Some Faba Beans and a Nice Chianti

Prospects and Challenges for Increasing the Production of Faba Beans as Food

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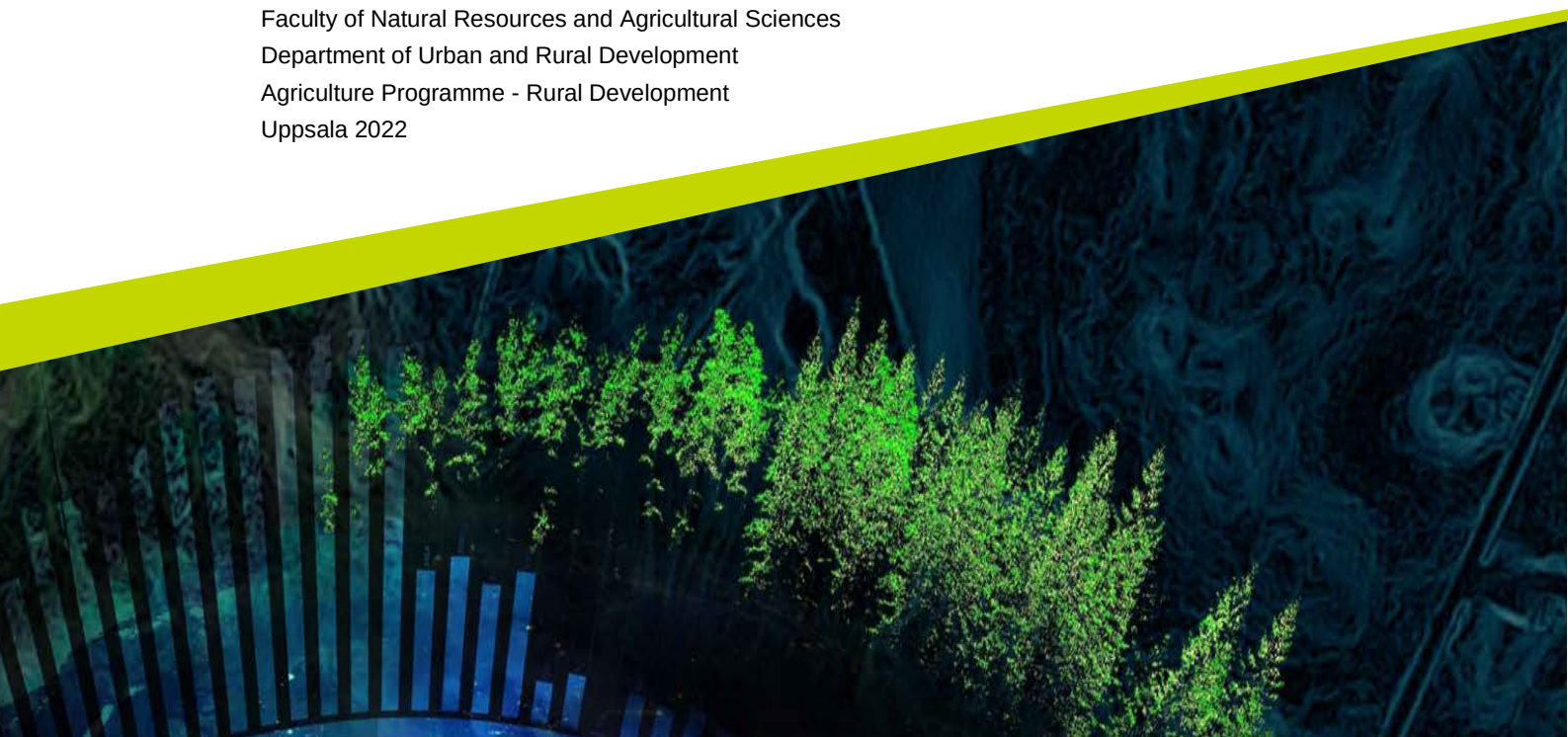

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Abstract

Swedish produced faba beans have recently been acknowledged as a sustainable food product containing important nutrition and are produced with low environmental impact. Faba beans belong to the group of protein crops and have great potential to replace resource-demanding proteins, but today the crop is exclusively used as feed in Sweden. This study aims to understand how faba beans can play a role in the transition towards a sustainable diet as well as to investigate what prospects and challenges such transition may face. Cultivators and food processors constitute important actors within the production chain as well as possess certain valuable knowledge. The aim is hence narrowed into three research questions concerning how cultivators and food processors view faba beans and work practices related to the production, possibilities and restrictions in increasing the production of faba beans as food, and how the views from cultivators and food processors differ from each other. To approach the aim and questions, nine qualitative semi-structured interviews with cultivators and food processors were conducted, followed by applications of a summative content analysis and a conventional content analysis on the interview materials. The two content analyses aim to, in different ways, identify, summarise and adequately reflect the interview content.

The findings suggest that the role of faba beans is wide as it functions as food and feed as well as a means to gain economic returns and a means to address sustainability issues. The cultivators tend to view faba beans as feed and a tool to generate economic returns, and experience cultivation as positive, negative and neutral. However, they view food processing as mostly negative. Often, the cultivators experience the work practices in relation to the possibility to gain economic returns. The food processors tend to view faba beans as food and a means to combat sustainability issues, and experience cultivation and food processing as most positive or neutral. Often, the food processors experience the work practices in relation to a progressive work that mitigates environmental impact. Further suggested by the findings, the cultivators experience four aspects of possibilities for increasing the production of faba beans as food, which include access to knowledge, possible economic returns, cropping advantages and health benefits. Restrictions include cropping disadvantages, low economic returns, unsuitability as food and suitability exclusively as feed. The food processors experience six aspects of possibilities, including food security, environmental benefits, possible economic returns, cropping advantages and product development. Restrictions concern structural obstacles, cooperation networks, cropping disadvantages and novel food. Finally, the cultivators and food processors understand possibilities and restrictions differently, and a conclusion drawn is that depending on the perspectives reasoned from, possibilities and restrictions are understood differently.

The results supplement previous research and contribute to an understanding from a Swedish perspective and a food production perspective. In combination with previous research, the results may enable a transition towards a more sustainable diet, which in the longer term is a means to combat critical environmental issues.

Keywords: Faba beans, cultivation, food processing, food, possibility, restriction, summative content analysis, conventional content analysis

Sammanfattning

Svenskt producerade åkerbönor har på den senaste tiden identifierats som en hållbar livsmedelsprodukt. Åkerbönor produceras med lågmiljöpåverkan och tillhör gruppen proteingrödor som innehåller viktiga näringsämnen. Grödan har stor potential att ersätta proteinprodukter som har producerats under mer resurskrävande produktionssystem med högre miljöpåverkan, men idag används åkerbönor nästan uteslutande som foder. Därmed syftar denna studie till att förstå hur åkerbönor kan spela en roll i övergången till en hållbar kost samt undersöka vilka möjligheter och hinder en sådan övergång kan stå inför. Odlare och livsmedelsförädlare utgör viktiga komponenter i produktionssystemet och de besitter värdefull kunskap. Syftet besvaras därför med hjälp av tre forskningsfrågor som rör hur odlare och livsmedelsförädlare ser på åkerbönor och arbetet relaterat till produktionen, möjligheter och utmaningar för att öka produktionen av åkerböna som livsmedel samt hur synsätten från odlare och livsmedelsförädlare skiljer sig från varandra. För göra detta genomfördes nio kvalitativa semistrukturerade intervjuer med odlare och livsmedelsförädlare, följt av tillämpningar av dels en summerande innehållsanalys och dels en konventionell innehållsanalys på intervjumaterialet. De två innehållsanalyserna syftar till att på olika sätt identifiera, sammanfatta och adekvat återspegla intervjuinnehållet.

Resultaten tyder på att åkerbönans roll är bred eftersom åkerbönor fungerar som både mat och foder samt som både ett medel för att få ekonomisk avkastning och ett medel för att bekämpa problem relaterat till hållbarhet. Odlarna tenderar att se åkerbönor som foder och ett sätt att få ekonomisk avkastning. De upplever odling som positivt, negativt och neutralt, men livsmedelsförädling som mest negativt. Oftast upplever odlarna själva arbetet i relation till möjligheten att få ekonomisk avkastning. Livsmedelsförädlare tenderar däremot att se åkerbönor som livsmedel och ett medel för att bekämpa problem relaterat till hållbarhet, och de upplever både odling och livsmedelsförädling som mest positivt och neutralt. Oftast upplever de själva arbetet i relation till ett progressivt arbete som minskar miljöpåverkan. Vad som ytterligare föreslås av resultaten är att odlarna upplever fyra aspekter av möjligheter att öka produktionen av åkerbönor som mat. Dessa aspekter inkluderar tillgång till kunskap, möjlig ekonomisk avkastning, odlingsfördelar och hälsofördelar. Utmaningarna inkluderar odlingsnackdelar, låg ekonomisk avkastning, olämplighet som livsmedel och uteslutande lämpligheter som foder. Livsmedelsförädlarna upplever sex aspekter av möjligheter, vilka inkluderar livsmedelssäkerhet, miljöfördelar, möjlig ekonomisk avkastning, odlingsfördelar och produktutveckling. Utmaningarna inkluderar strukturella hinder, samarbetsnätverk, odlingsnackdelar och ’Novel Food’. Slutligen upplever odlarna och livsmedelsförädlarna olika möjligheter och hinder, och en slutsats som dras är att beroende på de perspektiv som aktörerna resonerar utifrån så förstås möjligheter och utmaningar olika.

Resultaten kompletterar tidigare forskning och bidrar till en förståelse ur ett svenskt perspektiv och ett livsmedelsproduktionsperspektiv. I kombination med tidigare forskning kan resultaten möjliggöra ett underlag för en övergång till en mer hållbar kost, vilket på sikt är ett medel för att lösa kritiska miljörelaterade problem.

Nyckelord: Åkerböna, odling, livsmedelsförädling, livsmedel, möjlighet, utmaning, summativ innehållsanalys, konventionell innehållsanalys

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1. Introduction

The subject of food systems currently represents one of the “grand challenges” faced by the world (Marsden & Morley, 2014). Mankind has entered a new paradigm of destabilisation of the food systems that has urged mankind to recognise the connection between food systems, sustainability, supply, access and justice (ibid). The demand for animal protein is increasing, while the livestock sector is among the top three generators of the most urgent environmental issues, including local, regional, national and global scales with various consequences at different locations worldwide (Pelletier, 2008). Environmental problems include global warming, biodiversity loss, land degradation, and water and air pollution. (ibid). The livestock sector occupies almost 80% of the global agricultural area (Ritchie, 2017). However, less than 20% of the supply of calories is provided by livestock production. This indicates that what type of food we consume is more relevant than how much food we consume in determining the amount of agricultural land area needed to produce what we eat. (ibid). In addition, the demand for livestock production has also fuelled an expansion of the man-made agricultural land, resulting in losses of forest areas and natural ecosystems (Smith & Gregory, 2013). The expansion has increased the pressure on the ecosystem services significantly, which has fuelled the loss of these services (ibid). The pressure on ecosystems has, and is, causing severe threats to livelihoods and food security in vulnerable societies in the Global South (Marsden & Morley, 2014).

