



The Feed and Food Value Chain of Faba Bean in Austria

CROPDIVA – 5.1

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ABBREVIATIONS

BMLRT	Federal Ministry Republic of Austria Agriculture, Regions and Tourism (Bundesministerium Landwirtschaft, Regionen und Tourismus)
dt	deciton(s), $\frac{1}{10}$ of a metric ton
ha	hectare(s)
VC	value chain
VCA	value chain analysis

1. THE VALUE CHAIN OF FABA BEAN IN AUSTRIA

1.1 Faba Bean in Austria

Grain legumes are very old crops. The field bean also called faba bean (*Vicia faba* L.) originates from the Mediterranean region. As a legume, faba bean provides benefits to the soil due to its taproot and the ability of nitrogen fixation (LK Niederösterreich, 2010).

In 2019, faba bean covered a total cultivated area of 5710 ha in Austria which accounts for only 0,43% of the total arable land (FAOSTAT, 2019). Figure 1 depicts the acreage of grain legumes in Austria (BMLRT, 2021).

In 2019, Austrian faba beans yielded in total 13.030 tons with an average yield of 22,8 dt (decitons) per hectare. In the same year, Austria imported a total of 4391 t of faba beans (this

number may contain other beans such as string bean as well) (Eurostat, 2019; FAOSTAT, 2019). In 1990, faba beans yielded in total 41.298 tons which reveals an average reduction of total yield by 70% within the past 30 years (BMLRT, 2021).

The areas where faba bean cultivation is mainly located are in Lower Austria and Upper Austria. Data from 2020 compared to the year before showed a slightly reduction in total cultivated area (-3.2%) after already massive area reductions in previous years; a good yield nevertheless allowed the harvest volume to increase to 14,000 t (+7.7% compared to 2019) (Statistik Austria, 2021).

A stronger increase in cultivation areas and thus a strengthening of Europe's self-sufficiency in the protein sector was recorded from 2015 onwards, because since then protein crops could be cultivated on ecological priority areas (ökologischen Vorrangflächen) and credited within the scope of greening. However, when the Omnibus Regulation became effective, cultivation declined again (BMLRT, 2021). Domestic breeding of site-adapted and healthy seed would be conducive to the expansion of legume cultivation. However, within the past years, little to none breeding activities are recorded by domestic seed breeding companies. In the case of field bean, particular attention should be paid to resistance breeding in the area of nanoviruses. In both field and grassland, there is still potential in breeding for an increase in efficiency and an improvement in protein content and protein quality (Bundesministerium für Landwirtschaft, 2021).

The field bean has a great cultivation importance, especially on organic farms. In 2020, the vast majority of the cultivated field beans, namely 79,2%, were cultivated organically (BMLRT, 2021).

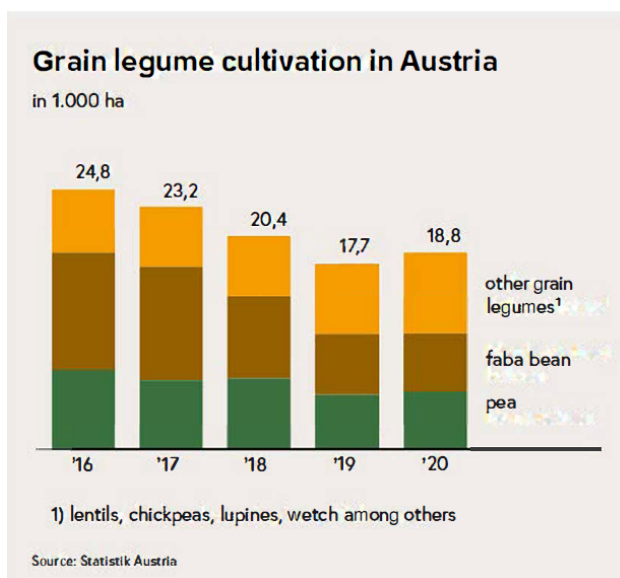


Figure 1. Grain legume cultivation in Austria, source Statistik Austria (2021)

However, in recent years organic cultivation has declined sharply due to massive problems caused by drought, aphid infestation and the nano-viruses transmitted by them (LK Oberösterreich, 2022).

1.2 Overview of the interviews completed

The interview partners in the Austrian fabe bean value chain have been collected over internet desk research, review of professional, technical articles, search of business directories and requests to associations of the Austrian agriculture (for example BioAustria, i.e. the largest association of organic farmers in Austria or the Austrian Chamber of Agriculture, i.e. the largest governmental extension service in Austria). Furthermore the interview partners indicated relevant interview partners in the faba bean value chain.

Dependent on their activity and engagement with other CROPDIVA crops some interview partners – seed suppliers, processors, or wholesalers – have been interviewed also to other CROPDIVA crops. One interview partner has been interviewed about two different levels in the value chain, because he was engaged with business activities in both of them.

Table 1. Overview of the number of interviews performed for each VC actor.

VC actors	Number of interviews
Seed supplier, seed propagator	3 (1 telephone interview)
Seed wholesaler	0
Producer (farmer)	4 (2 telephone interviews)
Wholesaler	2
Food processor	2
Retailer (sells to consumers)	0

Table 1 shows that 11 interviews have been made, 8 of them via Zoom video conferences and two over telephone (1 interview partner was processor and wholesaler and has been counted in each of his functions) (1 Interviewpartner deals with faba bean as feed and food product and was counted for both value chains) and 3 short telefon interviews. Interviews were made on each level of the value chain, except with the retail level because there are no faba beans in Austrian retail listed. Telephone interviews were made because of tight schedules of interview partners.

The lower number of possible and made interviews is due to the lower importance and short length of the feed value chain of faba beans in Austria. Fabe beans as feed have compared to food products a lower processing intensity and reach the farmer without specialized retailers.

