

## Article

# Valuing in the Agrifood System: The Case of Fresh Grain Legumes in Denmark

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**Abstract:** Transitioning towards more sustainable food products, such as plant proteins, requires a change in practice by several actors in the agrifood system. Change of this kind involves everyday choices about what food to produce, sell, prepare, and eat. Inspired by science and technology studies (STS) thinking, we investigate how such choices are influenced by socio-material practices of valuing. We use the case of fresh grain legumes for human consumption to explore how valuing is simultaneously affected by and shapes the agrifood system. Through interviews with 24 actors in the Danish agrifood system, we identify valuing parameters ranging from taste, nitrogen fixation, durability, and nutrition to price. The study reveals differences regarding *what* and *how* actors value depending on the actors' position in the agrifood system and how the fresh grain legumes travel from field to plate. Where values conflict, we observe how some valuing practices have the power to exclude others and thereby prevent specific enactments of the fresh grain legumes. We argue that looking for valuing practices can help us understand how agrifood systems come into being, and that valuing *differently* can represent active involvement, both academically and practically, in encouraging change in the agrifood system. By using STS-thinking, the study brings novel insights about barriers towards more plant-based diets and contributes to the diversification of theoretical perspectives on sustainable transitions.

**Keywords:** valuing; sustainable transition; agrifood system; fresh grain legumes; STS



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## 1. Introduction

Considerable attention is directed towards the adverse effects of our current agrifood systems and the urgent need for a transition towards more sustainable ways of producing, distributing, processing, and eating food. Increasing the production and consumption of plant protein is one way to counteract some of the environmental and climatic consequences associated with food production [1,2]. Substituting meat with plant protein can reduce greenhouse gas emissions from animal production, including the negative effects of soy production and imports [3] and inefficient land use for fodder production compared with production for direct human consumption [4]. Furthermore, leguminous symbiotic atmospheric nitrogen (N) fixation abilities allow for reduced fertiliser input compared with other major crops, while the diversification of the cropping system with the introduction of grain legumes (GL) can reduce infestation rates as well as pest and disease pressure [5,6]. Furthermore, it is acknowledged that increasing GLs in diets will improve human health [7] and the number of varieties of eatable GLs might offer important sources of taste and textures for kitchens in their experimentation for future sustainable cooking [8,9]. Hence, there is growing national and international political awareness and support for the production and consumption of GLs [10,11].

GLs can be harvested dry for long-term storage or harvested at their green stage and sold as a seasonal fresh product, often in their pods or as storable frozen products. In comparison with dry GLs, fresh grain legumes (FGL) allow for earlier harvest and thereby early establishment of cover crops, with the ensuing benefits for soil health, nutrient

cycling, etc. [12–14]. Despite their manifold potential, the production of GLs in Europe is low due to a focus on cereal production after the Second World War [15]. In Denmark, the strategy of animal and dairy production for export has similarly resulted in specialised land use dedicated for cereal-fodder production combined with the import of soy as a protein source [16,17]. New national dietary advice that highlights the need for increased plant protein as part of a sustainable diet [18] suggests new opportunities for increased production and consumption of FGLs in Denmark. However, such changes involve shifts across the entire agrifood system.

The agrifood system is organised in a complex and interconnected web of people, places, materiality, technology, knowledge, and power [19]. The system is held together through interwoven activities such as producing, distributing, and cooking, and leads to diverse societal outcomes, such as foods, jobs, environmental impacts, etc. At the same time, the agrifood system is determined by the bio-geophysical and human environments in which it is situated [20,21]. Ericksen (2008) argues that agrifood systems are “heterogeneous over space and time and replete with non-linear feedbacks”. Applying the systems approach, thus, helps us in “understanding the critical factors that lead to particular outcomes or the interactions that govern a specific behavior of interest” [20]. Hence, paying attention to this complexity is vital in understanding transition processes towards more sustainable agrifood systems [22–24]. However, a considerable amount of research is directed at understanding the challenges faced and suggesting innovations within specific parts of the agrifood system [25,26]. In this study, we attempt to include several perspectives and experiences of different actors in the FGL system to shed light on how they are interconnected and how they all play a role in the transition towards the greater production and consumption of more sustainable crops.