Hence, it appears increasingly evident that in order to sustainably supply food to a growing world population, in regard to all dimensions of sustainability, progress in the production site alone is insufficient (Röös *et al*., 2018; Wendin & Nyberg, 2021). A shift towards less resource-demanding food consumption habits in Western countries, with reduced impact on the environment, is evidenced particularly essential in order to diminish the environmental burden caused by current food systems (Röös *et al*., 2018). A less resource-demanding food consumption consists of diets comprising more plant-based food products and less animal food products (ibid). Legumes inhabit great potential to provide plant-based proteins when sustainably replacing animal proteins (Tidåker *et al*., 2021). An issue important to highlight is the variation of sustainability in relation to where and how legumes are produced, processed, and transported. Legume food products produced and processed in Sweden cause a significantly lower impact on climate and

biodiversity loss in comparison to commonly imported legumes found in Swedish supermarkets. (ibid). Promoting a sustainable supply of plant-based proteins domestically, including legume food products, the domestic food systems are also strengthened (Lantbrukarnas Riksförbund, 2019). The Swedish self-sufficiency rate currently is 50%, and the current food consumption is heavily dependent on food import through global trade links. However, with a higher self-sufficiency rate, the food supply becomes more resilient to different types of crises or trade barriers. Resilience is just as much about providing space for more sustainable production, and greater opportunities for consumption and export of sustainable food with lower climate impact as resilience is as much as about more stable job opportunities in Sweden. (ibid).

Faba beans are cropped widely in Sweden, and the crop is almost used exclusively as feed for livestock (Johansson *et al*., 2022). However, faba beans are considered a promising alternative to imported legume food products and meat-based protein products (Johansson *et al*., 2022; Labba *et al*., 2020; Röös *et al*., 2018; Langton *et al*., 2020; Ferawati *et al*., 2021). Developing a food production chain focusing on faba beans as food faces a range of possibilities and obstacles (Röös *et al*., 2018) Thus, this study intends to provide a deeper understanding of faba beans as food as well as of possibilities and obstacles for producing the beans as food in Sweden.

1.1 Aim and Research Questions

The purpose of the master project is to understand how faba beans as food can play a role in the transition towards a diet that includes plant-based proteins. Beyond this, the purpose is also to provide an understanding regarding what prospects and challenges such transition may face. The master project intends to target the perspectives of the producers of faba beans, including cultivators and food processors. The following research questions guide the master project:

1. How are cultivators and food processors viewing faba beans as a raw product and experiencing work practices related to the production of faba beans?
2. What possibilities and restrictions do cultivators and food processors see in scaling up the production of faba beans as food?
3. How do the views of cultivators and food processors differ from each other?

1.2 Definition of Faba Beans

Faba bean (*Vicia faba L.*) originates from the Western part of the Fertile Crescent in prehistoric times and is a nitrogen-fixing grain legume crop (Etemadi *et al*., 2019; Karkanis *et al*., 2018; Fogelfors, 2015; Singh *et al*., 2013). Faba bean is a cool-season crop and is traditionally utilised as a source of protein for human and livestock nutrition (Etemadi *et al*., 2019; Carlsson, 2018). The genus Vicia belongs to the family Fabaceae which is colossal in a number of species with distribution covering locations worldwide. Different species of faba beans are presently cultivated in highlands, lowlands, temperate areas, savannas and arid regions. (ibid). Its global acreage in 2014 was 2.1 million hectares, and yields vary between different regions (Karkanis *et al*., 2018). As a cool-season legume, faba beans may constitute a suitable crop for different cropping systems in shorter-growing season areas (Etemadi *et al*., 2019) such as the Middle and South parts of Sweden (Fogelfors, 2015). In Sweden, various species of faba beans are currently grown (ibid). They differ in attributes and characterisations suitable for different farming conditions and different usage purposes (Åkerfeldt & Wivstad, 2020). Although breeding activities on this crop have been absent in Sweden since the 1990s, attempts to increase such activities are currently made in order to develop different characteristics (Grimberg, 2019). The cultivation of faba beans in Sweden occurs in both conventional farming systems and organic farming systems (ibid).

1.3 Delimitations of the Thesis

The study does not include an international perspective. Instead, the study intends to pay attentions toward faba beans produced in Sweden. Due to methodological limitations, including time aspects, the focus is exclusively on capturing the experiences of faba bean cultivators and faba bean food processors within the supply chain. The research interest is limited to understanding how these actors relate to and understand faba beans, work practices in relation to the production as well as possibilities and restrictions for scaling up the production of faba beans as food. Thus, perspectives from potential consumers of faba beans and supermarkets are excluded from this study. Furthermore, there is also a significant potential for increasing the production of faba beans as feed, but this study is not putting weight on the feed perspective. The focus is rather on faba beans as food. The limitation is also the basis for how the study is conducted.

The results of the study may advantageously be supplemented with other studies, which, for example, investigate the perspectives of consumers and supermarkets. An additional favourable supplementation may be studies which investigate what measures are required to overcome obstacles and take advantage of opportunities to scale up the production of faba beans as food.

1.4 Thesis Outline

The study is based on two qualitative content analyses, which affect the design of the thesis. The following chapter (2) contains an in-depth review of the methodological framework in order to create transparency in what the data used consists of as well as in how the data is understood and interpreted. The next chapter in the outline (3) constitutes a presentation of the research context to provide an understanding of relevant previous research on faba beans, how this study contributes with a broader understanding of the subject and how the current production of faba beans is conducted in Sweden today. The fourth chapter (4) is dedicated to the findings from the study. This chapter may appear as technically written, but this was done methodologically and theoretically in accordance with the concept of qualitative content analysis when applied on the empirical data. As a result, the empirical material is not presented extensively, rather, only some parts from the empirical material are presented in order to demonstrate examples of how the results are interpreted. The last chapter (5) presents the conclusion drawn from the findings.

2. Methodological Framework

The research design has obtained an explorative approach with the intention to generate knowledge within a research gap on producing faba beans as food (cf. Bowen, 2006). The exploratory approach implies that the study is not only exploratory, but also that the highest possible amount of knowledge regarding the subject is obtained based on methodological and resource conditions (Patel & Davidsson, 2011). Thus, the study may both comprehensively expose a research problem and generate knowledge for future studies. The following chapter presents the methods both for data collection (2.1) and data analysis (2.2).

2.1 Data Collection

Data collection in this study has consisted of qualitative interviews with cultivators of faba beans and processors of faba beans to reach an understanding of the interviewees' point of view on various phenomena related to faba beans as food. The phenomenon concerns faba beans as a raw product and work practices related to the production as well as possibilities and restrictions in increasing the food production of faba beans. After the interviews were conducted, relevant literature was collected to obtain a deeper understanding of the narratives provided by the interviewees. The details on the data collection are provided below.

2.1.1 The Qualitative Research Interview

The collection of the empirical data has consisted of conducting qualitative interviews with cultivators and processors of faba beans, where the experiences of the interviewees are in focus (Teorell & Svensson, 2007; Kvale & Brinkmann, 2014). Qualitative interviews have provided an in-depth and broad understanding of the interviewees' views on the phenomenon of faba beans (ibid).

Two interview guides were constructed to outline questions suitable for both producer groups: *cultivators* and *processors*. To fulfil the purpose, the questions focused on how faba beans and related work practices are experienced and how opportunities and restrictions are considered. Although the questions are relatively similar, some words and formulations differ to suit the groups. The questions were pre-determined to a large extent, however, space for additional unplanned

questions, based on the statements of the participants, was allowed. Follow-up questions in the interviews entail a less structured approach of the qualitative interviews, and abled participants to provide detailed and reliable answers (Robson & McCartan, 2002). Less structured approaches also contributed to the collection of multifaced data revealing new angles on the complexity of the phenomenon of faba beans (ibid). This was essential to examine the complexity of how the participants view different aspects of faba beans and faba beans production.

All interviews were recorded. The recording tool simplified the process of transcription and enabled the capture of the exact formulations of the narratives provided by the participants. However, the interviews were conducted in Swedish to minimize the risk of linguistic misunderstandings. Quotes from the narratives presented in the text have been translated to English, but with caution to preserve the essence of the narratives. Since the interviewees operate in different parts of Sweden, the interviews were conducted via digital tools. Conducting interviews through video functions can widen the geographic distribution and function as an alternative to face-to-face interviews that may limit the study to a particular area (Creswell & Creswell, 2018). Although it is known that body language and gestures are lost in interviews conducted via telephone (Opdenakker, 2006), some of them can be captured using the video function (Creswell & Creswell, 2018). Due to the geographic distribution of the interviewees and the opportunity to capture some body language and gestures when performing the interviews via digital tools, this approach was satisfactory for the purpose of the study.

Ethical considerations are important when conducting interviews, where four main requirements should be followed (Vetenskapsrådet, 2002). The requirements refer to information, consent, confidentiality and utilization (ibid). To fulfil this, the research participants were informed about the purpose of the study and the interviews, and my role as a student. The participants were also ensured that they could withdraw at any time, they are kept confidential and the data collected is only used for research purposes for this study. Moreover, to ensure confidentiality, pseudonyms are used throughout the thesis, and certain details in the informant's statements are excluded.

2.1.2 The Interview Sampling Procedure

The sampling of research participants was prepared through meetings with supervisors. The intention was to broaden the understanding of the research area, identify potential research participants who may contribute with data, and discuss relevant interview questions. As a result, cultivators in both conventional and organic farming systems, as well as food processors, were contacted through email. These groups were considered to constitute major actors in the production chains of faba beans as food and thus relevant to target when studying this type of production. In other words, the sample of the study is a result of a strategic selection

of interview participants, meaning that the actors that may contribute with data relevant to the research purpose were selected (Eriksson Barajas *et al*., 2013). The sample of this study consists of nine actors (recording units) with different professions in the production chain of faba beans. *Table 1*. provides a shorter description of the research participants. The research participants will be referred to as *recording units* in the results to keep consistency throughout the study.

Table 1. List of the recording units.

Recording unit	Description
1	Cultivator; organic farming system
2	Cultivator; organic farming system, and processor of food
3	Cultivator: organic farming system, but plan to convert to conventional farming system
4	Cultivator; conventional farming system
5	Cultivator; conventional farming system
6	Cultivator; works in a cooperation of farmers operating in both conventional and organic farming systems, and processor of food
7	Processor of food
8	Processor of food
9	Processor of food

Due to methodological limitations, the sampling consists of a narrow number of interview participants that may not ensure a statistical representation (Teorell & Svensson, 2007). Since literature, however, will be applied to the narratives, the narrow selection becomes less important. This may enable a certain degree of generalisation. (ibid).

2.1.3 The Collection of Literature

The collection of literature has been inspired by two methods: A *systematic review* and *a non-systematic review*. A non-systematic review intends to be an informative review of the literature on a certain subject (Huelin *et al*., 2015). This was done to generate an in-depth approach to qualitative content analysis, theoretical concepts and various aspects highlighted by the interviewees. The findings in this literature were connected to the discussion of the results. A systematic review, however,

intends to comprehensively collect all relevant data available on a topic (Huelin *et al*., 2015). This approach is considered a gold standard concerning evidence assessment (ibid). The systematic review was conducted when collecting data on faba beans. This was done to generate an in-depth approach to faba beans, map previous research and identify a research gap. Search phrases were developed to capture relevant literature on faba beans, and all searches were conducted in four databases, respectively: *CAB Abstracts*, *AGRIS*, *Food Science & Technology Abstracts (FSTA)* and *Google Scholar*. *Table 2*. presents the search phrases.

Table 2. Literature search phrases on the topic of faba beans for the systematic review.

