



The Feed and Food Value Chain of Hull-less Barley in Austria

CROPDIVA – 5.1

Deliverable Information

Title	The Feed and Food Value Chain of Hull-less Barley in Austria
Deliverable number	5.1
WP number	5
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Lead beneficiary	BOKU
Type	Report
Dissemination Level	Public
Due date	October 2022

History of Changes

Version 1	Final Version
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This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 101000847. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or [name of the granting authority]. Neither the European Union nor the granting authority can be held responsible for them.

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ABBREVIATIONS

BMLRT	Federal Ministry Republic of Austria Agriculture, Regions and Tourism (Bundesministerium Landwirtschaft, Regionen und Tourismus)
BAES	Bundesamt für Ernährungssicherheit (Federal Office for Food Safety)
ha	hectare
VC	Value chain
VCA	Value chain analysis

1. THE VALUE CHAIN OF HULL-LESS BARLEY IN AUSTRIA

1.1 Hull-less barley in Austria

Hull-less barley is a special barley variety and a virtually husk-free grain. In addition to cooking properties and beta-glucan content, peel-ability is an important factor for common barley to be edible (BAES, 2022). That is why hull-less barley is said to be very healthy and nutritious, since the mechanical hulling process is omitted, during which a lot of nutrients are lost (Paradeisa.at, 2022). Currently no such variety is listed in Austria (BAES, 2022). In Austria it is so rare, that no data for cultivation are available. In statistical reports hull-less barley coincides with other barley varieties. Therefore, we briefly refer to conventional barley where statistical data is available. Hull-less barley makes up only a slight fraction of the market for barley. This is also reflected by the limited number of interviews we were able to conduct (see chapter 1.3 and 1.4).

1.2 Barley in Austria

The per capita demand for barley is merely 0,3 to 0,5 kg per year. Edible barley is mainly used as rolled barley, groats, barley flakes, edible bran. For this, the most suitable barley varieties are two-lined, have a high proportion of whole barley, a high thousand-grain weight and a low husk content. An important criterion is the light coloration of the aleurone layer; gray, gray-green or blue-skinned barley is undesirable (BAES, 2022).

Barley is a frequently grown crop in Austria and is cultivated on 10.4% of the cropland (Statistik Austria, 2021). In 2020, 864.860 t of barley were harvested on 134,800 ha of land, which corresponds to an average yield of 6.4 t/ha (FAO, 2022). Two variants of barley are grown in Austria, mainly in Upper and Lower Austria (Statistik Austria, 2021): Winter barley which is sown in September to early October, less demanding concerning soil quality and use of winter moisture and mainly used as animal feed (high yields, longer nutrient intake, greater protein content); spring barley, which mainly used as malting barley (relatively high soil quality required, less efficient root system, quality criterion: low protein content of maximum 9.5 to 11.5 %). The cultivation of spring barley is decreasing, it is grown on an area of around 35,700 hectares in Austria (winter barley: around 101,600 ha) (Bundesministerium Landwirtschaft Regionen und Tourismus, 2022). While winter barley cropping grew by 5% (+1,261 ha), spring barley declined by -12.3% in 2020 (BMLRT, 2021).

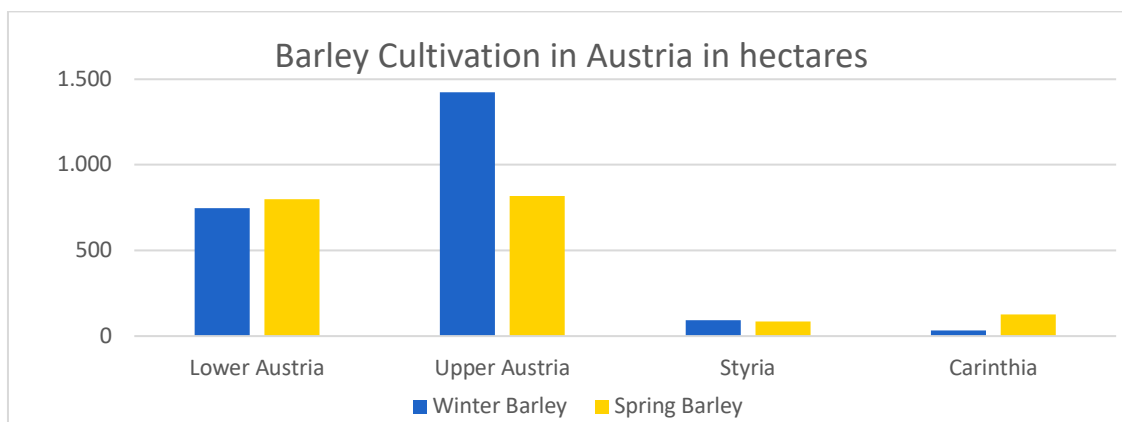


Figure 1. Most of Austria's Barley comes from Upper and Lower Austria (Statistik Austria, 2021)