1.3 Results: Faba Bean Feed Value Chain

1.3.1 Description of the Faba Bean feed value chain

The value chain for faba beans as feed is relatively short due to the small market in Austria, definitely shorter than the oat or lupin value chains. Seeds are imported mainly from Germany or France, because the last Austrian seed propagator recently died. Only few farmers propagate the imported faba bean seeds, mainly for their own use. Faba bean seeds get directly from seed propagators or indirectly from whole salers and crop collectors (Raiffeisen Ware, Lagerhaus) to the farmers, who plant faba beans on their fields.

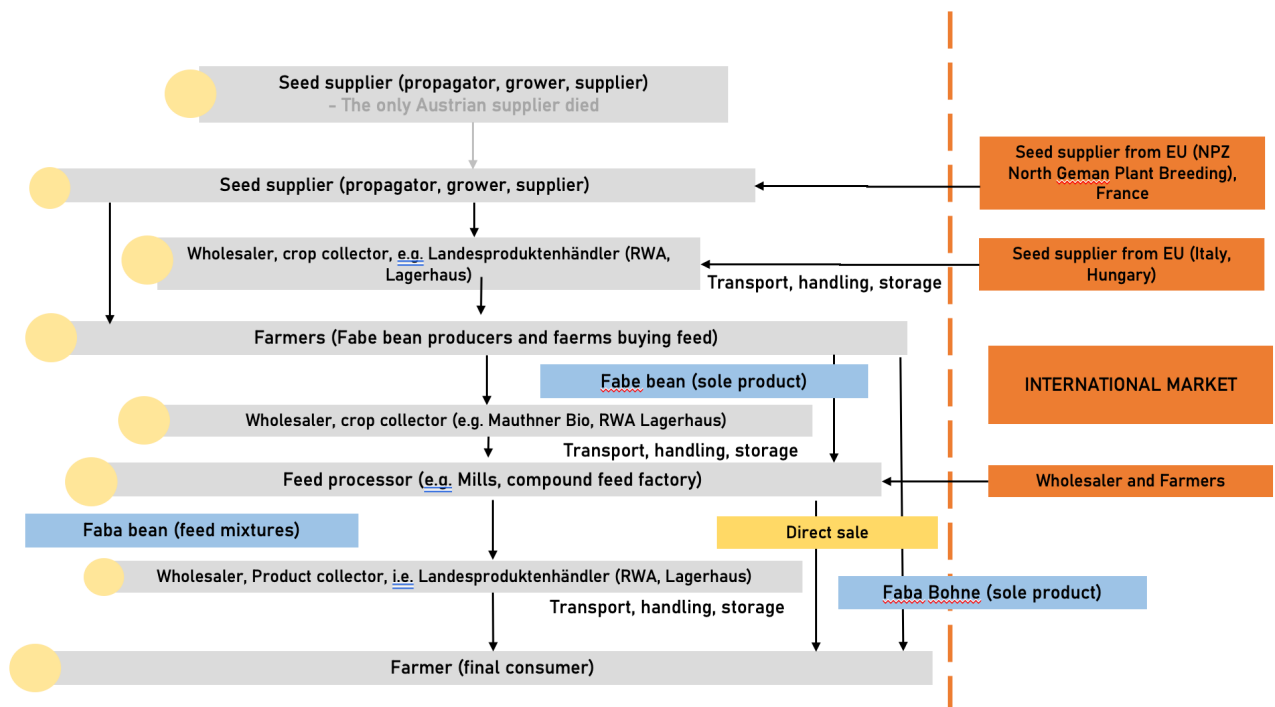


Figure 2. Austrian faba bean feed value chain map

The harvested faba beans are either used by farmers themselves as feed or they sell the harvest directly to other farmers. Another way through the value chain would be over wholesalers, mills, or compound feed factories to the farmer. Austrian feed processors get faba beans from Austrian farmers or from other EU countries (e.g. Germany, France, Italy, Hungary, ...).

There is only small or no interest at all of Austrian seed propagators to invest into breeding, further development or propagation of seeds. Therefore only few Austrian farmers, processors or wholesalers deal with faba beans.

Faba bean is more important as feed or catch crop than as food product. Farmers appreciate the benefits of faba beans for soil health – due to its ability for nitrogen fixation – and its high protein content.

1.3.2 Seed suppliers (Growers, propagators, suppliers)

From the three interviewed seed suppliers, two produce faba bean seeds only for feed, and one said the same seeds can be used for feed or food. One mentioned that he focused on feed because of the low protein content and the high content of bitter substances. The seed for further propagation came from Germany for two of the seed suppliers. RWA (Raiffeisen Ware), Sautbau Linz and Probstdorfer Saatzucht are the most important suppliers for faba bean seeds in Austria. One supplier mentioned that the majority of produced faba beans are used by the farmers themselves as feed.

VC capacities and organization

Vertical and diagonal linkages: The most important vertical linkage is a German (Norddeutsche Pflanzenzucht, <https://www.npz.de/de/npz/>) and a French seed company (RAGT, <https://ragt-semenes.fr/en-fr>). One seed company a horizontal linkage with a wholesaler, one had a diagonal linkage to a seed propagating company. The most important customers are rural agricultural warehouses (90% of sales; i.e. RWA, Lagerhaus) and farmers (10% of sales). The relationships to suppliers and customers is long-term oriented and stable.

Knowledge and technology of actors: Suppliers use own experience and information from other breeding companies, from feed producers and professional journals ("Feldbauratgeber" published by Agentur für Ernährungssicherheit and Chamber of Agriculture, see <https://noe.lko.at/feldbauratgeber-für-den-frühjahrsanbau-2022+2400+2856850>).