	Search phrases
Search phrase 1	(“faba bean*” OR “fava bean*” OR “åkerbön*” OR “vicia faba”) AND (cultivation OR odling) AND (production OR production OR förädl* OR processing) AND (Sverige or Sweden)
Search phrase 2	(“faba bean*” OR “fava bean*” OR “åkerbön*” OR “vicia faba”) AND (production OR production OR förädl* OR processing) AND (food OR mat OR livsmedel)
Search phrase 3	(“faba bean*” OR “fava bean*” OR “åkerbön*” OR “vicia faba”) AND (food OR mat OR livsmedel) AND (production OR production OR förädl* OR processing) AND (Sverige or Sweden)
Search phrase 4	(“faba bean*” OR “fava bean*” OR “åkerbön*” OR “vicia faba”) AND (cultivation OR odling) AND (Sverige or Sweden)

2.2 Data Analysis

The analysis of the interviews derives from the concept of *qualitative content analysis*. Qualitative content analysis is a concept enabling subjective interpretation of text data via a systematic classification process of identifying and coding certain patterns or themes (Hsieh & Shannon, 2005). The aspect regarding subjective interpretation when using qualitative content analysis requires detailed reasoning of the method and a transparent presentation of the application (Lundman & Hällgren Graneheim, 2008). In this study, two different approaches to content analysis were applied: one of more quantitative character and one of more qualitative character. These applications derive from the approaches of *summative content analysis* and *conventional content analysis* (Hsieh & Shannon, 2005). The summative content analysis is more quantitative and intends to enable an understanding of how faba beans and the work practices related to faba beans are viewed by the producers. This is the first step of the analysis applied to arrange the

empirical data and identify patterns of similarities and differences between the actors (cf. Bergström & Boréus, 2013). The identified similarities and differences reveal patterns and enable groupings of the actors (ibid). The second step is the application of conventional content analysis, which is done based on the findings from the first step. The experiences regarding potential possibilities and restrictions for scaling up the production of faba beans as food are analysed from the groups based on the findings from the first step (cf. Lundman & Hällgren Graneheim, 2008). This is done in order to capture the differences in the experiences between certain actors (ibid). As a result of the analysis, the result chapter is not detailly outlining the interview material, rather, the interview material is presented in a concise and summary manner, but this is done methodologically and theoretically in accordance with the concept of qualitative content analysis. Further, the collected literature on various phenomena, found in the interview material, was applied in order to provide a deeper discussion of the content. Literature on theories concerning *rationality* provided by Habermas (1986) and *capital* provided by Bourdieu (1985) were also applied to add to the complexity of the content.

Content analysis is often applied to textual material and the text unit exposed for analysis may be referred to as the *recording unit* (Bergström & Boréus, 2013). In this study, the narratives from nine actors constitute nine recording units.

2.2.1 Summative Content Analysis

Within the first step in the content analysis, the intention is to quantify the usage of certain words or content and to quantify the contextual usages of these. In this case, the contents of interest are how faba beans as a raw product and work practices related to faba beans are viewed. *Summative content analysis* provides tools for quantifying not only the manifest appearance of particular content in textual material but also include latent content (Hsieh & Shannon, 2005). This means that the focus also points towards discovering underlying meanings of words or content. Alternative terms for the specific content may thus be identified in order to more accurately capture the frequency of certain contents. (ibid).

Rolling out a summative content analysis in this study, *coding schemes* were developed to function as guidance for the analysis. Coding schemes are analysis instruments, constructed for manual analysis of textual material, that indicate what should be noted in the texts (Bergström & Boréus, 2013). Before constructing the schemes, the recording units were reviewed multiple times to achieve certain knowledge of the content. This process led to the development of two coding schemes, which include defined *coding units* and *variables*.

Coding units are the labels for certain words or content intended to be quantified (Bergström & Boréus, 2013). In this study, certain words and phrases were identified as different coding units. These were later quantified to reveal how faba beans as a raw product is viewed and how work practices related to faba bean

production are described in the different recording units. The exact coding units were not pre-determined, however, they emerged throughout the analysis process of the data. This strategy was used to ensure that no perspectives were excluded. As a result, four coding units were identified and used as a guide for quantifying when the analysis was conducted. *Table 3*. presents the coding units within the summative content analysis used in this study.

Table 3. Presentation of the coding units in the summative content analysis.

Coding unit #	**Coding unit**
1	Faba beans as food
2	Faba beans as feed
3	Cultivation of faba beans
4	Processing of faba beans

Adding to the analysis, the coding units can 'vary' (Bergström & Boréus, 2013). A certain phenomenon may i.e., be described in a neutral, appreciative or derogatory way. The varying properties of the coding units are referred to as *variables*. (ibid). Three variables were included in the two coding schemes in this summative content analysis. Assigning these variables to the coding units means that the coding units are not only being quantified but also quantified in relation to the variables. This approach was applied in order to deepen the understanding of how faba beans and the work practices related to faba beans are viewed by the cultivators and the processors. *Table 4*. demonstrates an example of the variables of a coding unit in this study. All four coding units are ascribed to the same variables.

Table 4. Example of the variables of a coding unit in the summative content analysis.

	Coding unit #			
	Variables			
Described as:	Positive	Neural	Negative	Total
Frequency:	X	Y	Z	X+Y+Z = #

The first coding scheme in this summative content analysis was constructed to capture how the cultivators and producers view faba beans as a raw product. In this scheme, the two coding units are 'faba beans as food' and 'faba beans as feed' and the three variables are 'positive', 'negative' and 'neutral'. The second coding scheme was constructed with the intention to reveal how the cultivators and processors view the work practices related to the production of faba beans. In this scheme, 'cultivation of faba beans' and 'processing of faba beans' constitute coding units. The same three variables as for the first coding scheme are also included. However, the two coding schemes were first applied to the material as a test in order to decrease the space for losing perspectives. The coding schemes appeared to not exclude any perspectives on the function of faba beans and the work practices.

Furthermore, the coding schemes included two coding units each since these constituted different views on the same phenomenon, meaning that there may be a contrast to discuss. The different views will also be compared, which enabled groupings of the recording units. Space for comparing the views is thus included in both coding schemes, in which comparisons are revealed by demonstrating the ratios. *Table 5*. presents the coding scheme used for enabling an understanding of how faba beans are viewed by the cultivators and processors. *Table 6*. presents the coding scheme used for enabling an understanding of how the work practices of faba beans are viewed by the cultivators and the processors.

Table 5. Coding scheme 1 for the summative content analysis.

	Recording unit #		
	Faba beans as food	Faba beans as feed	Ratio
Positive	A	X	#:1
Neutral	B	Y	#:1
Negative	C	Z	#:1
Total	A+B+C = #	X+Y+Z = #	#:1

Table 6. Coding scheme 2 for the summative content analysis.

	Recording unit #		
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	A	X	#:1
Neutral	B	Y	#:1
Negative	C	Z	#:1
Total	A+B+C = #	X+Y+Z = #	#:1

To avoid any insecurities in the classifications of the coding units and related variables, certain *coding instructions* were developed. This also ensures transparency and thus increases the credibility of the analysis method. A coding instruction refers to a set of guidelines on how the identification and classifications of a coding unit should be managed (Bergström & Boréus, 2013). In this study, coding instructions were developed for both identifications of a coding unit and the specific variable. First, decisions on how to quantify certain coding units were made. This step often involves an in-depth analysis of the underlying meaning of the content since some coding units do not necessarily constitute manifest content (Isaksson, 2017). The coding instructions for this analysis were hence constructed to enable identification and quantification of the coding units that may be found latent in the textual material. Assigning variables may be a result of subjective interpretations (Lundman & Hällgren Graneheim, 2008). Therefore, criteria regarding assigning variables to the different coding units were also included in the coding instructions. The coding instructions for the variables may increase the

chance for another person to achieve the same results when coding the material. An example of the coding instructions for identifying the coding unit 'faba beans as food' and for assigning a variable to the coding unit are presented in *Table 7*. Coding instructions were developed for the other coding units as well, however, the process of assigning variables is the same for all coding units.

Table 7. Coding instructions for the coding unit 'faba beans as food' in summative content analysis.

Coding instructions	
Coding unit	**Faba beans as food**
Coding instruction	• 'Faba bean*' and 'food' are mentioned in the same argument • Synonyms to 'faba bean*' ('bean*', ''the crop*', 'the legume*') and 'food' are mentioned in the same argument. The synonyms must be interpreted in the context to ensure that the synonyms refer to the crop faba bean • 'Faba bean*' and synonyms to 'food' ('eat*', 'human consumption', 'for human*', 'for us') are mentioned in the same argument. The synonyms must be interpreted in the context to ensure that the synonyms refer to food • The synonyms of 'faba bean*' and 'food' are mentioned in the same argument. The synonyms must be interpreted in the context to ensure that the synonyms refer to correct content.
Variables	The variables must be understood in its context and there is space for subjective interpretations in order to capture underlaying meanings.
Neutral	= The coding unit are mentioned as a fact, without assigning either positive or negative values either to the coding unit itself or to other phenomena that are mentioned in connection the coding unit
Positive	= Appreciating words or arguments are used in connection to the coding unit, or the coding unit is mentioned in connection to other phenomena where appreciating words or arguments are used in connection to these phenomena.
Negative	= Derogatory words or arguments are used in connection to the coding unit, or the coding unit is mentioned in connection to other phenomena where derogatory words or arguments are used in connection to these phenomena.

Again, the summative content analysis was applied on textual material created from interview narratives. When a researcher conducts interviews, the interviewees are often allowed to speak freely about a certain phenomenon and the researcher may ask follow-up questions (Lundman & Hällgren Graneheim, 2008). Hence, the researcher becomes co-creator to the text and should provide detailed reasonings of the methodology to increase the credibility of the study (ibid). One certain key aspect in this study may be clarifications of how the coding units are quantified in the analysis, when space for additional questions during the interviews was allowed. The interview guides for the cultivators and the processors were similar except the questions related to the work practices. The amount and the essence of these questions were the same, however, the words describing the work practices were exchanged to fit the targeted professions. In the analysis, un-planned additional questions played a minor role in the quantification of the coding units. The coding units constituted arguments of a certain type. Thus, although follow-up questions were asked, they often concerned the same arguments and were not quantified multiple times. Instead, the follow-up questions could enable clarifications of the variables ascribed to the coding units, which decreased the space for misinterpretations in the quantification. In addition, the interviewees responded with different length and depths in their answers. The space for follow-up questions also increased the possibility to encourage less conversational interviewees to provide deeper responses.

Moreover, in qualitative content analysis focusing on quantifications, there are often deviation in the results both when the researcher repeats the coding and when another researcher applies the same analytical instrument (Bergström & Boréus, 2013). What the acceptable degree of deviation in the coding is depends on the extent to which different deviations in the assessment would affect the results the researcher may be interested in (ibid). In this study, the results of the quantification may not be exact due to the space for subjective interpretation, however, the results should highlight differences and similarities between the actors. Thus, the detailed instructions for the coding decrease the risk of too much deviation. This means that the provided results may face a risk of differing slightly, but not as much that it would affect the overall results.

2.2.2 Conventional Content Analysis

The second step in the content analysis intends to investigate the potential possibilities and restrictions for scaling up the production of faba beans as food. Conventional content analysis derives from a more qualitative approach and is generally used to describe a certain phenomenon (Hsieh & Shannon, 2005). In contrast to summative coding analysis, the intent is not to quantify certain coding units (Isaksson, 2017). Rather, the focus is to identify and understand aspects of a certain phenomenon and interpret certain narratives in regard to its contexts (ibid).