1.3 Overview of the interviews completed

The interview partners in the Austrian hull-less barley 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, the largest association of organic farmers in Austria, or the Austrian Chamber of Agriculture, the largest governmental extension service in Austria). Furthermore, the interview partners indicated relevant interview partners in the hull-less barley value chain.

Dependent on their activity and engagement with other CROPDIVA crops one interview partner, a wholesaler, have been interviewed also to other CROPDIVA crops. Two interview partners have been interviewed about two different levels in the value chain, because they have been 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 multiplier	0
Seed wholesaler	0
Producer (farmer)	3 (1 telephone interview)
Wholesaler	0
Food processor	5 (4)
Wholesaler	2
Retailer (directly to end consumer)	3

Table 1 shows that 13 interviews have been made, eight of them via Zoom video conferences and five by telephone (one interview partner was producer/farmer and food processor and has been counted in each of these functions; one interview partner was producer/farmer and retailer and has been counted in each of this functions). Five interviews could only be conducted as short telephone interviews with rather limited information content. This is mainly due to the little importance of hull-less barley in Austria, also compared to the other CROPDIVA crops. It is also reflected by the fact that hull-less barley was only bred in some sort of trial farming. The results were not satisfying and farmers stopped with it. Therefore, these interview partners could not provide in-depth information, short telephone calls were sufficient (interviewees were also not willing to give video interviews).

1.4 Results: Hull-less barley as food

1.4.1 Description of the hull-less barley food value chain

Also compared to other CROPDIVA crops, the Austrian hull-less barley value chain is quite short and simple. There are less levels between actors, the link between producers and farmers are only wholesalers. Food processing of hull-less barley is not very common in Austria, most food products are imported, mainly from German wholesalers and food processors. On each level of the VC, however, some companies could be identified selling their products directly consumers; these are absolutely niche products.