Entry barriers: The seed suppliers offer faba beans for two reasons. One reason was to have old varieties and niche varieties in their assortment, and they see a bit a trend for old varieties, second faba bean was always a permanent part of crop rotation in Austria. Its positive impact on soil fertility is important too, but the overall importance of faba bean has declined (see introduction, in 30 years a reduction of 70% in harvest volume). It was important in the past but the competition of soybean had a negative effect on faba bean. There was more research into soybean, and the protein content of soybean is better. One supplier mentioned that climate change has negative impacts on faba bean, without saying why. There are no difficulties to enter the market and also no exit barriers.

Resource and infrastructure

Inputs availability: The labour market is currently difficult, and one supplier reported problems importing inoculants, because of current supply chain disruptions.

Existing and required infrastructure: It was not difficult for the growers to adapt the existing equipment and machines to the production and processing of faba beans.

Costs: The main cost factors are storage room, logistic costs, production costs. Production costs could be lowered with higher volumes.

Logistical issues: Wholesalers and farmers come and get the seeds themselves. One supplier had his own trucks and worked with external shipping companies.

Volume & capacity of processing facilities: For the future none of the suppliers plans to increase production volume. the plan is to produce slightly more. Storage room could be limiting if production volume increases.

Market conditions

Market trends and demand: An increase of organic farming acreage is promoting the use of faba beans. Suppliers expect demand to decline.

Prices are stable and suppliers are satisfied with price levels.

Import and Exports: Imports from Germany, Denmark, Poland and France are important in Austria. One supplier is exporting more than he sells in Austria. Exports go to EU countries and Switzerland.

Marketing: The benefits of faba bean are positive impacts on soil (Nitrogen fixation, soil loosening). Farmers decide to buy faba bean if faba beans are healthy on the field and show high yields. The strongest competitor are soybeans, they substitute faba beans. Customers are reached over fairs, website and a printed product catalogue. Also, presentations, social media and events together with rural warehouses are used. One supplier mentioned flyers added to agricultural journals.

Distribution channels: Seeds are sold over wholesalers and directly to farmers. Wholesalers are way more important for sales volume.

Framework conditions

Regulatory & institutional environment: Faba bean is regulated in the Austria seed law. The biggest limiting factor is that seed companies in Germany use electron treatment of seeds to sterilize them, which is not allowed for organic farming in Austria. No other regulatory barriers were mentioned. The Austrian seed law is important to define quality (purity, germination capacity, ...).

Role of public sector (support, policies, etc.): The Agri-environmental Programme ÖPUL, Austria's programme for the promotion of an agriculture which is appropriate to the environment supports faba bean with 70 Euro/ha, if underseeds are used. The ÖPUL lists crops which are seen as promoting erosion. These crops are faba bean, corn, sunflower, millet, vegetables, ... Another subsidy for

cultivating faba beans is part of the EU Greening subsidies, which are given for environmental and climate protecting measures. Faba bean is listed as one of the plants providing nitrogen fixation and can therefore receive subsidies from this program. Without stronger political support there will be no expansion of faba bean acreage. All suppliers use extension services of the Austrian chamber of agriculture. They are satisfied with the quality of extension, less than with private consulting companies. Certificates: Used certificates are organic and ISO certification.

1.3.3 Producers (farmer)

The idea to cultivate faba bean came from the wish to improve soil conditions during crop rotations because it improves yields of follow up grain cultures. One farmer mentioned that specific subsidies demand the cultivation of alternative crops.

VC capacities and organization

Vertical and diagonal linkages: Important suppliers are rural warehouses (Lagerhaus), which sells seeds from Saatbau Linz and "Die Saat". The most important customers are wholesaler (Mauthner Bio), direct sales to farmers and feed processing companies. Farmers reported no horizontal or diagonal linkages.

Knowledge and technology of actors: Knowledge to cultivate faba bean came from exchange with other farmers, from trial and error experiences and from information from the seed producer. A challenge is that faba bean needs sufficient humidity to thrive. It should only be cultivated every 5 years on the same spot because she is prone to nano virus infections. With too short intervals and too much frequency on the same fields the harvest will get unusable. As organic farmer you have to deal with weed problems. Important is the right weather and enough bees for fertilization.

Entry barriers: It wasn't difficult to enter the market because faba bean is known as feed product. There are no exit barriers.

Resource and infrastructure

Inputs availability: Rural warehouses have all the necessary inputs. A deficiency is to find a good consultation to select the right seed product. Also, sometimes the quality of the seeds is not on the same level. Highest cost factor currently is diesel fuel. Further cost factors are energy costs for processing, labour costs, seed costs, harvesting costs.

Existing and required infrastructure: Farmers process the harvest at farm (cleaning and drying).

Logistical issues: Harvest is picked up by customers

Volume & capacity of processing facilities: Farmers could produce more but only if price would increase.

Market conditions

Positive for faba bean is the trend towards more organic farms. A barrier is the business practice to make no price guarantee before cultivation. To secure sales over a contract is a strength for marketing.

Market trends and demand: Some farmers observe market trends for other crops but not for faba beans. One mentioned that currently there is strong price fixation.

Marketing: Word of mouth is important to reach customers for the farmers, and landwirt.com, which is an information exchange platform for Austrian farmers.

Distribution channels: Farmers sell either over wholesalers, directly to other farmers, also over online sales.

Framework conditions

Regulatory & institutional environment: AMA (AgrarMarktAustria) defines maximum percentages of one crop per farm (not more than 50% of one crop cultivated). Other regulatory conditions are not known.

Role of public sector (support, policies, etc.)

Farmers wish better subsidies for faba beans. A stronger promotion as food product would be helpful too.

1.3.4 Wholesale

We interviewed two wholesalers, one conventional and one organic wholesaler. The organic wholesaler bundles, stores and sells faba beans to compound feed factories. He said that there is high demand for faba bean in the organic sector as protein feed. The conventional wholesaler sells faba bean as raw or roasted product for feed and as backing mix, flower or granulate. The conventional wholesaler is a specialized mill. They stopped processing wheat some years ago and decided to specialize on niche products (faba beans, lupin, oat, ...).