Applying a conventional content analysis as a second step of the analysis was done in regard to the findings of the first step of the analysis. As presented in the previous chapter, the summative content analysis intends to reveal similarities and differences between the recording units, and hence enable groupings of these units. Conducting a conventional content analysis, a more comprehensive analysis regarding possibilities and restrictions for scaling up the production of faba beans as food experienced by the different groups became possible (cf. Lundman & Hällgren Graneheim, 2008). Here, differences in the experiences between certain actors were captured. Capturing the differences decreased the risk of losing important perspectives. (ibid). Thus, the focus of this study is to understand the essence of the narratives related to possibilities and restrictions for scaling up the production of faba beans as food, which was done by ensuring coverage of multiple perspectives.

Findings from the first step of the analysis suggest a sorting of the recording units into two groups. This means that one conventional content analysis was applied to one group and another to the second group. However, the design of the analysis is the same for both applications. A flow chart of the conventional content analysis process in this study is presented in *Figure 1*.

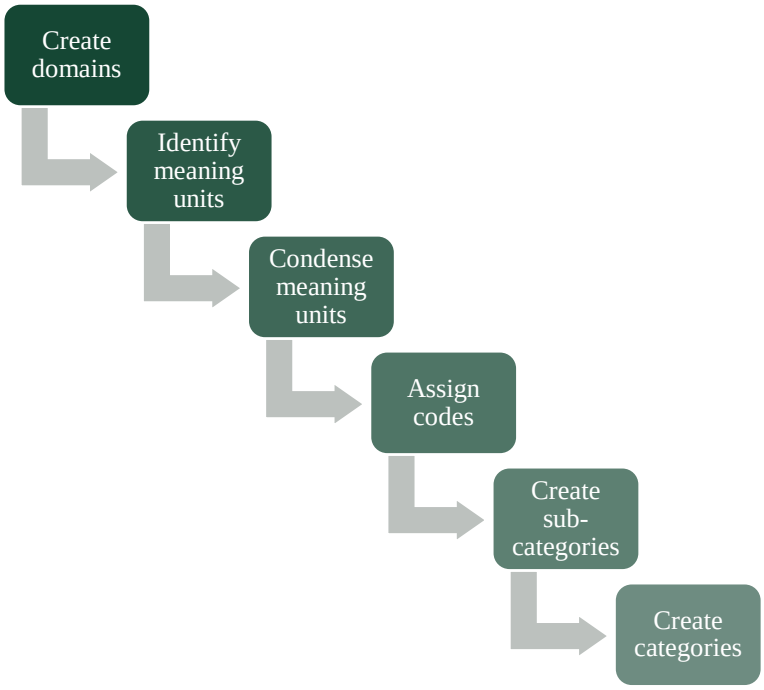

Figure 1. Flow chart of the conventional content analysis process.

Creating *domains* was the first step in designing the process. Domains are parts of the text that deal with a specific area (Isaksson, 2017). ‘Possibilities’ and ‘restrictions’ constitute the two domains in this analysis of the interviews, aiming to capture the experiences regarding possibilities and restrictions of scaling up the

production of faba beans as food. These were pre-determined in order to suit the purpose of this study. However, the rest of the steps follow an inductive design where the content included in the results emerged throughout the process of analysis. The step that followed after creating domains involved the identification of *meaning units*. Meaning units can be sentences or phrases found in the recording units (Lundman & Hällgren Graneheim, 2008). The meaning units that were picked out contain information relevant to the purpose of the study. Surrounded texts were also included to ensure that the context of the meaning units remained. This means that the meaning units that were identified relate to the domains of possibilities or restrictions for scaling up the production of faba beans as food. After the meaning units were identified, they were *condensed* in order to simplify the handling of the texts. Condensing meaning units involves the process of shortening the text, but still retaining the content (Isaksson, 2017). The condensed meaning units were then labelled with a code, referring to the process of *coding*. A code is a label that briefly describes its content and is created in regard to the context of the meaning unit (Lundman & Hällgren Graneheim, 2008). This helped the analysis to move to the next step which involved the process of creating *categories*. The categories aim to include several codes consisting of relatively similar content that mirrors the central messages in the interviews (Lundman & Hällgren Graneheim, 2008). No code can be sorted into several categories (ibid), which also increased the need for dividing the analysis to capture nuances of the experiences. Further, no preconceived categories were used, rather this step allowed the categories to flow from the texts. This means that the categories emerged when identifying and assigning codes to different meaning units. All findings in each step of the analysis are sorted into a table in relation to either the domain of possibilities or the domain of restriction. *Table 8*. demonstrate an example of the construction of such a table. However, the results do only present a summary of the content, which means that a more simplified table is presented in the results. The below table aims to provide an understanding of how the analysis process was conducted.

Table 8. Organisation of the data analysis of conventional content analysis.

Domain	**Meaning unit**	**Condensed meaning unit**	**Code**	**Sub-category**	**Category**
Possibilities	XX	XX	XX	XX	XX
	XX	XX	XX		
	XX	XX	XX	XX	
	XX	XX	XX		
Restrictions	XX	XX	XX	XX	XX
	XX	XX	XX		
	XX	XX	XX	XX	
	XX	XX	XX		

Again, when creating categories, the researcher needs to understand the latent content of the text, meaning that the focus lies in interpretations of the text (Isaksson, 2017). However, multiple interpretations of the texts are possible, and many may be valid although they may be different (Lundman & Hällgren Graneheim, 2008). Part two of the analysis, the conventional content analysis, in this study did not follow certain coding instructions due to the complexity and variations of the content. Instead, reflections and reasoning arguments are provided in this chapter to evaluate the *trustworthiness* of the analysis. Trustworthiness can be achieved if the arguments and the findings are sufficiently reflecting the content (Elo *et al*., 2014). It is essential to consider trustworthiness since categories are constructed from the raw material without using a theory-based categorisation matrix (ibid). To establish trustworthiness in this study, attempts to adequately reflect the content when creating the categorisation matrix were made. The attempts include an effort for capturing all perspectives related to possibilities and restrictions in relation to faba beans by dividing the texts into groups as well as an effort for describing the analysis method in detail by presenting nuanced reflections. Peer-debriefing of randomly selected parts of the texts was also conducted. In sum, the detailed presentation of the application of the conventional content analysis and related reflections intend to provide valid findings concerning potential possibilities and restrictions for scaling up the production of faba beans as food.

3. Research Context

The following chapter constitutes two sections. The first section (3.1) is a literature review presenting previous research on faba beans. The second section (3.2) is a description of how the current production of faba beans is conducted in Sweden today.

3.1 Literature Review

To place the research subject "faba beans as food" into a research context, this section constitutes a literature review. A discussion of the research gap on the subject concerning producing faba beans as food is also presented in this section.

Most of the previous research on faba bean production in Sweden has been conducted with a focus on cultivation aspects and evaluation of different intercropping strategies (see Weidow, 2018; Fogelfors, 2015; Stoltz & Nadeau, 2014; Stoltz *et al*., 2013). Much previous research has also been focused on different aspects of faba beans as feed (see Karlsson *et al*., 2015; Stoltz *et al*., 2013; Ivarsson *et al*., 2021). Faba beans are currently grown in many areas of Europe where they are extensively produced (Johansson *et al*., 2022). However, they are primarily used for animal feed in Sweden (ibid). Although the attention aimed at cultivation and feed production differs from the focus of this study, the different aspects concerning cultivation and feed have laid the foundation for understanding faba bean production in Sweden. These aspects are important in order to understand how faba beans as a raw product may be viewed, how the cultivation may be viewed and how the views may relate to possibilities and restrictions for scaling up the production of faba beans as food. In other words, this study may function as a complement to previous research.

Previous research regarding faba beans as food has been conducted worldwide. Faba beans are traditionally utilised as a source of protein for both human and livestock nutrition over the world (Etemadi *et al*., 2019; Altuntas & Yildiz, 2007). It has been highlighted by many authors that there are several environmental and health benefits to increasing faba bean production and consumption as food in many places (see Etemadi *et al*., 2019; Karkanis *et al*., 2018; Singh *et al*., 2013; Multari *et al*., 2015; Askar, 1986). Faba beans are very nutritious due to their high protein content and they are a rich source of mineral nutrients and vitamins (Karkanis *et*

al., 2018). Evenly essential is the input of faba beans in increasing the sustainability of agricultural systems, since the crop is effective in the fixation of atmospheric nitrogen (ibid). Furthermore, legumes, such as faba beans, obtain the potential to assist in global protein production by functioning as a replacement, to a certain degree, for meat (Multari *et al*., 2015). In addition to the ability to meet the worldwide demand for protein, faba beans assist in mitigating the pressure on the environment caused by current agricultural practices (ibid). Research focusing on a Swedish perspective in regard to faba beans as food is more difficult to locate. Some research that has been conducted focuses on protein gelation (see Johansson *et al*., 2022; Langton *et al*., 2020) and texture properties (see Ferawati *et al*., 2021). Commonly stated in previous research concerning faba beans as food in Sweden, faba beans are a promising alternative to soybeans for the production of plant-based proteins and meat-based proteins (see Johansson *et al*., 2022; Labba *et al*., 2020; Röös *et al*., 2018; Langton *et al*., 2020; Ferawati *et al*., 2021). The previous research on faba beans as food, conducted with both a Swedish and an international perspective, does not fully concern the purpose of this study. The findings in the previous research can, however, be used as a comparison to some of the results provided by this study to identify similarities and differences related to some perspectives. Furthermore, the results of this study may add to the understanding of producing faba beans in Sweden by including additional perspectives such as how cultivators and processors of faba beans consider possibilities and restrictions for the production.

Röös *et al*. (2018) studied the aspects of nutritional intake and environmental impacts when exploring a scenario in which meat consumption in Sweden is reduced by 50% and replaced by domestically grown grain legumes. With the help of the scenario, a Swedish dietary survey and life cycle assessment (LCA) methods, calculations of nutrient intake and environmental impacts when including faba beans were done. The results suggested potential benefits of increasing the production of faba beans as foods. The authors also provided a discussion concerning the challenges of an implementation of the scenario would face. Such challenges relate to, for example, the lack of processing facilities and low consumer awareness. Furthermore, the authors also express the need for joint efforts from multiple actors in order to increase the use of domestically grown legumes. (ibid). The research conducted by Röös *et al*. (2018) deepens the knowledge of prospects and challenges towards including faba beans in the diets, which relate to the purpose of this study. However, the main focus of this study is not to quantify health and environmental impacts, which the method of LCA is most suitable for since it provides quantitative results (cf. Knudsen *et al*., 2019; Pelletier *et al*., 2008). Thus, the same method cannot be used for this study.

In sum, previous research on cultivating and producing faba beans focuses on various geographic locations and various aspects of the subject. The results of the

research suggest potential benefits for health and the environment when increasing the production of faba beans as food, which indicate the relevance of this study. Additional knowledge regarding the production of faba beans as food in Sweden is needed in order to attain the production within a national context and to include a social perspective on the topic. Qualitative methods were used in order to search beyond numbers and capture the social perspective, which may contribute to broadening the understanding of the production of faba beans as food in Sweden. Hence, this study aims to provide insights into additional perspectives in relation to previous research and thus fill a research gap.

3.2 Review on Faba Beans in Sweden

In 2021, the total agricultural land area in Sweden consisted of 3.010.166 hectares, of which 2.545.943 hectares constitute arable land (Jordbruksverket, 2022). Legumes, including faba beans, were cropped on 49.867 hectares of the arable land the same year (ibid). Thus, ~2% of the arable land was assigned to legumes in 2021. No statistics regarding hectares of faba beans, specifically, in 2021 are available to the public. However, if the same number for 2020 is valid for 2021, the total cropping area for faba beans was 19.911 hectares (Jordbruksverket, 2021). Thus, ~ 0,8% of the arable land was assigned to faba beans in 2021. The number of hectares used for cultivating faba beans has varied over the years, whereas the statistics for hectares used for faba beans between 2001 and 2020 are presented in *Figure 2*. (ibid). The data is collected from Jordbruksverket (2021).