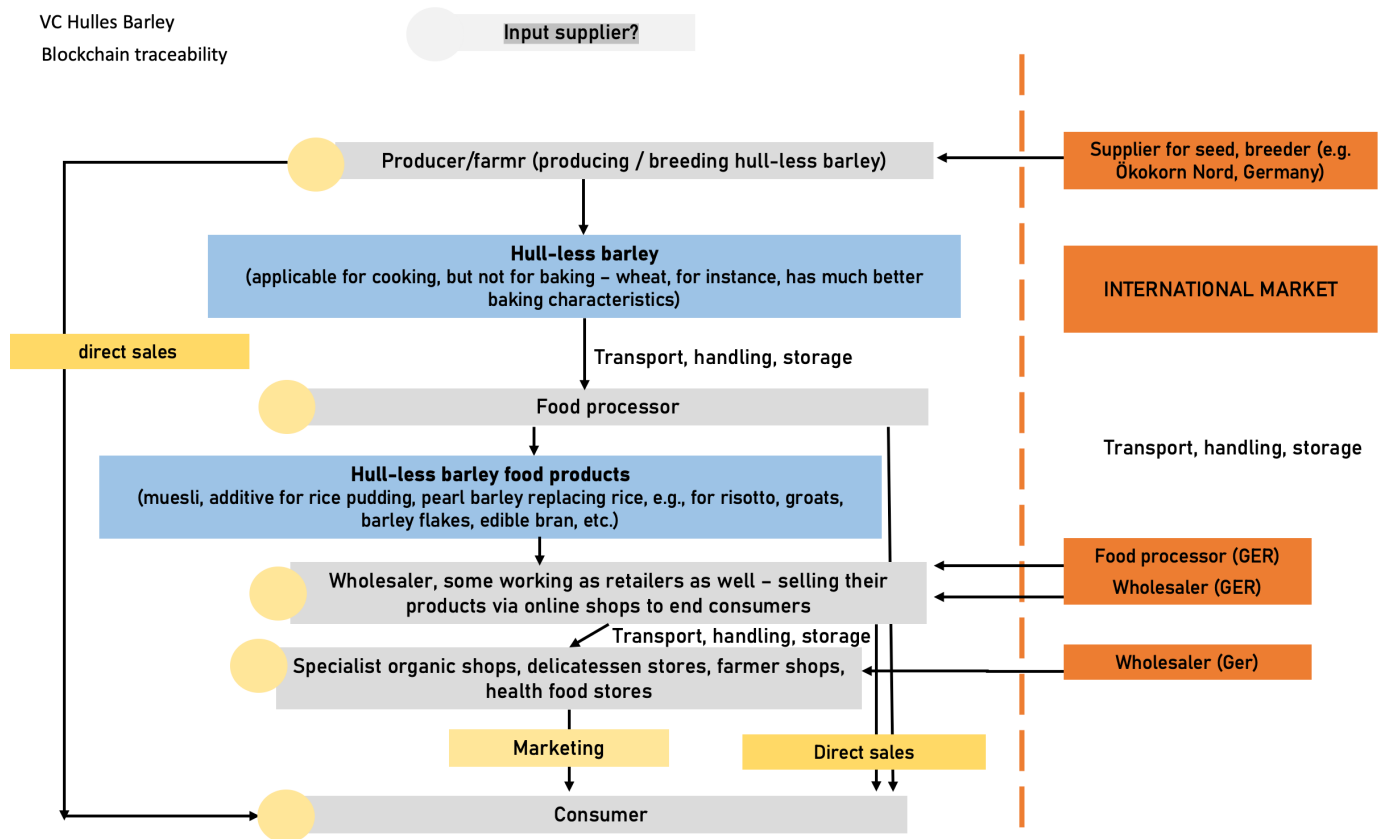


Figure 2. Austrian hull-less barley food value chain map

1.4.2 Input suppliers (growers, propagators, suppliers)

As mentioned above, hull-less barley is a very tiny niche in the Austrian food market. It was not possible to find any growers, propagators, suppliers for hull-less barley seeds located in Austria. All we know from the other actors of the VC is that hull-less barley seeds are mainly imported from Germany (e.g., Ökokorn Nord).

1.4.3 Producers (farmer)

In total, we interviewed three farmers producing hull-less barley, one of them was only willing to make a short telephone interview. The latter one meanwhile stopped producing hull-less barley as demand for it was too low. He once also cultivated seeds of hull-less barley. The other two producers cultivate hull-less barley as a small niche product (they sell also hull-less barley flour (mixed with other crops such as spelt) and cereals containing hull-less barley. One producer only sells to end consumers; the other one mainly produces for health food stores, organic food shops. The main USP of hull-less barley is the health claim.

Knowledge and technology of actors / entry barrier: According to the interviewees, they decided to produce hull-less barley mainly as a complementary crop and interest in old crop varieties. They were simply curious about the crop. As only small quantities are produced, it was not difficult to enter the market. However, it takes time until clients get to know the product and accept it but this is, strictly speaking, no entry barrier but a significant market barrier.

VC capacities and organization

Vertical and diagonal linkages: Important suppliers are Ökokorn Nord (variety “Binora”) from Germany; farmers, however, also propagate seeds themselves. One of the last Austrian seed providers died recently, the cultivation of hull-less barley seeds therefore seems to be more or less non-existent in Austria as larger corporations have no interest in it due to small demand (only small farms were mentioned in the interviews propagating small quantities). So as long as seeds are still available from Germany, there seems to be no big issue to be able to cultivate hull-less barley. If these companies decide to reduce propagation as well or even have it expired, the situation will worsen, of course. It is then also possible that the cultivation of hull-less barley disappears in Austria.

Concerning their sales, the farmers have cooperations with health food shops and other retailers, but they also sell their products directly to end consumers.

Horizontal linkages: One interviewee cooperates with a company harvesting and cleaning the hull-less barley (organic farm with the adequate machinery). The other one reported no horizontal linkages for hull-less barley (there are some for other crops of the interviewee). In marketing, this very farmer cooperates, however, with a farmers’ association (the other one doesn’t for hull-less barley; i.e. reverse behaviour in comparison to production).

Knowledge and technology of actors: As to the necessary knowledge and technology to enter the market, the interviewees refer to their long-lasting experience as farmers, talks with colleagues and consultants (Austrian chamber of agriculture), and their own research based on self-motivation.