VC capacities and organization

Vertical and diagonal linkages: Important suppliers are farmers from Austria and abroad and the rural warehouses. Important customers are compound feed companies (Fixkraft, Göweil Mill, Raiffeisenverband Salzburg, Raiffeisen warehouse Klagenfurt). There are no horizontal or diagonal linkages.

Resource and infrastructure

Inputs availability: Availability of faba bean is limited. The necessary volumes are secured over contracts. Quality is no issue in the feed market.

Market conditions

Market trends and demand: Wholesalers don't see a trend for increased faba bean demand. For this the market in Austria is too small. In the conventional market faba bean prices are dependent on the protein price. If the protein price is high, demand for faba bean goes up. In the organic market demand for faba bean feed will increase.

Marketing: The main benefit of faba bean is that it represents an alternative feed product and that the protein content is high. For promotion of their feed products wholesalers use word of mouth and fairs. The market is so small that all the actors know each other. The organic wholesaler mentioned that all compound feed companies collaborate with them. It's more of a closed protected market for organic faba bean.

Distribution channels: Wholesalers deliver to feed processors and other wholesalers.

Framework conditions

Regulatory & institutional environment: In the organic sector the regulations of the organic associations are binding and important. Organic associations in Austria forbid to import faba beans. It is only possible with a special approval of the association. No important regulations were mentioned for the conventional market.

Role of public sector (support, policies, etc.): The public sector doesn't play a significant role.

1.3.5 Feed processors

We interviewed two feed processors. They buy faba bean from farmers and wholesalers from different regions in Austria. One company uses faba bean based on a fixed recipe in a compound feed product. The other feed company is processing faba bean for 10 years and it is part of 10% of its production volume.

VC capacities and organization

Vertical, horizontal and diagonal linkages: The food processors source faba beans from farmers, wholesalers in Austria and import. Important customers are farmers and other compound feed companies. There are diagonal linkages with wholesalers. The business relationships are long-term, both with suppliers and customers.

Knowledge and technology of actors: It is not necessary to treat faba bean differently than other grains. At the beginning they made their own trials to learn.

Entry barriers: There are no entry barriers. Faba bean as feed has a long tradition. One feed processor started producing for Switzerland, France and Italy because the demand is way higher in these countries. Later he started to produce for the Austrian market too.

Resource and infrastructure

Inputs availability: Due to few acreages under cultivation, feed processes secure their necessary volumes over contracts. Availability of volumes is a reoccurring problem. Sometimes there are harvest losses due to pests. Other limiting input factors are labour force and recently energy prices.

Logistical issues: Feed processors have their own vehicle fleet for logistics. Some customers pick up their orders at factory.

Market conditions

Market trends and demand: 80% of the sourced faba beans come from Austria and the rest from Germany for the conventional feed processor. The organic feed processor imports also from EU countries. No relevant trends for faba beans have been reported. One processor mentioned that demand for faba bean is higher than production. The demand for faba bean is highly dependent from the protein price. If high, then demand for faba bean increases. For the conventional market the feed processors expect a stagnant demand, for the organic sector a slightly increasing demand (Remark: that was before the Ukraine war. We see a decline of demand for organic food product due to high inflation rates. Already ten percent less organic meat is consumed in EU. This will have an impact on faba bean demand).

Marketing: Bitterness is a challenge for selling of product. If too bitter animals decline to eat. Protein content is the most important benefit. Word of mouth, advertisement in Bio Austria journal and participation on fairs are the marketing communication instruments the companies use.

Distribution channels: The products are sold to wholesalers, small trading companies, compound feeding companies and directly sold to farmers.

Framework conditions

Regulatory & institutional environment: The interview partners were not aware of any regulations promoting or hindering faba bean. Both were organic certified.

Role of public sector (support, policies, etc.): Public sector plays no role for feed processors

1.4 Results – faba bean FOOD value chain

The next results are concerning the food value chain of faba bean. There are similarities between both chains, mostly regarding the upstream processes. Many interview partners emphasized that at the early stages in the value chain there is no difference between faba bean for feed or food.

1.4.1 Description of the faba bean food value chain

Faba bean as feed has a long tradition in Austria. Faba bean as food is a pronounced niche product. Reasons mentioned from value chain actors in Austria are the content of bitter substances, the lack of

interest of seed producers and connected to it, the lack of interest of farmers. One actor mentioned that he made some trials with faba bean to use it as food product, but he gave up because of repeated nano virus infections and other illnesses.

An additional challenge is the price determination. Due to the small Austrian market size and the low yields, the price for faba bean must be relatively higher compared, to soybean or peas, to be attractive for farmers. Opportunities for faba bean are its importance for crop rotation and soil health and the alternative for protein rich vegan food products. Faba bean could be used for meat substitutes, backing aids, and sauces.

Other than on the Austrian market there is higher acceptance of faba bean on European markets. One Austrian actor had very positive experiences with faba bean food products in the Netherlands. A very positive development is that from autumn 2022 faba bean products will be listed in Austrian supermarkets.

Most actors see faba bean as a niche product with low relevance in Austria. That's why you will find it up until now only in specialty food stores or health food stores and as backing ingredient in bakeries.