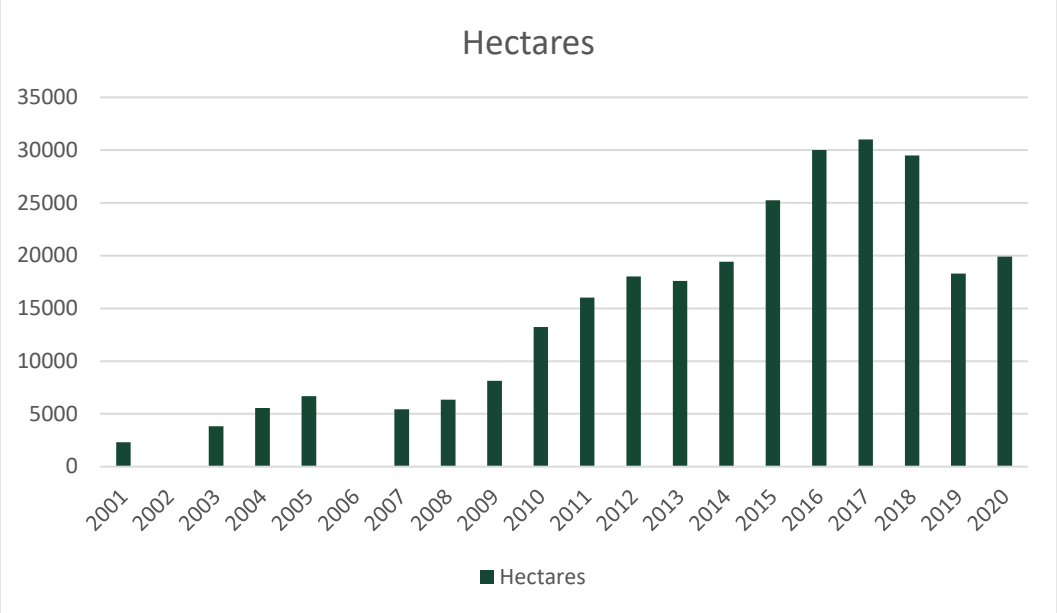

Figure 2. Hectares used for cropping faba beans from 2001-2020. Data fetched from Jordbruksverket (2021) and included in software Excel (Microsoft, 2022).

Furthermore, faba beans are not reported to be cultivated in the most far Northern regions in Sweden but are mostly cultivated in Västra Götaland and Östergötland (Carlsson, 2018). In 2016, the highest concertation of faba bean cultivation was in Västra Götaland (12.492 hectares) and the lowest was in Västernorrland (11 hectares). However, zero hectares of faba bean cultivation were reported in Norrbotten, Västerbotten and Jämtland. (ibid). *Figure 3*. presents the cultivation concentration per region in Sweden in 2016 and the data is collected from Carlsson (2018). Due to methodological limitations, values from more recent years cannot be presented.

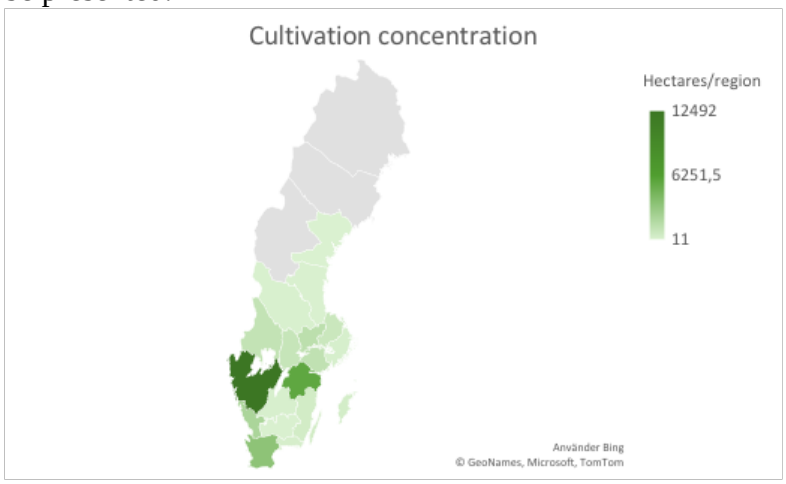

Figure 3. Faba bean cultivation concentration per region in Sweden 2016. Data fetched from Carlsson (2018) and included the software Excel for the illustration of the geodata and coordinates (GeoNames, Microsoft, TomTom, 2022).

Most of the domestically grown legumes are used as feed in Sweden, and the proportion of these legumes used directly as food in 2019 was only approximately 3% (Tidåker *et al*., 2021). The greatest potential for expansion in Swedish legume cultivation for food is to expand the cultivation of faba beans due to that they can be grown in greater areas than today (ibid). In recent years, the range of plant-based protein products has increased in Swedish food markets, but there is still a shortage of protein crops of Swedish origin (Bertilsson, 2019). Increased production of faba beans in Sweden is seen as a great potential of replacing both meat protein and imported plant-based protein in regard to developing environmental and health sustainability (Röös *et al*., 2018). Thus, this states the relevance of this study. Furthermore, faba beans may be considered a novel food in Sweden (Johansson *et al*., 2022). Important to highlight, ‘novel food’ is a concept that concerns that new

food products must be legally approved before they can enter the market and be sold as food (Livsmedelsverket, 2022). ‘Novel food’ incorporates foods that have not been consumed to any great extent in the EU before 15th May 1997 (ibid). However, faba beans are currently consumed in many countries in the EU (Johansson *et al*., 2022). This means that faba beans are not considered novel food in legal terms, but rather in terms of food culture and tradition in Sweden, which are taken into account in this study.

Although breeding activities on the crop, aiming to ensure food quality, have been absent in Sweden since the 1990s, attempts to increase such activities are currently made in order to develop different characteristics (Grimberg, 2019). However, many additional measures must be taken to develop a robust production chain of faba beans as food (Bertilsson, 2019). Thus, as stated earlier, this study aims to identify possibilities and restrictions to developing such a robust production chain.

4. Results and Analysis

The following chapter suggests the findings from the interviews with support of the qualitative content analyses. This chapter may appear technically written, but this was done methodologically and theoretically in accordance with the concepts of content analysis. Three sub-chapters constitute the results and analysis, where the first (4.1) and second (4.2) sub-chapters are based on the summative content analysis. The third (4.3) sub-chapter is based on the conventional content analysis.

4.1 Faba Beans – Food or Feed?

The findings from the summative content analysis suggest the frequency of the coding units ‘Faba beans as food’ and ‘Faba beans as feed’ found in the narratives from the interviewees. These narratives are referred to as recording units and each recording unit is assigned a number. The results also suggest a quantification of variables associated with each coding unit identified in each recording unit. Ratios are also presented in the results in order to demonstrate comparisons between the frequency of the different coding units and variables. *Table 9*. presents the results of the quantification using the summative content analysis.

Table 9. Presentation of the quantification of the coding units ’Faba beans as food’ and ’Faba beans as feed’.

Recording unit 1			
	Faba beans as food	Faba beans as feed	Ratio
Positive	1	5	0,2:1
Negative	0	0	1:1
Neutral	2	2	1:1
Total	3	7	0,43:1
Recording unit 2			
	Faba beans as food	Faba beans as feed	Ratio
Positive	3	2	1,5:1
Negative	0	0	1:1
Neutral	14	6	2,33:1
Total	17	8	2,13:1
Recording unit 3			

	Faba beans as food	Faba beans as feed	Ratio
Positive	1	5	0,2:1
Negative	3	1	3:1
Neutral	1	6	0,17:1
Total	5	12	0,42:1

Recording unit 4

	Faba beans as food	Faba beans as feed	Ratio
Positive	1	5	0,2:1
Negative	3	1	3:1
Neutral	1	4	0,25:1
Total	5	10	0,5:1

Recording unit 5

	Faba beans as food	Faba beans as feed	Ratio
Positive	1	4	0,25:1
Negative	2	1	2:1
Neutral	2	6	0,33:1
Total	5	11	0,45:1

Recording unit 6

	Faba beans as food	Faba beans as feed	Ratio
Positive	3	1	3:1
Negative	2	0	-*
Neutral	6	2	3:1
Total	11	3	3,67:1

Recording unit 7

	Faba beans as food	Faba beans as feed	Ratio
Positive	9	1	9:1
Negative	3	3	1:1
Neutral	12	5	2,4:1
Total	24	9	2,67:1

Recording unit 8

	Faba beans as food	Faba beans as feed	Ratio
Positive	8	1	8:1
Negative	2	2	1:1
Neutral	10	5	2:1
Total	20	8	2,5:1

Recording unit 9

	Faba beans as food	Faba beans as feed	Ratio
Positive	7	2	3,5:1
Negative	9	3	1,5:1
Neutral	3	2	3:1
Total	19	7	2,71:1

* = This quote is not possible to calculate since the denominator is zero and the numerator is two.

The results presented in the table may indicate how faba beans as a raw product is viewed by the cultivators and processors. How faba beans are viewed differs across the various recording units. The table suggests that cultivators, those who do not participate in work practices related to the food processing of faba beans, mainly mention the product of faba beans as a product of feed.

> The harvest is sold into a prosperous feed market in Sweden and the demand for faba beans is exclusively from the feed market. It might be possible that there is a demand from the food market, but I have not recognised a widespread demand. (…). Faba beans as a feed product is effective for livestock and may decrease the need for imported soybeans. Reduced transport is essential to decrease the negative impact on the environment. (Recording unit 1, cultivator).

> The livestock needs protein to have a nutritious diet. Faba beans cannot be a healthy food product since the taste is bitter. Applications of chemical shit are required to get the taste to at least an acceptable level. Put the faba beans in the animals instead. It is much more effective, and it is good for the animals. (Recording unit 3, cultivator)

Above quotations found in two of the recording units constitute examples of the views of faba beans as a raw product. As revealed in the first quotation, one of the cultivators suggests that the market for feed production is established and more widespread than the food market when considering the demand for faba beans (cf. Grimberg, 2019). The cultivator also assigns a positive function to faba beans as feed because it may be a means for releasing pressure on the environment. Hence, in the first quotation, the coding unit ‘Faba beans as food’ is quantified once and is assigned with the variable ‘Neutral’. The coding unit ‘Faba beans as feed’ is quantified twice. Since the cultivator states that the harvest is sold to a prosperous market and that faba beans as feed may decrease environmental impact when replacing imported soybeans, both are assigned with the variable ‘Positive’. In the narrative found in the second quotation, one of the cultivators suggests that faba beans are better as feed since, in order to develop a suitable taste, the beans must be processed with chemicals. ‘Faba beans as feed’ is quantified once and coded as ‘Positive’ due to the argument that faba beans function well as feed. ‘Faba beans as food’ is also quantified once, however, the coding unit is assigned with the variable ‘Negative’. This is done because the cultivator expresses negative values related to the application of chemicals to the beans.

To clarify, the results found in *Table 9.* reveal that cultivators mainly view faba beans as feed. Although faba beans are mainly viewed as a product of feed, the beans are also mentioned as a product of food. However, the cultivators tend to express faba beans as feed more positively and faba beans as food more negatively or neutrally. Two quotations are presented in order to provide both an in-depth understanding of how cultivators may view faba beans and how the coding units are quantified and labelled. When quantifying the coding units ‘Faba beans as food’

and ‘Faba beans as feed’ as well as assigning variables to the coding units, the recording units from the cultivators may be considered relatively similar.