Resource and infrastructure

Inputs availability: Up to now, the interviewed farms didn’t report big issues with the purchase of seeds from Germany; however, as no significant seeds production is located in Austria, producers are depending on imports. In the last two years, it was quite problematic to recruit enough qualified labour force. This is still the biggest issue concerning inputs.

Existing and required infrastructure: The production technology is an existing one, if a farmer decides to leave the market again, it can be used for other crops. The most significant cost factor is labour force. According to one interviewee, the limitation of this cost factor could become less important if he succeeds in widening the turnover for hull-less barley.

Logistical issues: Deliveries are done via the own vehicle fleet, dispatching the refined food (parcel shipping), and collection by the customers.

Volume & capacity of processing facilities: One interviewee wants or would increase production (in particular, if market demand rises), one doesn’t. Capacities would be sufficient in any case.

Market conditions

A main triggers of marketing hull-less barley are the health benefits of this crop and rising health consciousness in parts of the population. As mentioned above, hull-less barley is considered to be very healthy and nutritious in comparison to common barley, since the mechanical hulling process is omitted, during which a lot of nutrients are lost (Paradeisa.at, 2022). A sidenote: One farmer also mentioned that it was easier to sell hull-less barley at the beginning of the Covid-19 crisis, as people started to horde durable food (also hull-less barley could benefit from this changed consumer behavior).

Market trends and demand: The health trend supports hull-less barley sales. If the Austrian retail sector will put hull-less barley food into its shelves, the demand will rise significantly; according to this opinion, it mainly depends on this sector of the VC if hull-less barley will become an accepted crop with higher sales in Austria. This market trend is considered to be possible, because hull-less barley has – besides its USP as healthy – some other positive characteristics: naturalness, positive effects on climate change (sustainable crop), additional variety in retail.

Marketing: The main benefit of hull-less barley food products is their healthiness (consumers might consider it as a regional and sustainable crop if produced in Austria). This is the main and only trigger

for marketing hull-less barley. Up to now, the interviewees are not expecting large growth rates in the future. Customer relations are long term oriented, all interviewed farmers mentioned that. Their customer relation mainly is based on word-of-mouth activities, there were no real market research and communication activities reported. Price levels are satisfactory; the interviewees calculate the prices for their niche products themselves, depending on harvest yields. The quality is depending on weather conditions but also availability of qualified labour force. The interviewees reported high quality, higher prices, broad offer of products, and customer proximity.

In general, farmers said that is quite difficult to offer constant qualities. Further, it might happen to have enough quantities of the requested products because storage is problematic. Also, general contamination was mentioned as an issue.

Distribution channels: Farmers sell either directly to end consumers on farm shops or online (parcel shipments). They also sell to specialised retailers.

Framework conditions

Regulatory & institutional environment: The farmer reported no regulatory incentives etc. that could further promote hull-less barley in Austria. To make the crop more interesting to producers, high prices and better information of consumers are required. The interviewees are both certified (organic); this might be an important prerequisite to be successful in the niche market.

Role of public sector (support, policies, etc.): Confirming the interviewed farmers, the public sector is not really relevant for them. In general, consulting is accepted (from chambers, etc.), but no further details are available (it is also doubtful to get significant additional information about hull-less barley as the interviewees are experts in the field).

1.4.4 Wholesalers

We interviewed no wholesalers as there are no specialised actors available in the Austrian hull-less barley VC (selling hull-less barley seeds, hull-less barley from farmers, hull-less barley flakes and other processed food). Seeds, for instance, are usually imported from Germany.

1.4.5 Food processors

We interviewed five food processors. However, we conducted four short telephone interviews and only one in-depth interview with a food processor. This food processor is a farmer as well; the input of this interviewee is therefore part of chapter 1.4.3 Producers (farmer). Therefore, the following text only refers to more general details all interviewees provided concerning hull-less barley. This limitation is, again, justified because of the limited market relevance of hull-less barley in Austria.

In general, the success of Austrian food producers in manufacturing food using hull-less barley was rather limited. One big brewery developed a beer speciality based on black hull-less barley. During the malting process, the brewer was not really satisfied with sensory, also the ready-made beer was unsatisfactory. The flavour was not adequate, therefore the brewery decided to stop introducing hull-less barley into their manufacturing processes. This outcome is replicated by the experience of the other interviewed food producers who experimented some time with hull-less barley. All decided against it mainly based on flavour issues. Also processing hull-less barley is reported to be an issue.

