, the importance of imports is more difficult to determine. Those reproduction chicks produce as parent animals eggs for the hatchery. Later on animals are available for the production of meat or eggs. Multiplication factors must be defined to reflect this. Due to the significant increases in imports of breeding and propagating chicks into Germany and the effect of potentiation, the results so far have not led to plausible results in recent years. The role of imports is overestimated. The assumptions and underlying database of the model for propagating chicks must therefore be critically reviewed.

The role of importing hatching eggs has not yet been considered. In foreign trade, statistics hatching eggs for chickens (HS Code 04071100) are not differentiated according to the destination for egg production or fattening. An assessment of these imports for the importance according to the production directions eggs and fattening is therefore hardly possible.

2.7. Work Package 1.7: Analyzing fodder import

Collecting basic data for national fodder balance. Setting up calculation methods. Calculation of fodder balance with and without imports in quantity and value. This allows to show how imports supply in quantity and value the domestic production of animal products. The level of animal production is important for farmer's income.

2.8. Work Package 1.8: Analyzing fertilizer import

Comparison between yield of different agricultural products in organic and conventional production. Developing calculation models for impacts of fertilizers in plant production in quantity and value. Fertilizers are important for agriculture and often imported products. Organic production does not use "industrial fertilizers" and can be used to estimate production quantities without fertilizers. The difference in yield between organic and conventional production show the role of imported fertilizers on farmer's income.

3. Conclusion and Outlook

This intermediate report marks a foundational step in our project, which aims to analyse the impact of imports on agricultural value-added, focusing specifically on imported intermediate products that compete with domestic inputs in the agricultural sector. By identifying these key intermediate products, we have established a basis for assessing the potential economic significance of these imports on agricultural production and consequently also on income.

In this initial phase, our work involved identifying relevant imported intermediates that directly compete with domestically produced alternatives. This process required an in-depth analysis of agricultural supply chains and trade flows to pinpoint imported products that are most integral to domestic agricultural production. By doing so, we created a comprehensive list of competing intermediates that serve as a critical input for subsequent analytical steps.

The next phase of the project will focus on analysing the relevance of these imported intermediates within agricultural production and their influence on agricultural income. This analysis will utilize a model-based approach to quantify the impact of imported competing intermediates on domestic agricultural value-added. Through this modelling framework, we aim to generate insights into how these imports affect income distribution within the agricultural sector, as well as their broader economic implications.

In conclusion, the work accomplished in this first phase sets a strong foundation for the project's overarching objectives. By establishing a clear categorization of imported intermediates that compete with domestic products, we have paved the way for a more rigorous examination of their effects on agricultural income. The next steps in this project will leverage these insights to inform policymakers and stakeholders on how income dynamics interact with import competition in agriculture, ultimately aiming to support decision-making processes that enhance the resilience and competitiveness of the domestic agricultural sector. An approach we would like to transfer also to other EU Member States.

Moving forward, this study will contribute to the understanding of how income within agriculture can be impacted by economic sustainability, agricultural productivity, and long-term growth. The subsequent steps will refine our model, allowing us to deliver comprehensive results that further clarify the link between utilization of imported agricultural value-added in the context of global market competition.

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