Considering the rest of the recording units, *Table 9*. suggests that the frequency of ‘Faba beans as food’ is greater than the frequency of ‘Faba beans as feed’. These recording units constitute food processors and actors that conduct work practices related to both cultivation and food processing.

> We have no choice but to reduce meat consumption, and it must be done in a sustainable way. This means that we must obtain the protein from somewhere else. We have a number of crops that can be good for that. (…). Faba beans are widely grown in Sweden, but it targets the feed market. It is a bit of a shame because it is a very sustainable food product. (…). Faba beans can be turned into many food products and the taste is very interesting. (Recording unit 9, processor of food).

> Foreign influences may have affected that faba beans are seen as something edible. Up to a few years ago, faba beans were exclusively used as feed in Sweden. In many foreign countries, it is mainly used as food. Now the usage of faba beans as food is increasing in Sweden as well. (Recording unit 6, cultivator and processor of food).

Found in the first quotation, the food processor states that faba beans should be increasingly included in human diets as a replacement for meat protein. It is also stated that there are great opportunities to increase the sustainability regarding food consumption when including plant-based protein food (cf. Röös *et al*, 2018). Faba beans may be an option due to the interesting taste, according to the processor. In the quotation, ‘Faba beans as food’ is quantified twice and both units are coded with ‘Positive’. This is done since the coding unit is identified in two different arguments, one concerning sustainability and one concerning the taste aspects. ‘Faba beans as feed’, however, is quantified once and assigned with the variable ‘Negative’. The term feed is expressed in connection to a derogatory argument. Viewing the second quotation, the actor provides arguments related to both faba beans as feed and as food. The statement includes a narrative of how and when faba beans entered the Swedish food market. Here, both coding units are quantified once and are coded as ‘Neutral’. The arguments are not concerning appreciating nor derogatory words in connection to faba beans as food or feed.

The two above quotations demonstrate examples of how faba beans are viewed by the processors of food and the actors that perform both cultivation and processing of food. The quotations are parts of the analysis that suggested the results found in *Table 9*. Two manifest similarities between these recording units are found. First, the frequency of ‘Faba beans as food’ is greater than the frequency of ‘Faba beans as feed’. Second, both coding units are assigned with the variables ‘Positive’ and/or ‘Neutral’ with a greater frequency than ‘Negative’.

In sum, two distinct groups emerge in the analysis. One of the main differences between the groups is that the relationship between the frequency of ‘Faba beans as food’ and ‘Faba beans as feed’ is reversed in the groups. In other words, the

cultivators mention coding unit 2 (faba beans as feed) more often than coding unit 1 (faba beans as food), and contrary results are applied to the other group. Further, the cultivators tend to reveal a more negative attitude to faba beans as food in comparison to the other group. In the divergent views of the raw product faba beans, two different discussions of why faba beans are valuable appear in the arguments. On the one hand, cultivators mainly view faba beans as a means to feed livestock and a crop for ensuring decent economic returns when sold into the feed market. However, on the other hand, the rest of the interviewees provide reasonings concerning sustainability, which appear more holistic. Recognizing the two different discussions of why faba beans are valuable, parallels may be drawn to the concept of rationality (within the theory of system and lifeworld) provided by Habermas (1985). Here, cultivators more often reason from what Habermas refers to as instrumental rationality; it is about economic aspects. Food processors, however, tend to more often reason from what Habermas calls communicative rationality. In these arguments, the interviewees focus with greater frequency on questions upon holistic functions of faba beans as food. (ibid). This grouping is a suggestion, however, the second part of the summative content analysis will either suggest a regrouping of the recording units or confirm the suggested grouping found in this part of the analysis. *Table 10*. provides a summary of the suggested two groups of the recording units.

Table 10. Suggested grouping of the recording units.

Group 1	**Group 2**
Recording unit 1	Recording unit 2
Recording unit 3	Recording unit 6
Recording unit 4	Recording unit 7
Recording unit 5	Recording unit 8
	Recording unit 9

4.2 Faba Beans – Work Practices

The previous chapter suggested groupings based on the findings from the applied summative content analysis using the coding units ‘faba beans as food’ and ‘faba beans as feed’. The groupings thus derive from how faba beans as a raw product is viewed by the interviewees. Applying the summative content analysis on the interview narratives again, the coding units ‘Cultivation of faba beans’ and ‘Processing of faba beans’ will be quantified. As for the first application of the content analysis, the quantified coding units here will also be assigned variables associated with each coding unit identified in each recording unit. Ratios are also presented in the results to demonstrate comparisons between the frequency of the different coding units and variables. This quantification intends to understand how

the work practices related to faba bean production are viewed. Further, the results from the analysis may either confirm the suggested groups or suggest additional groupings. *Table 11*. presents the results of the quantification using the summative content analysis.

Table 11. Presentation of the quantification of the coding units 'Cultivation of faba beans' and 'Processing of faba beans'.

Recording unit 1			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	7	0	X*
Negative	3	1	3:1
Neutral	8	1	8:1
Total	18	2	9:1
Recording unit 2			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	4	5	0,8:1
Negative	3	6	0,5:1
Neutral	9	7	1,29:1
Total	16	18	0,89:1
Recording unit 3			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	4	0	X*
Negative	8	2	4:1
Neutral	5	1	5:1
Total	17	3	5,67:1
Recording unit 4			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	5	1	5:1
Negative	4	0	X*
Neutral	5	1	5:1
Total	14	2	7:1
Recording unit 5			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	4	0	X*
Negative	4	1	4:1
Neutral	5	1	5:1
Total	13	2	6,5:1

Recording unit 6			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	6	5	1,2:1
Negative	3	3	1:1
Neutral	5	8	0,63:1
Total	14	16	0,88:1
Recording unit 7			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	2	10	0,2:1
Negative	2	6	0,33:1
Neutral	1	4	0,25:1
Total	5	20	0,25:1
Recording unit 8			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	4	8	0,5:1
Negative	3	6	0,5:1
Neutral	3	4	0,75:1
Total	10	18	0,56:1
Recording unit 9			
	Cultivation of faba beans	Processing of faba beans	Ratio
Positive	5	4	1,25:1
Negative	2	7	0,29:1
Neutral	2	6	0,33:1
Total	9	17	0,53:1

* = This quote is not possible to calculate since the denominator is zero and the numerator is two.

The results in the above table indicate how the work practices related to faba bean production are viewed. The interviewees conduct different work practices, but all provided arguments for both cultivation and food processing. How the work practices are experienced differs across the various recording units. The same two groups (see *Table 10.*) appear distinct when viewing the table. Cultivators mention 'Cultivation of faba beans' with greater frequency, due to the evident factor of their profession correlated with cultivation, than 'Processing of faba beans'.

> Including faba beans in the crop rotation, the need for fertilisers decreases. It is actually the best possible crop to include in the crop rotation since faba beans provide nutrition for the coming years, but it can be problematic to sow. The size of the seed can be too large for the combine harvester depending on the species. (Recording unit 5, cultivator).

> It is a bit difficult to cultivate faba beans. Picture this: it is difficult to sow, difficult to dry, difficult to handle. Many farmers try, but then I hear 'never again'. Also, not to forget, the harvest of the beans can be very late, which means that the crop rotation will be completely disturbed. It is not fun to have the combine harvester out in the field in November. (…). Despite all the problems, one positive thing is that faba beans enable an organic farming system due to the nitrogen fixation function. (Recording unit 4, cultivator).

Two perspectives regarding cultivating faba beans appear in the above quotations. One perspective of the positive function of including faba beans in the crop rotation and one perspective on the difficulties related to cultivation. When including faba beans in the crop rotation, the need for applying fertilisers decreases due to the nitrogen fixation function of the crop. Faba beans in a crop rotation can be a strategy for maintaining organic farming systems. However, the cultivators experience difficulties with the cultivation of faba beans. In the second quotation, the cultivator describes difficulties from sowing to post-harvesting and witnesses that other farmers deny cultivating faba beans after they have tried it once. Applying the summative content analysis on the first quotation, the coding unit 'Cultivation of faba beans' is quantified twice. This is done due to that two arguments can be found in relation to the work practice: the strategy to include the crop in a crop rotation and the performance of attaching the crop to the soil. The variable 'Positive' is assigned to the first identification and the second identification is coded as 'Negative'. In the second quotation, however, 'Cultivation of faba beans' is quantified thrice. Three arguments were found in relation to cultivation. The arguments include the difficult handling, late harvest and the strategy to include the crop in a crop rotation. Two of the arguments are assigned with 'Negative' and one is assigned with 'Positive'.

The above two quotations constitute examples of how work practices related to faba bean production are viewed by the cultivators. The quotations are part of the analysis that suggested the results found in *Table 11*. When quantifying the coding units 'Cultivation of faba beans' and 'Processing of faba beans' as well as assigning variables to the coding units, the narratives from the cultivators may be considered relatively similar. Thus, the suggested groupings of the recording units that contain one group of cultivators are confirmed as a result of the analysis of work practices related to faba bean production.

Taking the rest of the recording units into account, *Table 11*. suggests that the frequency of 'Processing of faba beans' is greater than the frequency of 'Cultivation of faba beans'. These recording units constitute food processors and actors that conduct work practices related to both cultivation and food processing.

> Farmers ensure to harvest a decent raw product, which is relatively simple in Sweden considering our history of legume cultivation. The faba beans enter a company site, where processors create a food product. There are many different options for potential food products made of faba beans. You can take fresh faba beans and boil them. You can fry them and have them as a snack if you like. You can make ice cream or yoghurt. At the other end, we have

> something extruded that looks like meat, a slightly more advanced process. (Recording unit 8, processor of food).
>
> Faba beans have been cultivated in Sweden for a long time and we are good at it. Then it is natural to question why we do not eat the beans although it is an awesome crop. One of the biggest challenges in starting to eat faba beans is a lack of infrastructure and knowledge to prepare the product in order to make it understandable for the consumers. The industry of processing legumes into food has not existed in Sweden, which is threatening the food production of faba beans. (Recording unit 2, cultivator and processor of food).

Found in the first quotation, the processor argues that the cultivation of faba beans is a relatively simple process and that there are many areas of usage for faba beans as food. The processor suggests that there is a whole range from boiled beans to meat substitutes, where faba beans may constitute the base. In the first quotation, 'Cultivation of faba beans' is quantified once and the unit is assigned the variable 'Positive' since the processer expresses an appreciating word in connection to the work practice of cultivation. 'Processing of faba beans' is also quantified once, however, the unit is coded as 'Neutral'. The processor is not using any appreciating or derogatory words in relation to the work practice. Viewing the second quotation, the actor also provides arguments related to both cultivation and processing of food. The statement includes an argument concerning the proficiency of cultivation and the lack of proficiency in processing faba beans as food. Here, both coding units are also quantified once, however, 'Cultivation of faba beans' is coded as 'Positive' and 'Processing of faba beans' is coded as 'Negative'. This is done since the arguments concern appreciating and derogatory words, respectively, in connection to the statements of work practices.

The two quotations demonstrate examples of how work practices related to faba beans are viewed by the food processors. The quotations are parts of the analysis that suggested the results found in *Table 11*. One manifest similarity between these recording units is found. The frequency of 'Processing of faba beans' is greater than the frequency of 'Cultivation of faba beans'.