Several theoretical approaches have been applied to explore the transition of agrifood systems in all their complexity. Since the late 1990s, different kinds of systems theories (e.g., socio-technical systems theory and science and technology studies (STS)) have, despite different ontologies, been concerned with the diversity of the actors involved in the agrifood system [27]. The socio-technical systems perspective examines historical and systemic changes associated with the introduction of new innovations as a combination of technological readiness, available infrastructure, regulations, and cultural and social norms [28,29]. Including the word *socio* in the theoretical concept indicates acknowledgement of the social aspect of transitioning. However, “discussions of sociotechnical transitions and their governance routinely obscure the central role that practitioners themselves play in generating, sustaining and overthrowing every-day practices.” [30]. Instead of seeking to identify immanent dynamics in agrifood systems, for example, STS theories operate with relational ontologies where realities are enacted through constant negotiation and entanglements of human and non-humans in everyday life [31]. The STS perspective, thus, offers the study of such entanglements through socio-material practices of everyday life, and we apply this approach in order to understand the development of agrifood systems and their potential for change.

In order to acknowledge agrifood systems as interconnected and affected by day-to-day practices, we explore how FGLs are brought into being through the practices of enacting values in an object [32,33]. *Valuing* becomes relevant because “the performance of valuations are . . . not only ubiquitous; their outcomes participate in the ordering of society” [33]. Thus, we argue that valuing reveals how actors relate and engage with objects [32,34] and that this engagement (or lack thereof) is a part of making decisions about continuing or implementing new (sustainable) practices.

Studying the practice of valuing includes perceiving *value* in more than just monetary terms; it is also related to convenience, interest, preferences, emotions, etc. [33]. Inspired by relational ontology, we recognise that objects (e.g., foods) do not have an immanent value independent of the networks and relations of which they are part (see e.g., [34–36]). Instead “objects come into being—and disappear—with the practices in which they are manipulated. And since the object of manipulation tends to differ from one practice to another, reality

multiplies" [37]. An important aspect in this regard is that values are not only enacted through social processes, but through concrete matter, and, thus, socio-material practices as well [38]. Thereby, the shapes, weights, textures, sizes, etc., of objects, as well as their containment of other objects, such as nutrients or water, are part of practices and of how objects are valued. The objects with which we engage and that are brought into being through the interaction are, thus, also a result of its materiality.

The idea that objects are *brought into being* and how this results in multiple realities also suggests that objects and realities can differ when engaging in new relations, and, therefore, hold potential for change (what Mol refers to as ontological politics [39,40]). As a consequence, values attached to a specific object may "be conflicting or not, overlapping or not, combine with each other, contradict each other" [33]. The acknowledgement that multiple versions of an object exist at the same time substantiates the argument for considering all these versions (e.g., experienced by different actors) when trying to understand the potential for increased production and consumption of FGLs.

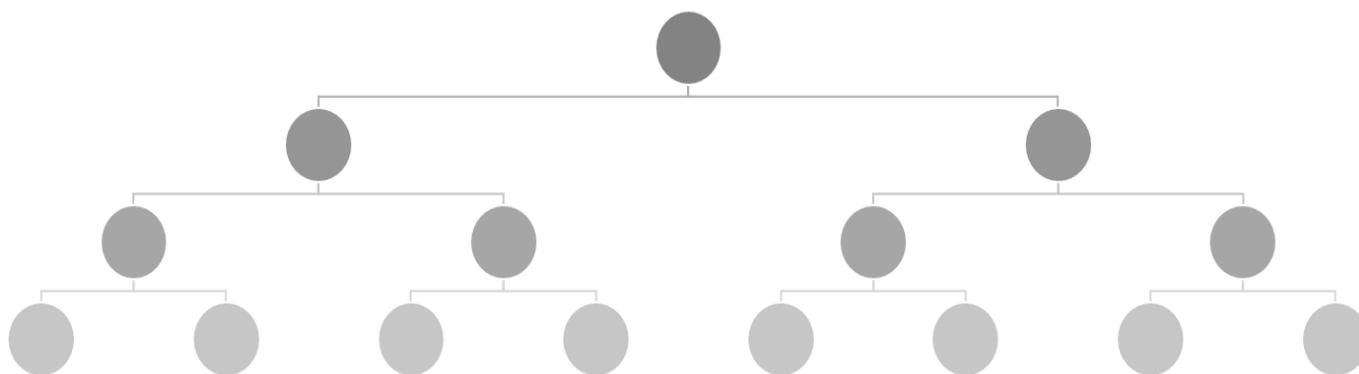
The ontological perspective levels out different kinds of knowledge and ways of knowing. If valuing takes place in concrete relations and practices, the actors become the experts, valuing according to their specific knowledge, position, perception, and aims [32]. Instead of looking for the *right* valuing, we attempt to understand actors' ways of rationalising, prioritising, and making decisions in the everyday performance of agrifood systems. Different practices of valuing reveal what is valued by some actors but not by others. This might indicate unspoken practices of (de)valuing or windows of opportunity for valuing differently.