1.4.6 Wholesalers and Retailers

We made one interviews with one wholesaler, one wholesaler/retailer and two small retailers. All of them have hull-less barley in their assortment. Hull-less barley is mainly sold as barleycorn (to be cooked). The wholesaler also sells food from other CROPDIVA crops (oat: muesli, cereals, muesli bars,

snacks, etc.; lupine: meat substitutes, grist, coffee, mixed spices; fava beans: ingredient for vegan meat substitutes, protein additive for food supplements, convenience food, frozen fresh beans). The trade companies decided to sell hull-less barley food mainly because there was obviously demand from customers (from the market), but also because it is still available in the Austrian market even though, in most cases, it has to be imported. The retailer selling via his farmer shop also mentioned that he wants to support old varieties; therefore, he also propagates seeds.

VC capacities and organization

Vertical, horizontal and diagonal linkages: The interviewees mentioned different cooperations to get hull-less barley. Hull-less barley is mainly imported from Germany, one retailer buys from a small Austrian producer, one retailer (a small farmer shop) cultivates hull-less barley for food processing by himself. Seeds are coming from a small organic farm in Austria. The wholesaler/retailer imports the products exclusively from Germany.

Concerning sales, the wholesaler mainly sells the hull-less barley food to small retailers (health food stores etc.), via the online shop small quantities are sold directly to end consumers. The retailers sell their products to end consumers, one retailer also reported to sell limited quantities to other regional retailers such as farmer shops.

Market conditions

Market trends and demand: Confirming the interviewees, hull-less barley is a small niche product in the Austrian food market. It is not difficult to get the products, as quantities are very small, it is not a problematic food product. Actual demand for hull-less barley is very low, and most interviewees don't expect that this will change in the near future. It might be possible that rising health (and environmental) consciousness might support hull-less barley as well. Also, regionality and veganism might help the market. But the interviewees are not very sure about that. Most of them were not able or willing to predict any market developments of hull-less barley. And it was also mentioned that in times of crisis, consumers are getting more price sensitive, this might be an important obstacle for the development of a market for premium products.

Marketing: The main benefits of hull-less barley are: sustainable, healthy, vegan, regional, supporting the local agriculture, substitute to wheat. The main obstacle for marketing hull-less barley seems to be that consumers have little to no knowledge about it. If they are price sensitive, selling premium products is difficult, of course. However, there seems to be a market for regionally produced, organic, old varieties as a substitute for wheat. Also, food processors have no real incentive for integrating hull-less barley into food manufacturing. Besides the fact that hull-less barley is, to some extent, in need of an explanation, correct storage is mandatory. Limited yields and comparably high price level might be an obstacle for marketing hull-less barley, as well. Therefore, it is not very surprising that hull-less barley food is still a very small niche in Austria: It is not very popular or famous; consumers have little to no knowledge about the benefits of hull-less barley; there are a number of food alternatives such as spelt, wheat; it is not part of the recipes of the Austrian population; also, the taste of it might be an issue. Interviewees thought of a mixture of different communication tools to get hull-less barley out of the niche: advertising, storytelling, creating experiences, articles in the press, influencer marketing, information campaigning, promoting hull-less barley as a healthy, traditional, high-quality food product. And, as always, word-of-mouth is a priority. However, marketing hull-less barley cannot be a core issue for the food trade sector, assortments are too large to be able to focus on tiny niche products. At best, it could be part of the marketing of mills, food processors, farmers associations. However, if larger retailers see a potential in hull-less barley, this could be a huge trigger as well.

1.5 Discussion

Confirming our interviews, hull-less barley is a very small niche in the food market. It was even difficult to recruit experts who are able to answer our questions. Barley itself is a widely used product, but hull-less barley is a mostly unknown variety at the Austrian market. Seeds are usually imported from Germany or bred at small local farms. As consumers seem to have little to no knowledge about the benefits of hull-less barley (healthy, sustainable, regional, etc.), knowledge transfer has the highest priority to develop the market. Hull-less barley as a truly underutilised crop has some potentials, but it will be hard to get it out of the niche at the Austrian food market. This is a little bit of a contradiction to publications from literature dealing with the potentials of hull-less barley (Bhatty, 1999). Within this publication, Bhatty (1999) showed empirical evidence of the benefits and potentials of hull-less barley within a review publication. Although already published 20 years ago, the article seems to be still valid. However, as we saw from the examples above (brewer trying to integrate black hull-less barley into production processes). Although hull-less barley has a number of advantages in the brewer process, flavour seems to be an issue. So, we have to agree Dickin et al. (2010): the under-utilisation of hull-less barley in the food market is also in Austria a missing opportunity – Dickin et al. (2010) said the same for the UK – but in times of worsening health problems within the population (obesity and type-2 diabetes, to name important threats) the market growth for healthy food might also help marketing hull-less barley food products and finally support cultivation of hull-less barley within the agricultural production in Austria as well, even though harvesting and yields are an issue compared to common barley.