In sum, the two distinct groups of cultivators and food processors that emerged in the summative content analysis, concerning the quantification of 'Faba beans as food' and 'Faba beans as feed', are confirmed in this chapter. In this chapter, one of the manifest differences between the groups is that the relationship between the frequency of 'Cultivation of faba beans' and 'Processing of faba beans' is reversed in the groups. This means that the cultivators mention coding unit 1 more often than coding unit 2, and contrary results are applied to the other group. However, the ratio between coding units 1 and 2 is greater for the cultivators. Furthermore, when providing views on faba beans as a raw product, the concept of rationality also emerges when describing the work practices around cultivation and processing (cf. Habermas, 1985). Since the cultivators tend to mostly focus on cultivation and assign negative values for the work when the material asset, the economic capital,

decreases (cf. Bourdieu, 1986), the cultivators seem to reason from instrumental rationality (Habermas, 1985). On the contrary, the food processors tend to provide arguments derived from communicative rationality (ibid). This is because they often describe their work practices as something progressive and something that may achieve sustainable goals that may not generate personal economic returns. *Table 12*. presents the summary of the confirmed two groups of the recording units, which is the same as for the suggested groups when analysing the view of faba beans as a raw product in the previous section.

Table 12. Confirmed grouping of the recording units.

Group 1	**Group 2**
Recording unit 1	Recording unit 2
Recording unit 3	Recording unit 6
Recording unit 4	Recording unit 7
Recording unit 5	Recording unit 8
	Recording unit 9

4.3 Faba Beans as Food – Possibilities and Restrictions

The two previous chapters suggested two groups based on the findings of how faba beans as a raw product is viewed and how work practices related to faba bean production are viewed. The following chapter constitutes an application of the conventional content analysis to understand how the interviewees understand the possibilities and restrictions of upscaling the production of faba beans as food. In contrast to the summative content analysis, the intention is not to quantify certain coding units. Rather, the analysis derives from a qualitative approach and the focus is on understanding the content that concerns potential possibilities and restrictions for scaling up the production of faba beans as food. These contents are assigned with various codes that intend to briefly reflect the actual content. The contents of the interviews from the two groups will be analysed separately. Again, the first group consist of the cultivators and the second group consist of the food processors as well as the actors that perform both cultivation and processing.

4.3.1 Group 1 – Cultivators

The findings from the applied conventional content analysis suggest how the cultivators (group 1) experience the possibilities and restrictions regarding scaling up the production of faba beans as food. Arguments, found in narratives from the cultivators, related to potential possibilities and restrictions are assigned with codes and sorted into categories. The categories consist of codes aimed to present

relatively similar content, but the content is presented as a shorter summarising phrase. *Table 13*. presents the results of the summarised possibilities and restrictions using the conventional content analysis.

Table 13. Presentation of the interview content from group 1 concerning possibilities and restrictions for faba beans as food.

Group 1 (Cultivators)		
Domain	**Code**	**Category**
Possibilities	Access to cropping advice	*Access to knowledge*
	Available cropping knowledge	
	Long tradition of cultivation	
	Support from EU-funds	*Possible economic returns*
	Increased demand for Swedish food	
	Increased demand for organic food	
	Increased demand for plant-protein	
	Loosens the soil	*Cropping advantages*
	Strategic crop in crop rotation	
	Good pest control	
	Low costs for inputs	
	No inputs of nitrogen	
	Less input of nitrogen for next crop	
	Nitrogen fixation	
	Good nutritional values	*Health benefits*
	High protein content	
	Produce clean food	
Restrictions	Difficult to sow	*Cropping disadvantages*
	Exposed to broad bean beetle	
	Too late harvest	
	Impossible to crop too often	
	Difficult to dry	
	Unstable harvests	
	Widespread negative attitude	
	Lack of information of buyers	*Low economic returns*
	No food purchaser	
	Unsustainable to eat	*Unsuitable as food*
	Bitter taste	
	Require unhealthy processing	
	Absence of plant breeding for food	
	Lack of common knowledge of food	
	Better as feed	*More suitable as feed*
	Secured economic returns as feed	
	Traditionally used as only feed	

When cultivators describe the work practices in relation to faba bean production, arguments concerning *access to knowledge* are provided as a possibility for scaling up the production of faba beans as food. Access to technical knowledge is of great importance for production, product quality and productivity (Gustavsson *et* al., 1999), which essence is captured in the interview material. The need for technical knowledge is emphasised in the narratives from the cultivators, whereupon it is described that technical knowledge in relation to farming is essential throughout the cultivation process in order to ensure a successful harvest outcome. One of the cultivators depicts the current access to knowledge concerning cultivation as a result of a long tradition of cultivating faba beans in Sweden (cf. Gustafsson *et al*., 2013) together with a long tradition of passing on this knowledge to other stakeholders. Found in the arguments, additionally, cultivators view it as possible to increase the production of faba beans in Sweden (cf. Röös *et al*., 2018) due to the widespread knowledge. The resources of technical knowledge regarding cultivation can characterize the supply of what Bourdieu (1986) describes as cultural capital (ibid). Access to knowledge may thus be regarded as a resource that is used consciously to achieve success in maintaining and potentially scaling up the production of faba beans as food (cf. Bourdieu, 1986). Since there is widespread knowledge and sharing of knowledge, access to such is considered a possibility.

Possible economic returns and *low economic returns* constitute both possibilities and restrictions for scaling up the production of faba beans as food. On the one hand, cultivators depict an increasing interest in Swedish produced plant-based proteins together with raising investments, from government institutions, in legume production in Sweden. Cultivators also experience a growing interest in Swedish produced legumes since they can be produced more organically with low or no inputs of synthetic fertilisers and distributed within limited distances. Organic farming systems have a lower negative environmental impact since no artificial fertilisers or pesticides are applied (Bosona & Gebresenbet, 2018). However, research has also proved the opposite; organic crop cultivation had greater negative environmental impact than conventional cultivation (see Tidåker *et al*., 2021). Rytkönen *et al*. (2018) prove that locally produced food is facing an increasing demand, which increase is a result of that consumers are increasingly demanding locally produced food that has been grown organically and produced with the least possible environmental impact (ibid). Further, *health benefits* have been highlighted, in the interview material, as leading to the willingness to scale up the production of faba beans as food. To a certain degree, many cultivators relate the health benefits, when replacing animal protein with plant-based protein, to the growing demand for legumes. The increased demand in regard to health benefits may also play a role in possibly gaining economic returns (cf. Jordbruksverket, 2010). However, the cultivators also provide a contradictory picture of the economic aspect, meaning that they expect low economic returns when the faba

beans target the food market. Found in the narratives are statements regarding the lack of food buyers that suit the cultivators and the lack of information on how to target the food market. The cultivators state that low economic returns constitute the largest restriction if faba beans enter the food market. Economic capital is considered dominant over other capital (cf. Bourdieu, 1986). In the longer term, however, cultivators believe that the economic returns might increase if both the investments from government institutions and the consumer demand for Swedish produced plant-based protein continue to increase. Considering the dominating form of capital, the possible economic returns may thus be the greatest possibility, in a long-term perspective, for scaling up the production of faba beans as food.

A large part of the content concerning possibilities and restrictions concerns *cropping advantages* and *cropping disadvantages*. The cropping advantages include many aspects such as nitrogen fixation function, relatively resilience to some pests and the creation of favourable structures in the soil. Cultivators depict these advantages in relation to organic farming systems, where the faba bean is a strategic crop to include in the crop rotation to enable such systems. Nitrogen fixation may limit the need for the application of fertilisers, which is favourable for organic farming systems (cf. Åkerfeldt & Wivstad, 2020; Köpke & Nemecek, 2010). In addition, found in the interview materials, these functions of faba beans are also valuable for conventional cropping systems since the financial expenses for fertilisers and pesticides decrease. When cultivating faba beans that inhabit the nitrogen fixation function, the need for nitrogen fertilisers for the following crop also decreases (Åkerfeldt & Wivstad, 2020; Köpke & Nemecek, 2010). Thus, the cropping advantages emerge as a possibility for including faba beans in a crop rotation for both conventional and organic farming systems, and thus for scaling up the production. Cropping disadvantages, however, are depicted as a restrain in the narratives from the cultivators. The cropping disadvantages constitute, for example, exposure to broad bean beetle, late harvest, limited cropping frequency, relatively large seeds and sensitivity when conducting the drying process (cf. Åkerfeldt & Wivstad, 2020). Cultivators depict these disadvantages influence many other cultivators to not include faba beans in their crop rotations. Often, cereal cultivators tend to hold a more negative attitude towards cultivating faba beans, according to the recording units. Cereals are currently cultivated on approximately 95% of the arable land in Sweden (Jordbruksverket, 2022). The cultivators provide an additional dimension towards the experienced widespread negative attitude: Since it may be difficult to motivate additional farmers, including many cereal cultivators, to cultivate faba beans and the current cultivators cannot shorten the frequency of cropping faba beans, cropping disadvantages constitute a restriction for scaling up the production of faba beans as food.

Two additional content categories are *unsuitable as food* and *more suitable as feed*, which can be found in relation to restrictions. Cultivators provide arguments

concerning reasons for not consuming faba beans as food, which often are compared to faba beans as feed. Feeding the livestock with faba beans is considered more effective and easier according to cultivators. The arguments for not using faba beans as food include a range of aspects involving taste, sustainability, health, knowledge and breeding. Often, when these arguments are provided, arguments highlighting faba beans as feed instead of food are followed. Cultivators express that faba beans are more suitable as feed since there is a long tradition of feeding livestock with faba beans and that the economic returns can be secured. Further, the contents found here may be related to how faba beans as a raw product is viewed by cultivators. The view of faba beans as feed appears more explicit in comparison to faba beans as food, whereas faba beans as feed may be a means for ensuring decent economic returns when sold into the feed market. Recognising the view of faba beans and the discussion concerning the function of faba beans, parallels may be drawn to instrumental rationality (Habermas, 1986). Cultivators tend to reason from an economic perspective, or instrumental rationality, where the feed market is highlighted as more suitable than the food market for faba beans (cf. Habermas, 1986). Thus, the view of faba beans as raw products, which is the latent content in the categories *unsuitable as food* and *more suitable as feed*, appears as a restriction for scaling up the production of faba beans as food.

To summarise, a conventional content analysis has been applied to the interview material provided by the cultivators in order to detect potential possibilities and restrictions for scaling up the production of faba beans as food. *Table 14*. presents a summary of the experiences of the cultivators regarding the potential possibilities and restrictions.

Table 14. Summary of the experiences from group 1 regarding possibilities and restrictions for scaling up the production of faba beans as food.

Possibilities	**Restrictions**
Access to knowledge	Cropping disadvantages
Possible economic returns	Low economic returns
Cropping advantages	Unsuitable as food
Health benefits	More suitable as feed

4.3.2 Group 2 – Food Processors

The findings from the applied conventional content analysis suggest how the processors of food (group 2) experience the possibilities and restrictions regarding scaling up the production of faba beans as food. Arguments, found in interview materials provided by group 2, related to potential possibilities and restrictions are assigned with codes and sorted into categories as for group 1. The categories consist of codes aimed to present relatively similar content, but the content is presented as

a shorter summarising phrase. *Table 15*. presents the results of the summarised possibilities and restrictions using the conventional content analysis.

Table 15. Presentation of the interview content from group 2 concerning possibilities and restrictions for faba beans as food.