Faba Bean FOOD Austria

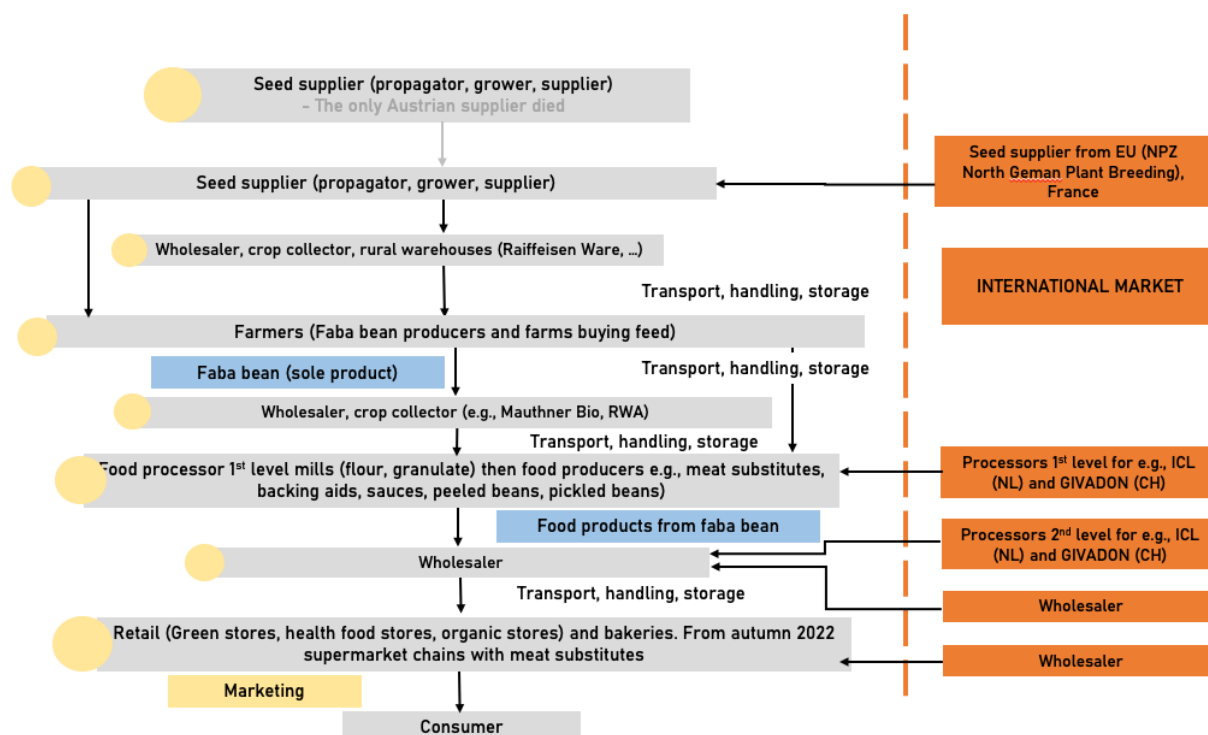


Figure 3. Faba bean FOOD value chain mapping.

Due to its low relevance, there is no Austrian seed producer anymore. The available seeds are mainly from German seed producers. Small volumes of German seeds are propagated from Austrian farmers and shared between themselves, comparable to the hull barley VC.

The processing of faba bean is a two level process. On the first level faba bean is processed into flour, granulate and protein extract. These intermediate products are then processed into meat substitutes, sauces and baking aids from second level processors. Besides that faba bean can also be offered as a whole in a peeled or pickled form.

The faba bean food value chain is relatively short. Remarkable is – compared to the other Crop Diva value chains – the dependency and cooperation with business partners and suppliers from foreign countries. It needs a concerted effort of Austrian food processors to create attractive, alternative food

products based on faba bean, to stimulate sufficient demand on consumer side. This would result in adequate market size, which would turn faba bean into a profitable product.

1.4.2 Overview of the interviews completed

The interview partners in the Austrian faba bean value chain have been collected over internet desk research, review of professional, technical articles, search of business directories and requests to associations of the Austrian agriculture (for example BioAustria, i.e. the largest association of organic farmers in Austria or the Austrian Chamber of Agriculture, i.e. the largest governmental extension service in Austria). Furthermore the interview partners indicated relevant interview partners in the faba bean value chain.

Table 2. Overview of the number of interviews performed for each VC actor.

VC actors	Number of Interviews
Seed supplier, seed propagator	1
Seed wholesaler	0
Producer (farmer)	1
Wholesaler	1
Food processor	3(1)
Wholesale	1
Retailer (sells to consumers)	1

Table 2 shows, that 8 interviews have been made, 7 via zoom and 1 was a short telephone interview (1 interview partner was processor and wholesaler and has been interviewed in each of his functions). It was difficult to find interview partners. There are only few actors on the Austrian market. Some of them gave faba bean up after unsuccessful trials.

1.4.3 Input suppliers (seed propagator)

Since faba bean is marginally used in Austria, there is no important differences between food and feed varieties cultivated and produced. For this reason, only the answers reflecting the food market are part of this and the following subchapters. For the complete answers see chapter 1.3.2, p. 5.

Market conditions

Market trends and demand: An increase of organic farming acreage would promote the use of faba beans. Suppliers expect demand to decline. Positive for demand would be an increase in demand for vegan product on the food market. Also, a higher interest of food processing companies would be helpful.

1.4.4 Producers

The elements are similar than for the chapter 1.3.3 “Producers”, p. 7. Only the differences are described in this subchapter.

Market conditions

Market trends and demand: Faba bean is a niche product in the food market because of its bitter substances. It needs in any case on step of intermediate processing to be useful as food product. Only supermarket chains and food processors could develop faba bean into a mainstream product.

Marketing: Sustainability was always an important topic, but media should promote faba bean more. Currently market changes are due to Covid-19 and the Ukraine war. On the consumer side the trend for regionality and sustainability is growing.

Distribution channels: 100% of harvest are sold to wholesalers. There is a fixed basic price. If sales are better than expected farmers get a subsequent payment. Farmers also get additional payments for extra services such as storage or purification.