That valuing is relational does not mean it is random. The practice affects, as well as is affected by, the dominance of specific realities over others that each bring different versions of objects and their valuation into being [39]. Thus, there are mechanisms of power at stake when different versions of objects are unable to co-exist easily.

In this study, we seek to understand how, in practice, the valuing within the Danish agrifood system affects whether, why, and how FGLs are grown, sold, and cooked, as well as some of the dilemmas and complexities in valuing processes when different ways of valuing contradict or do not point in the same direction. This offers an idea of the potential future role of FGLs in future agrifood systems.

## 2. Materials and Methods

The study was based on semi-structured interviews with 24 actors across the Danish agrifood system who are engaged with FGLs, e.g., through knowing, producing, processing, trading, or cooking. We identified the actors through a purposive snowball sampling [41] to find relevant participants and understand how actors engaged with FGLs are related (see Figure 1). The snowball sampling method was chosen for two reasons. Firstly, as the population is perceived as hard-to-reach, the number of actors engaged specifically in producing, distribution and cooking FGLs in Denmark is limited and innovative actors trying to engage with FGLs might not officially call attention to their experimentation and ambitions [42]. Secondly, as the study seeks to understand the agrifood system in which FGLs are placed, the aim of the sampling was not only to identify actors but also the relations between them [41]. The sampling was carried out until sufficient actors were identified. In this study, this was considered the case when the sampling included several representatives engaged in both producing, distributing, and cooking FGLs combined with the point where many actors referred to already identified interviewees. Some of the actors interviewed had experience of FGL while others did not. Thus, the study also explored the actors' valuing of a crop with which they do not yet have a relationship or have only a limited relationship. We argue that the inclusion of such (pre)valuing practices are crucial in order to understand how transitioning entails the establishment of new practices and relations.



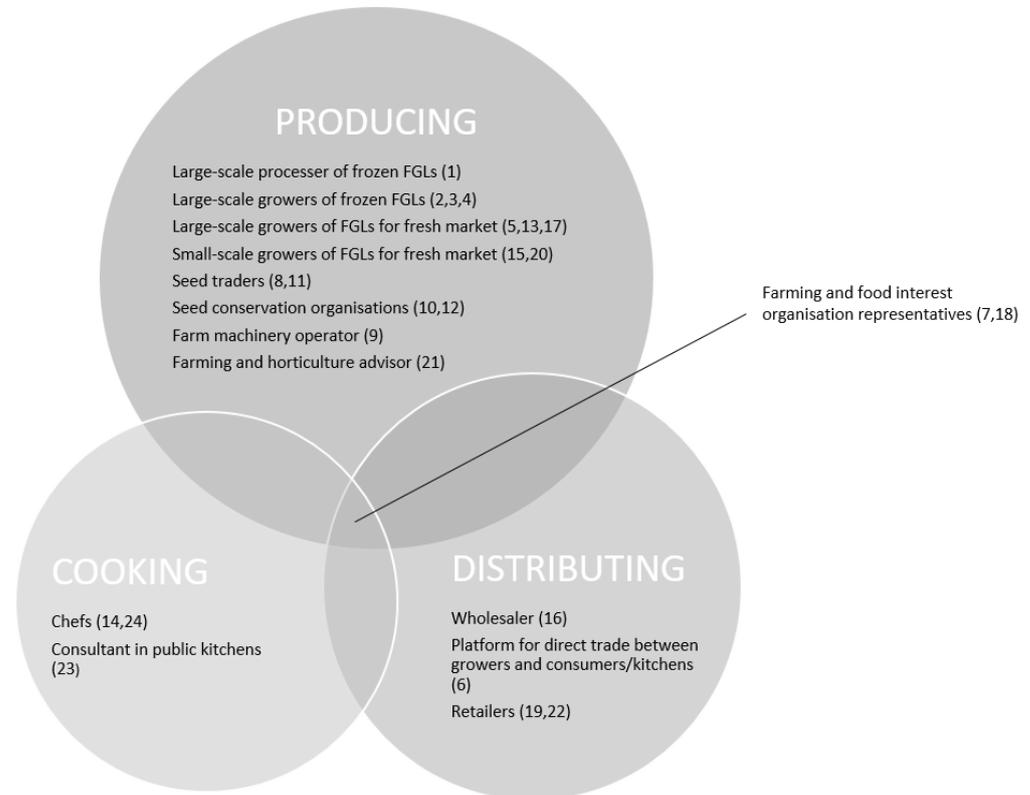
**Figure 1.** The snowball sampling strategy. From the initial interview (dark grey) new actors are identified (lighter grey). This sample continues until sufficient actors are identified.