Group 2 (Food processors)		
Domain	**Code**	**Category**
Possibilities	Strengthen resilience to crisis	*Food security*
	Decreased risk when global crisis	
	Less dependence on import goods	
	Reduced transportations	*Environmental benefits*
	Support biodiversity	
	Nitrogen fixation crop	
	Sustainable replacement of meat	
	Increased government grants	*Possible economic returns*
	Increased demand for plant protein	
	Increased demand for Swedish food	
	High protein concentration	*Health benefits*
	Healthy food option	
	Natural and healthy to eat	
	Beneficial nutritious content	
	Deep knowledge of cropping	*Cropping advantages*
	Willingness to crop	
	Suitable in Swedish climate	
	Industries are developing	*Product development*
	Current innovation projects	
	Increased plant breeding work	
	Multiple areas of food usage	
	Interest of faba beans as food	
Restrictions	Lack of processing infrastructure	*Structural obstacles*
	Lack of processing knowledge	
	Limited capacity to handle legumes	
	Slow progression in food industry	
	Stricter rules for food	
	Too strict regulations for food	
	Moat between production components	*Cooperation networks*
	Few arenas for cooperation	
	Exposed to broad been beetle	*Cropping disadvantages*
	Too much pressure on cultivators	
	No tradition of eating faba beans	*Novel food*
	Mainly seen as feed	
	Hard to motivate consumers	

When processors of food describe restrictions for scaling up the production of faba beans as food, arguments concerning *novel food* are provided. Processors of food suggest that faba beans are considered a novel food or a crop for feeding livestock (cf. Lindgärde, 2021). Shared perceptions about what are considered accepted food products and dishes comprise a substantial impact on individual food preferences (Köstlin, 2013). Thus, the widespread view of faba beans as novel food may currently be a restriction for consumers to demand faba beans as food, which limits incentives for scaling up the production of faba beans as food. This is since the food processors find that there is a lack of knowledge of the existence of faba beans as food among Swedish consumers.

However, when processors of food describe possibilities, they use arguments highlighting that a new era of food consumption and production is currently rising (cf. Marsden & Morley, 2014). Arguments related to this rising era include *food security*, *health benefits* (cf. Wendin & Olshov, 2021) and *environmental benefits* (cf. Marsden & Morley, 2014). The narratives contain discussions regarding rising global insecurities, which exposure poses a threat to food security including access to essential nutrition. Here, the food processors argue that there is an increasing awareness of the possible vulnerability of food access, among Swedish institutions and consumers. Faba beans may thus be a subject of interest as they can play a role in stable Swedish food production, according to the food processors. As a result of the recent pandemic, the current war in Europe, climate change and loss of biodiversity, light has been shed on the Swedish degree of self-sufficiency in order to improve food security (Regeringskansliet, 2022; Lantbrukarnas Riksförbund, 2022). Climate change and biodiversity loss are also contributing to the discussion on the role of agriculture to mitigate the environmental impact (Hobbs, 2019; Marsden & Morley, 2014). Here, faba beans produced as food in Sweden may play a vital role in mitigating the risks of food insecurity and malnutrition nationally as well as a means for producing food with lower environmental impact than e.g., imported soybeans. Important to highlight is that Sweden is not predicted to face issues concerning malnutrition in the near future. However, because faba beans are widely cropped in Sweden as well as they are protein-rich and inhabit essential nutritional values, faba beans as food are on the agenda of many institutions such as research institutions (see Grimberg, 2019; Tidåker *et al*., 2021; Johansson *et al*., 2022; Axfoundation, 2022). Processors of food depict a development of a food product that may replace, to a certain degree, food products consisting of animal protein, which can reduce the pressure on the climate and biodiversity loss (cf. Röös *et al*., 2018). A domestic food production chain of faba beans would, in addition, reduce the need for imported soybeans or other plant-based protein products, according to the processors of food. Reducing the demand for such imports would reduce transport and the need for deforestation in favour of arable land, which decreases greenhouse gas emissions and loss of biodiversity (Lantbrukarnas

Riksförbund, 2019). The food processors emphasise the advantages when faba beans as food is obtaining increasing attention in relation to food security and environmental stresses. Köstlin (2013) describes how food as a moral act is playing an increasingly large role in Western food culture. Moral responsibility for climate, environment and health is highly present and affects the food choices in Western society. Consuming different food products becomes a tool for moral responsibility. (ibid). In the longer term, an increased number of consumers may consider faba beans as a food product, which may increase the demand for faba beans as food since it appears as a moral responsibility to consume domestic plant-based proteins where faba beans are an option. As a result, businesses may be motivated to produce food products made of faba beans. *Possible economic returns*, hence, emerge as a possibility in regard to the increasing demand.

Structural obstacles pose challenges toward scaling up the production of faba beans as food, according to the narratives from the processors of food. The food industry level is identified as a component constituting a bottleneck in the production chain of faba beans as food, according to the food processors. Found in the interview material, a limiting aspect at this level is a lack of national facilities and infrastructure for the processing or preparations of faba beans to be incorporated as a functional ingredient in other food products. Röös *et al*. (2018) suggests that independencies among stakeholders in the dominating cereal-based production systems and processing systems create lock-in effects blocking development in legume production systems. In order to unlock the system, investments in processing and pre-treatment facilities for legumes are needed. (ibid). Processors of food witness, however, *product development* due to new investments in such systems as a possibility for scaling up the production of faba beans (cf. Axfoundation, 2022). Product development investments include developing processing industries, innovation projects of both industries and food products made of faba beans (ibid), and plant-breeding (cf. Grimberg, 2019). Thus, a greater scale of producing faba beans as food is being enabled. However, found in the narratives, there is a need for more investments in order to combat the structural obstacles.

Within the agri-food sector, according to processors of food, *cooperation networks* are absence. Developing a new production chain of faba beans as food requires cooperation between the actors in the system (cf. Röös *et al*., 2018). Elmhester (2008) proves that different forms of collaborations can contribute with noticeable strategic meanings for the production process, marketing and relationship with other actors (ibid). In line with Elmhester (2008), processors of food highlight the need of constructing arenas for cooperation in order to achieve a better understanding between the actors in the production chain. Found in the interview material, a moat can be distinguished, which creates distances between the actors in the food production chain. Conflicts arise between cultivators and the

food industry, which causes frustration. The lack of networks for cooperation for reaching mutual understandings constitutes restrictions for cultivators and processors to create business agreements (cf. Elmhester, 2008). An additional way of understanding the importance of cooperation networks is to use the concept of social capital provided by Bourdieu (1986). Social capital, including networks of collaboration, is an indispensable resource since the availability of social capital helps actors to gain access to resources to a greater extent (Woolcock & Naranya, 2000; Putnam, 2002). Such resources can lead to an extended network, minimise the risk of misunderstandings, build trust as well as, in the longer term, lead to business agreements between the actors in the production chain (Bourdieu, 1986). Thus, the lack of cooperation networks (social capital) constitutes a restriction for increasing the production of faba beans as food.

The content regarding possibilities and restrictions also concerns *cropping advantages* and *cropping disadvantages*. The food processors state that favourable condition for cropping is essential in order to access the essential resource of faba beans. Even though some cropping disadvantages are highlighted in the material, such as exposure to broad bean beetle (cf. Borgström *et al*., 2019; Carlsson, 2018) and tough economic pressure on farmers (cf. Lantbrukarnas Riksförbund, 2022), the experiences concern cropping advantages that create favourable cropping conditions. A cropping advantage concern the experiences of competent cultivators in Sweden that have expertise in cultivating faba beans. Farming competence held by the cultivators is emphasised in the narratives from the processors of food, whereupon it is described that farming competence in relation to faba beans is essential throughout the cultivation process in order to ensure a useful raw product. Current competence held by the cultivators is depicted as a result of a long tradition of cultivating faba beans in Sweden (cf. Gustafsson *et al*., 2013). Access to such competence can be related to what Bourdieu (1986) calls cultural capital. Thus, broad access to competence constitutes a possibility to cultivate faba beans and hence ensure the availability of faba beans for processors of food. In addition, found in the interview material from the food processors, cultivators share a great willingness to include faba beans in their crop rotations. The food processors also find that willingness extends to many groups of cultivators; those who currently grow faba beans, those who do not grow faba beans, those who operate within organic farming systems and those who operate within conventional farming systems.

To summarise, a conventional content analysis has been applied to the interview material provided by the processors of food in order to detect potential possibilities and restrictions for scaling up the production of faba beans as food. *Table 16*. presents a summary of the experiences of the processors of food regarding the potential possibilities and restrictions.

Table 16. Summary of the experiences from group 2 regarding possibilities and restrictions for scaling up the production of faba beans as food.

Possibilities	**Restrictions**
Food security	Structural obstacles
Environmental benefits	Cooperation networks
Possible economic returns	Cropping disadvantages
Health benefits	Novel food
Cropping advantages	
Product development	

5. Conclusions

The role of faba beans is wide, both as it functions as food and feed as well as a means to gain economic returns and means to combat sustainability issues. Based on interviews with cultivators of faba beans and food processors of faba beans combined with applications of two different qualitative content analyses, the findings provide a deeper understanding of how cultivators and food processors view faba beans as a raw product and faba bean production as well as experience possibilities and restrictions for increasing the production of faba beans as food.

Considering the first research question of how faba beans as a raw product is viewed, the views differ between cultivators and food processors. However, all interviewees view faba beans exclusively as food, feed or both. The cultivators on the one hand, mainly view faba beans as feed for livestock and, in the longer term, as a means to gain economic returns when used as feed. This group tends to have a more negative than positive attitude towards faba beans as food. The food processors, on the other hand, mainly view faba beans as potential food and, in a larger dimension, as a means to combat sustainability issues when used as food. This group tends to adopt a more positive than negative attitude towards faba beans as food. Considering the second research question of how the work practices, in regard to cultivation and food processing, are experienced, the experiences also differ between the cultivators and the food processors. The cultivators, on the one hand, experience the work practices related to cultivation as both positive, negative and neutral, but the work practices related to food processing are mostly experienced as negative. This group, the cultivators, tends to experience the work practices in relation to the possibility to gain economic returns. The food processors, on the other hand, experience the work practices related to both cultivation and food processing as both positive, negative and neutral, but tend to view the work practices as more positive and neutral than negative. This group tends to experience the work practices in relation to a progressive work in order to achieve necessary sustainability progress when enabling and simplifying a transition towards a more plant-based diet including domestically produced food. What emerges here, thus, is that the groups tend to reason from different perspectives, which results in different experiences regarding both faba beans as a raw product and work practices in relation to faba bean production. With these

different understandings, the two groups identified different, but also some similar, possibilities and restrictions for scaling up the production of faba beans as food.

Regarding the third research question of identifying possibilities and restrictions in scaling up the production of faba beans as food, the cultivators and food processors provided several examples of such possibilities and restrictions. On the one hand, the cultivators include four aspects of possibilities, incorporating access to knowledge, possible economic returns, cropping advantages and health benefits. The cultivators also include four aspects of restrictions, incorporating cropping disadvantages, low economic returns, unsuitability for food and suitability exclusively as feed. On the other hand, the food processors include six aspects of possibilities, incorporating food security, environmental benefits, possible economic returns, cropping advantages and product development. The food processors include four aspects of restrictions, incorporating structural obstacles, cooperation networks, cropping disadvantages and novel food. Analysing potential possibilities and restrictions on two different groups with different characterisations, a broad coverage of perspective is captured, which provides a comprehensive view of possibilities and restrictions for increasing the production of faba beans as food, but also that possibilities and restrictions can be understood differently depending on the perspectives the cultivators and food processors reason from and hence understand the complexity of faba beans and its production.

In conclusion, the findings of this study may function as a complement to previous research on faba beans as food, but the results can advantageously be supplemented with other studies. A favourable supplementation may be studies which investigate what measures are required to overcome obstacles and take advantage of opportunities to scale up the production of faba beans as food. In addition, studies investigating the perspectives of, for example, consumers and supermarkets may also be a favourable supplementation.

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