1.4.5 Food processors

We interviewed three different kind of food processors. One, who stopped several years ago to produce it. The reason was that every several years faba bean had problems with pests and then the quality was not sufficient. The other food processor uses faba bean protein concentrate, and faba bean press cake from processors of the first level in the value chain from Switzerland and Netherlands and processed them into meat substitute produce (the brand “Die Ohne”). It is the biggest processor of faba bean in Austria. The third processor is a first level processor and wholesaler. He processes 40% of his traded volume. It is a specialized mill, focusing on lupine, oat and faba bean and processes faba bean for 10 years. Its faba bean is thermic treated and peeled and processed into flour and granulate. These products are sold to food processors who produce baking aids.

VC capacities and organization

Vertical integration: The food processor of the second level import faba bean protein concentrates from companies in the Netherlands and Switzerland. This food processor needs big volumes of processed faba bean for which there are no suppliers in Austria. Besides them there are only small start-ups, which mainly work with peas. Its most important customer are supermarket chains.

The first level food processor buys faba bean from farmers (contract farming), rural warehouses and imports. Their faba bean for food products comes to 100% from Austria. Its biggest customers are compound feed and bakery products industry. Both companies have no horizontal linkages. The relationships with suppliers and customers are long-term and stable.

Resource and infrastructure

Inputs availability: There is not enough faba bean supply in Austria for the Austrian food processors, but enough from the EU. Harvest volumes in Austria have to be secured over contracts. Energy prices are becoming a concern.

Logistical issues: Food processors have their own vehicle fleet for logistics.

Market conditions

Market trends and demand: The second level food processor became the idea to use faba bean for cold cut sausages because a customer asked for it. They looked for a sausage with new texture without bad tasting aromas. The benefit of faba bean is that it tastes neutral, once bitterness is removed, and its positive effects on sustainability can be used for marketing. It is planned that the two biggest supermarket chains in Austria will launch these cold cuts in autumn 2022. The vegan trend is strongly supportive. Faba bean and wheat is used to replace eggs and milk in these cold cuts. This food processor is currently searching for Austrian companies who could supply them with protein extracts from faba bean. Shorter transport routes would improve the sustainability of the product. Unfortunately, they couldn't find a company yet.

They see a strong trend for meat substitutes. Other positive trends regionality, sustainability and “functional food”. The first level food processor expects stagnant demand, except if the price for protein would rise. The second level food processor is convinced that meat substitutes will grow significantly

which will have a very positive effect on faba bean. A challenge could be for the organic products, that if prices are rising more, demand of consumers will switch to conventional food products.

Marketing: Market research is done via social media, trend reports and information provided from supermarket chains. Talks with suppliers and customers are important sources of information too. For consumers the main benefit is the health aspect of faba beans.

Distribution channels: The food processors sell to food processors second level, wholesaler and retailers, a bit also over online shop. Supermarket chains (retail) and food processors second level are the most important customers. Both export their faba bean products, one mentioned Switzerland. Exports are strongly growing.

Framework conditions

Regulatory & institutional environment: There are no known regulatory barriers. A positive effect would be to make Nutri-Scores mandatory for food labelling. This would shift the nutritional components in many vegan products more towards plant based protein and fibre, which would have a positive effect on faba bean.

Certification: One company has a vegan label certificate, the other one organic.

1.4.6 Retailer

The interviewed retailer sells organic faba bean as raw product or pickled in glasses. Faba bean for this retailer is the niche of a niche product. In the past it was more widespread. In the last decades it was strongly reduced and substituted by peas and green beans.

Resource and infrastructure

Inputs availability: The beans are bought from organic wholesalers, one is from Austria and one from Germany. Sometimes the retailer gets fresh beans from Italy. Imports are important from Germany, Netherlands and Italy.

1.5 Discussion

Our interviews identified several conditions about the faba bean value chain, which are in many areas common for niche products but in some are specific for faba beans. Specific for faba bean are the challenges concerning bitterness, nano virus infections and dependency on moderate weather conditions. Common for niche products are a lack of consumer awareness and a small array of available food products containing faba bean. In the following subchapter we will summarize the main challenges and success of the faba bean value chain.

1.5.1 Past, current, and foreseen challenges & successes of the value chain

The findings in our interviews showed that the most challenges for faba bean production are still an issue, that's why we summarize them all under one chapter.

Cultivation conditions – humidity and Nano virus infections

Faba bean needs sufficient humidity to thrive. This could be a potential challenge for a future expansion of faba bean acreage in Austria. Due to climate change, we already see a decline of annual precipitation in many Austrian areas. It is also not advisable to plant faba bean in short interval on the same fields otherwise it is prone to Nano virus infections. The current utilized agricultural area for faba bean is small, the number of farmers cultivating it is low, which forces food processors to import faba bean granulate or faba bean extracts.

Replacement through other crops

Due to lower yields compared to other crops a high price is necessary for an economic production. In the past 30 years production of faba bean declined in Austria by 70%. Especially soybean has contributed to the replacement of faba beans (but also peas and green beans). The vegan trend and the trend towards meat substitutes could be an opportunity to reverse this negative development.

Low yields and volatile quality

Faba beans have lower yields than soybean. In average the yields are 2,5 tons per hectare for faba beans, for soybean it is 3,1 tons in Austria (BMLRT, 2021). The rising fertilizer prices make farmers plant more legumes in Austria, which could be an opportunity for faba beans, but the higher yields of soybean make faba beans for farmers less attractive. Soybean acreage has increased in Austria in 2021 by 10%. Austria is already the fifth biggest soybean producer in Europe. Insofar soybean is the strongest competitor and is definitely a substitute product for faba bean.

Faba beans are prone to Nano virus infections, which result in lower quality. Especially when faba beans are planted in too short intervals on the same fields virus infections happen. This was the reason for some of the interviewed value chain actors in Austria to give up faba bean production.