We started the sampling with a central large-scale processor of frozen FGLs in Denmark to get in contact with large-scale growers of FGLs. As a second starting point, we added a small-scale grower of fresh Borlotti beans identified through a promotional event for growers of GLs in order to avoid being locked into specific networks of actors operating solely in large-scale production and distribution through the sampling method. This strategy allowed us to establish contact with a diverse network of actors, but also revealed that, despite their differences, large-scale production and alternative food networks were not two strictly separate networks since some growers sell through both mainstream distribution channels (retail and wholesale) and through direct sales (restaurants and private costumers), for example. However, when engaging with the STS perspective, we found it useful in the analysis to differentiate between large-scale growers of frozen FGLs, large-scale growers of FGLs for fresh market and small-scale growers of FGLs for fresh market owing to differences in their valuing, networks, finances, etc.

Through the sampling (brackets indicate number of interviews), we identified and interviewed a large-scale processor of frozen FGLs (1), large-scale growers of frozen FGLs (3), large-scale growers of FGLs for the fresh market (3), small-scale growers of FGLs for the fresh market (2), seed traders (2), seed conservation organisations (2), a farm machinery operator (1), a farming and horticulture advisor (1), a wholesaler (1), a platform for direct trade between growers and consumers/kitchens (1), retailers (2), chefs (2), a consultant in public kitchens (1), and farming and food interest organisation representatives (2). Starting out with different types of growers, our sampling strategy resulted in an overrepresentation of interviews with actors who cultivate FGLs (see Figure 2). We found that growers (especially those engaged with large-scale production) found difficulties in referring to the actors who buy their products, for example for reasons of confidentiality or limited personal relations. As we were interested in the enactment of the agrifood system, this type of observation provided an early understanding of how a lack of relations also plays a role in valuing processes. In line with the STS perspective, we also acknowledge that if we had begun the sampling from a different starting point, the sample would probably have been different with a potentially greater focus on other relations and differentiation between the other actors involved.

The interviews were conducted face-to-face or online in spring 2022, each lasting for approximately one hour. All interviews were transcribed apart from two, which were not recorded. For these two interviews, the researcher's notes have been used as empirical material. The interviews were semi-structured and explored the actors' thoughts about and experiences of the possibilities and challenges presented by engaging with FGLs. Going through this rich empirical material, we noticed the articulation of different FGL characteristics that were relevant for the actors in their practice of growing, trading, or cooking. We recognised this as a *practice of valuing* [32]. We coded the transcriptions by identifying these values and ended up with a long list ranging from aesthetic, ecological,

economic, and cultural to sensory values. In this analysis, we, therefore, focused on those characteristics used by agrifood actors to value FGLs in their everyday lives. To do so, we looked for both *what* and *how* actors value as a way to explore the coming into being of FGLs.



**Figure 2.** Illustration of the categories of actors interviewed placed in the analytical spheres of producing, distributing, and cooking FGLs. Numbers in brackets indicate the order in which the interviews have been carried out. The *Farming and food interest organisation representatives* have been placed in between spheres as they represent the whole agrifood system. The size of the circles indicates the balance between number of interviews within the three spheres.

Well aware that the agrifood system and its relations are complex, we divided the agrifood system into three spheres representing central activities such as *growing*, *distributing*, and *cooking* [21] in order to create an analytical structure (see Figure 2). We argue that a division of this kind offers interesting insights into the similarities and differences in valuing within as well as across these spheres.

### 3. Results

In the following section, we illustrate how the value of FGLs is enacted differently through the relations of the actors we interviewed in the agrifood system. By doing so, we encounter the diversity of values at stake and how these can sometimes be contradictory within and between the spheres.