Consumer awareness and a lack of information are a real threat for this market. Up to now, only limited knowledge within the population about the benefits of hull-less barley seems to be existent. One of the core tasks of marketing are therefore informing people about hull-less barley using various communication tools simultaneously.

Challenges, strategies and potentials and benefits

The interviewees of the VC were asked to name the most important challenges, strategies to meet these challenges and potential and benefits for the actors of the VC. The outcome of it is summarized in Table 2 for each stage of the VC. High quality production and consumer information seem to be the most important issues in the VC.

Table 2. 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	– no data available –		
Producers (farmers)	<ol style="list-style-type: none"> 1. High quality production 2. Getting information to end consumers (higher awareness) 3. Right time of harvest, yields 4. Cost effective labour force 5. Price levels 	<ol style="list-style-type: none"> 1. Cooperation 	<ol style="list-style-type: none"> 1. Short term no potential for growth 2. Long-term small growth
Food Processor	<ol style="list-style-type: none"> 1. Right time of harvest 2. Producing high quality, careful cleaning 3. Fair prices 4. Cost effective labour force 	<ol style="list-style-type: none"> 1. Cooperation 	<ol style="list-style-type: none"> 1. For market growth, influencing public opinion is mandatory
Wholesaler	<ol style="list-style-type: none"> 1. Availability of hull-less barley (quantity and quality) 2. Attractive prices 3. Consumer acceptance and knowledge (broad information) 4. Communication and persuasive efforts 	<ol style="list-style-type: none"> 1. Communication, cooperation with stakeholders 2. Providing information to market partners via media 3. Storytelling 	<ol style="list-style-type: none"> 1. (Slightly) increasing demand (Interviewees are in general uncertain about the forecast)
Retailer	<ol style="list-style-type: none"> 1. High quality 2. More activity in the market 3. More information about product (health benefits, usability) → increasing awareness 4. Increasing understanding for higher prices 5. Higher promotion for hull-less barley cultivation 	<ol style="list-style-type: none"> 1. Providing information to market partners 2. Marketing support 3. Efficient strategies to overcome crisis 4. Efficient strategies from the industry to increase consumer awareness 	<ol style="list-style-type: none"> 1. Rather stagnating market (uncertain forecast)

1.5.1 Limitations

The limitations of the study are related are threefold: the (1) *qualitative nature* of the VCA; (2) the *unwillingness of VC actors* to be available for interviews; (3) the true nature of the VC as a very small niche in Austria.

(1) It is obvious that our sample of interview partner *cannot be representative for all hull-less barley value chains* in Austria. We followed a snowball approach for our study. First, we searched for farmers or food processors in the chain and then we asked them to indicate their VC partners, which we contacted for further interviews. It was impossible to find experts/actors for specific stages of the VC which is a clear signal towards the reduced importance of the VC in Austria.

(2) With some of the interviewees it was only possible to make a short telephone interview. These actors usually tried hull-less barley in the past but were disappointed about the results and stopped using it in their production processes or assortments.

(3) As the market for hull-less barley in Austria is very small and a real niche in the food market, it was impossible to identify market participants at every stage of the VC.

1.6 Synthesis

Hull-less barley for is not at all new to the food market. Nevertheless, the market is really small in Austria. There are no significant seed producers located in Austria (seeds are rather imported from Germany). Consumers seem to be unaware of the health and sustainability benefits of hull-less barley.

Therefore, the most important and mandatory activity to develop the market is informing end-consumers about it. As Bhatti (1999) showed in their contribution already 20 years ago, hull-less barley has some real benefits compared to other food alternatives. Nevertheless, these characteristics are still widely unknown, knowledge transfer is therefore the most important activity. Nevertheless, there might be some other issues (yields, prices, flavour) that have to be met. In this respect we agree Dickin et al. (2010), hull-less barley has huge potentials in the market for healthy food. The biggest challenges will therefore be (1) to inform the public about them and (2) to meet existing shortcomings of hull-less barley in view of agricultural production and food processing.

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