Low or missing willingness of seed companies, farmers and other actors in the VC

Due to the low relevance and lower yields faba bean is for most farmers not very interesting. Faba bean seeds and 1st level processed faba bean products (e.g., faba bean protein concentrate) must be imported.

Bitterness is a challenge

The potential for faba bean applications in food products is limited. More research would be needed to find new ways to use faba bean as ingredient in food production. The high bitterness content is a challenge during processing.

Opportunity as ingredient for meat substitutes

Currently faba bean are sold to consumers in healthy food stores, specialty stores and rarely in supermarkets as whole beans (pickled or peeled) or as ingredient in sauces or bakery aids. This demand is stagnant on a low level. But there is a big opportunity to turn faba bean more into a main stream product. Two of the three biggest supermarket chains in Austria will launch a meat substitutes brand in autumn 2022, which contain faba bean protein extract. The protein extract is produced by an Austrian second level food processor. Second level means this food processor is importing faba bean protein extracts from Netherlands or Switzerland. The vegan trend is strongly supportive. This food processor is currently searching for Austrian companies who could supply them with protein extracts from faba bean. Shorter transport routes would improve the sustainability of the product. Unfortunately, they couldn't find a company yet able to produce the necessary volume. They see a strong trend for meat substitutes. The question is how rising food prices due to the Ukraine war and Covid crisis will impact consumer decisions. We already see a decline in purchases of organic food. Meat substitutes are more expensive than conventional food. In times of crisis consumers switch to discount food products.

Table 3. Challenges, strategies and potentials and benefits

VC actor	3-5 main challenges (order: most important first)	Strategies undertaken/to undertake	Potential & benefits for the actor in the VC chain
Seed supplier	<ol style="list-style-type: none"> 1. Low profit margins 2. Niche market with low demand 3. Quality of seeds 	<ol style="list-style-type: none"> 1. A VC for food should be developed 2. Fast and flexible adaption to changes in demand 3. More vertical cooperation 	<ol style="list-style-type: none"> 1. If no food VC is developed, potential is declining 2. Short term prices are high because of crisis
Producers (farmers)	<ol style="list-style-type: none"> 1. Availability of high-quality seeds adapted to Austrian conditions 2. Sufficient rain 3. Volatile and lower yields compared to soybean 4. A sufficient price 	<ol style="list-style-type: none"> 1. Austrian Seed companies should do research about better varieties 2. Universities should do more research on faba bean 3. Create a food market for faba bean 	<ol style="list-style-type: none"> 1. Mid-term potential for growth 2. Mid-term growth due to necessary time for university research 3. High short-term growth if supermarket chains develop meat substitutes based on faba bean
Food and Feed Processor	<ol style="list-style-type: none"> 1. Availability of sufficient raw material to produce protein extracts 2. Cooperation with 1st level processors and farmers 3. More farmers cultivating faba bean 4. Development of successful food products based on faba bean extracts 	<ol style="list-style-type: none"> 1. Thinking about in house production of protein extract instead of imports 2. Active communication and information sharing with suppliers 3. Contract farming 4. Cooperation with supermarket chains to develop meat substitute based on faba bean 	<ol style="list-style-type: none"> 1. More independence from European market 2. More sustainability of shorter transport routes for protein extracts 3. Organic feed processors get more supply and can offer attractive compound feed 4. Successful meat substitute brand could turn faba bean into a mainstream product
Wholesaler	<ol style="list-style-type: none"> 1. Reliability and continuity of available harvested volumes 2. Climate change 3. Energy prices 	<ol style="list-style-type: none"> 1. Extension service to farmers 2. Contract farming 3. More information for farmers 	<ol style="list-style-type: none"> 1. Demand of compound feed companies is increasing 2. Public opinion more critical about soybean from overseas
Retailer	<ol style="list-style-type: none"> 1. Sufficient available volumes of faba bean extracts 2. More consumers buying it 	<ol style="list-style-type: none"> 1. Information campaigns to consumers (presentation of producers, information about faba bean) 	<ol style="list-style-type: none"> 1. Short- and mid-term growth potential

1.5.2 Limitations

The limitations of the study are related on one side to the qualitative nature and on the other side to the unwillingness of VC actors to be available for interviews. Due to this qualitative study, it is obvious that our sample of interview partner cannot be representative of all faba bean value chains in Austria. We followed a snowball approach for our study. First, we searched for farmers, or food processors in the lupine chain and then we asked them to indicate their VC partners, which we contacted for further interviews.

The supermarket retail sector in Austria is very competitive and highly restrictive to share information. One representative of a nationwide supermarket chain was willing to participate in an interview, but his answers were very restricted. On the other side we believe that our study delivers a good description of the constraints and context of the faba bean VC in Austria, because of the niche market situation, few actors are sufficient to deliver a realistic picture of the situation. Another limiting factor is that most of our interviews happened before the Ukraine war started. Insofar our study provides only limited knowledge about the impact of the war on the faba bean market.

1.6 Synthesis

Faba bean as feed has a long tradition in Austria. But in the last 30 years the harvested volume declined by 70% in Austria. The value chain for faba beans as feed is relatively short due to the small market in Austria, definitely shorter than the oat or lupin value chains. Seeds are imported mainly from Germany or France, because there is no Austrian seed company cultivation faba bean. Only few farmers propagate the imported faba bean seeds, mainly for their own use.

There is only small or no interest at all of Austrian seed propagators to invest into breeding, further development or propagation of seeds. The volatility of quality due to nano virus infections, the variability of yields due to declining precipitation, and the lower yields per hectare make faba bean inferior to soybean, which offers the same benefit for soil health – nitrogen fixation – but higher yields and a bigger assortment of varieties adapted to Austrian soil and climate conditions. Therefore only few Austrian farmers, processors or wholesalers deal with faba beans. A concerted effort of plant breeders would be necessary to provide farmers with more resilient faba bean varieties better adapted to periods of droughts and nano virus infections.