#### 3.1. Growing FGLs: Weighing Price, Stories and Cropping System Benefits

Market price is a common way for growers to value and decide whether growing FGL is a profitable activity for them. The large-scale processor of FGLs explains that many of their growers terminate their contracts for pea production due to low pea prices compared with cereals. Individual growers (large-scale growers of frozen FGLs and FGLs for fresh market) explain that the market price is hard to negotiate with processors, wholesalers, and retailers due to competitive large-scale bulk markets of frozen products and production of

peas in pods for the fresh market. In contrast, one small-scale grower selling to a diverse group of customers explains that prices of FGLs vary greatly depending on the kind of network and relation in which they are engaged.

*“No, it’s not the same price. The retailers pay the lowest price, but they also take larger quantities . . . . Then of course there are restaurants and private customers, they of course pay a higher price.”* (Small-scale grower of fresh Borlotti beans)

In the interview, the grower elaborates on this differentiation in price. What they sell is a niche product both due to the specific story of their brand and because the specific bean variety is not otherwise available in shops. Similar experiences with price differentiation are raised in other interviews with a small-scale grower and representative of a direct trade platform. Prices are, therefore, linked to quantities, but also to uniqueness and storytelling. Relations to places and stories and between buyers and growers thus create room for flexibility in valuing.

Apart from the price, growers express their appreciation of the plant’s contribution to the cropping system, particularly the ability to fix N<sub>2</sub> from the atmosphere for increased N self-sufficiency as well as for the crops that follow.

*“Peas have always been the dynamo in my crop rotation. It’s a huge advantage that we can harvest those fields at the end of July. Then we can keep the soil black, and we can manage the weeds throughout July. And at the end of July we can sow a cover crop . . . . So it has accumulated nitrogen over the autumn and winter.”* (Large-scale grower of frozen peas)

Large-scale growers of frozen peas also explain that the early harvest time prevents problems with aphids and weeds, which often occur later in the season. Several growers (both small-scale and large-scale) express their appreciation of the contribution made by legumes in diversifying the crop rotation and, thus, stimulating subsequent crop effects. In a complex net of relations with soil, crops, time, machinery, weeds, nutrients, and humans, FGLs come into being as plants that provide ecosystem services. In particular for large-scale growers of frozen peas competing on market terms, the plant and its functions seem to be of greater interest than the product (grain) itself. Thus, the way in which FGLs interact in the broader cropping system is valuable enough for growers to cultivate the plant despite the product carrying a low price. This observation challenges the simplified assumption of price incentives being the primary driver among growers, and illustrates how objects come into being through valuing processes in concrete networks of relations (see also [43–45]).

Some growers value FGLs because they are, as a small-scale grower of different peas and beans for the fresh market says, “the world’s easiest vegetable to grow”. He appreciates the smaller workload involved with FGLs due to the high manual workload associated with having a diverse range of crops. For large-scale growers of frozen peas as well, the reduced need for fertiliser application means fewer hours spent in the field. Furthermore, frozen pea production is mainly managed by the processor (seeding and harvesting), which allows growers to engage in other activities in busy periods of the season. Again, valuing of FGLs depends on the complete network of relations and practices in which the growers are engaged (e.g., other crops, farm, or off-farm work).

The large-scale processor of frozen FGLs confirms the influence of current networks, explaining that it is too costly and complicated to introduce new FGL species if they are not adaptable to the existing infrastructure and farm machinery. The lack of flexibility within the acquired machinery and the lack of machinery applicable for new FGLs reduce the potential for large-scale growers in particular to value heterogeneity in the size and shape of different FGLs. In contrast, a small-scale grower with less need to use machinery has a flexibility allowing for experiments with different types of FGLs. Thus, the need to use machinery due to the size of production involves large-scale actors in different networks than small-scale actors, thus differentiating between their possibilities for valuing diversity and new FGLs.

The FGL crop is very sensitive to weather conditions, which means that the yield can vary a great deal. One large-scale grower calls it “our lottery ticket”, emphasising the risk associated with a lack of yield stability. For another large-scale grower, poor experiences with pea production 25 years ago have discouraged him from taking the risk of growing FGLs for several years:

*“We actually stopped [growing peas] after 1987 . . . . It literally rained every day in ’87 . . . . I don’t know how many farmers committed suicide around then . . . . A neighbour of a neighbour of a neighbour was sitting in a field. He had eaten rat poison. No, it was terrible weather. We ploughed 20 hectares down . . . . I must say, in that moment I thought, damn no! We don’t want anything [pea plants] lying on the ground anymore.”*  
(Large-scale grower of FGLs for the fresh market)

The personal consequences of yield losses reveal a seriousness about the choices growers make in their everyday lives. The quotation also shows how relations cross time and space [40], and, thus, valuing, are affected by things that have happened and assumptions about what might happen. In this way, *how we know* through personal experiences, feelings, and convictions is part of the practice of valuing. At the same time, these examples of valuing also show how different versions of the object of FGLs are enacted and valued as both ‘the world’s easiest vegetable to grow’ and ‘a lottery ticket’ and are thus difficult to control.