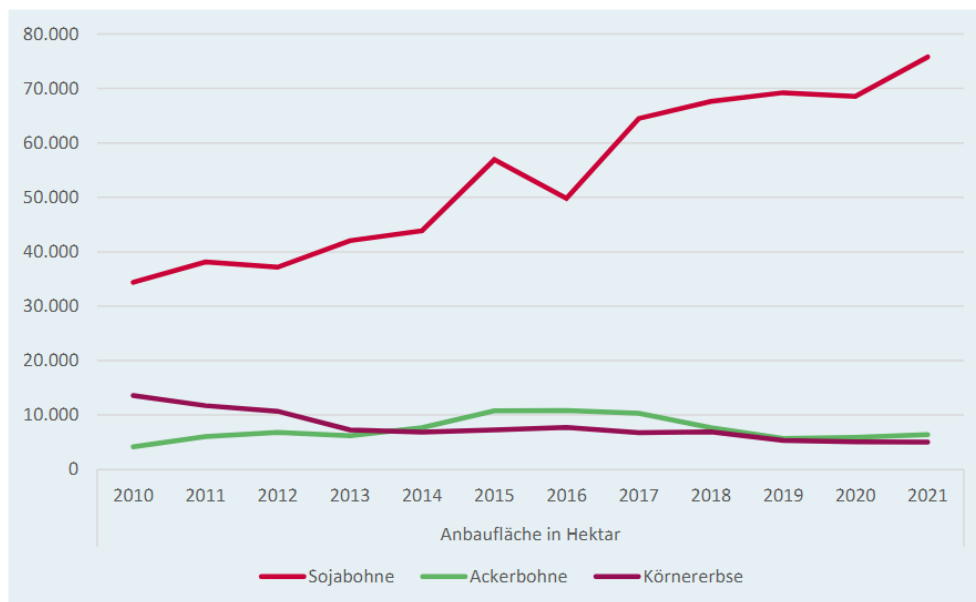
Faba bean is more important as feed or catch crop than as food product. Faba bean as food is a pronounced niche product. Reasons for the niche character are the content of bitter substances, the lack of interest of seed producers and connected to it, the lack of interest of farmers. One actor mentioned that he made some trials with faba bean to use it as food product, but he gave up because of repeated nano virus infections and other illnesses.

An additional challenge is the price determination. Due to the small Austrian market size and the low yields, the price for faba bean must be relatively higher compared, to soybean or peas, to be attractive for farmers. Soybean acreage is strongly growing in Austria (10% in 2021). On farm level soybean is the substitute product of faba bean. Opportunities for faba bean are its importance for crop rotation and soil health and the alternative for protein rich vegan food products. Faba bean could be used for meat substitutes, backing aids, and sauces. Most actors see faba bean as a niche product with low relevance in Austria. That's why you will find it up until now only in specialty food stores or health food stores (peeled and pickled) and as backing ingredient in bakeries.

There is higher acceptance of faba bean on European markets. One Austrian actor had very positive experiences with processed faba bean food exports to the Netherlands. A very positive development is that faba bean meat substitutes will be listed in Austrian supermarkets from autumn 2022 on. Two of the three biggest supermarket chains (market share approx. 60% of the food retail market in Austria) will launch meat substitutes brands based on faba bean protein extract. The protein extract is produced by an Austrian second level food processor. Second level means this food processor is importing faba bean protein extracts from Netherlands or Switzerland. The vegan trend is strongly supportive. This food processor is currently searching for an Austrian company, who could supply them with protein extracts from faba bean. Shorter transport routes would improve the sustainability of the product. Unfortunately, they couldn't find a company yet able to produce the necessary volume. They see a strong trend for meat substitutes. The question is how rising food prices due to the Ukraine war and Covid crisis will impact consumer decisions. We already see a decline in purchases of organic food. Meat substitutes are more expensive than conventional food. In times of crisis consumers switch to discount food products. But when food markets go back to normal (if there will be a back to normal), this could be the biggest opportunity to turn faba bean into a mainstream crop.

ANNEX

Figure 4: Acreage of soy bean (i.e. Sojabohne), faba bean (i.e. Ackerbohne) and peas i.e. (Körnererbse) in Austria



(Bundesministerium für Landwirtschaft, 2021)

Gesamternte von ausgewählten Feldfrüchten

Tabelle 2.1.1.2

Feldfrüchte	1990	2000	2010	2015	2019	2020	Änderung 2020 zu 2019 in %
	in Tonnen						
Körnerleguminosen (inklusive andere)	186.517	103.620	55.202	54.866	38.794	42.798	+ 10,3
Körnererbsen	145.219	96.503	31.250	18.728	12.799	13.097	+ 2,3
Ackerbohnen	41.298	7.117	10.534	24.641	13.032	14.038	+ 7,7

Hektarerträge von ausgewählten Feldfrüchten

Tabelle 2.1.1.3

Feldfrüchte	1990	2000	2010	2015	2019	2020	Änderung 2020 zu 2019 in %
	in Tonnen/Hektar						
Körnerleguminosen							
Körnererbsen	3,6	2,4	2,3	2,6	2,4	2,3	- 3,4
Ackerbohnen	3,2	2,4	2,5	2,3	2,3	2,5	+ 11,3

Preise pflanzlicher Produkte

Tabelle 2.1.1.4

Produkt	2010	2015	2018	2019	2020	Preisänderung 2020 zu 2019 in %
Erzeugerpreise in Euro (exklusive Ust.)						
Körnerleguminosen						
Körnererbsen	139.84	163.72	152.27	151.80	159.78	5,3
Ackerbohnen	141.83	176.80	n.v.	n.v.	n.v.	

(BMLRT, 2021)

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