### 3.2. Distributing FGLs: Durability, Diversity and Seasonality as Ambivalent Values

*Freshness* is one of the main values of FGLs articulated by actors in the large-scale distribution sphere of the agrifood system (retail and wholesale). The product needs to be able to stay fresh despite transportation and turnover time in shops. Thus, future consumers, although not yet directly present, become important actors in enacting value as the ability of the product to remain close to its state when harvested (‘fresh’). For peas in particular, this can be a challenge. The window for harvesting at the right time of maturity, which gives a *fresh* pea, is only a few days. After harvest, the value, enacted as the freshness of the pea, will decrease in only a few hours. As a small-scale grower of peas in pods explains: “. . . the peas [in the shop] are harvested one week ago. And they’re soft in the shell . . . and do not taste of anything”. The rapid decline in freshness, which in this quotation affects taste and texture, is a central argument for freezing FGLs as a way to preserve specific values enacted through the qualities and prolong the durability of freshness. In this case, there seems to be a contradiction between the freshness and the actual network of bringing FGLs to consumers through long-distance transportation, bulk handling, and storage. Thus, the example shows that valuing is relative, as a fresh pea (and the associated taste and texture) might be different to a grower than to a customer who might never have tasted a pea in a freshly picked pod.

Especially for actors within retail, appearance and taste are important qualities. As customers are normally not able to taste the product in the shops before purchase, the importance of appearance is even greater (small-scale grower of fresh peas and beans for the fresh market). Accordingly, a large-scale grower of fresh peas for the fresh market uses the appearance of the pod as one of the main criteria for selecting the varieties that he sells in pods for retail and wholesale. Thus, the look of the *outside* (the pod) becomes a translation of the value of the *inside* (the grain). Another small-scale grower of fresh beans mentions that “when we sell the fresh ones [Borlotti beans], we sell them in the pods. This means that people have to shell them themselves and this is a very exquisite and delicious product”. The valuing of FGLs thus depends on *where* and *how* we meet the product and is also related to sensing.

A representative of a wholesaler thinks that he is most able to sell something that is recognisable to his customers (e.g., public kitchens). In order to introduce new FGLs, he argues that the sector should agree on promoting a few specific species or varieties to simplify communication directed at customers. Moreover, retailers emphasise that they need to be sure that they will sell large quantities of each product to avoid them going

off in the shops. As noticed with large-scale growers, homogeneous material and large quantities are, therefore, also valued by the mainstream distribution actors. In contrast, an online platform for direct trade between growers and consumers (restaurants, private individuals, etc.) allows growers to decide on both the quantities and kinds of products. It is their experience that the diversity of products (colour, taste, size, etc.) is valued positively as the platform addresses other ways of relating between growers and customers.

Many actors mention the special value of fresh peas in pods in season. The product is associated with a nostalgic summer feeling for which people are willing to pay. Several actors (interest organisation, retail, advisor, small-scale grower) emphasise that the lack of accessibility all year around creates a specific value for FGLs. The seasonal products are often also local products because seasonality mostly presupposes a geographical proximity of production and consumption [46]. Supermarkets and wholesalers experience an increase in demand for local products and try to accommodate this by having local growers' shelves in shops, for example, and investment in local small-scale production by wholesalers, thus adopting what they perceive as valuing practices among their customers.

However, while wholesale and retail are making space for local and seasonal products, they are also extending the Danish season of peas and beans by importing products from other regions the rest of the year and through frozen FGL products. Thus, the provision of seasonal and local products exists alongside, although somehow in opposition to, the concept of constant availability of (local *and* global) products [46]. Despite trying to value local and seasonal qualities, the distribution actors' network of global suppliers affects small-scale local growers, in particular through price competition, which challenges the growers' ability to make a business out of selling to wholesale and retail. This example shows that opposing values can be present simultaneously but may also undermine one another.

Large-scale and small-scale growers explain that the retail sector and wholesalers' requirement for bulk deliveries limits the growers' ability to experiment with new crops or have a range of diverse crops, as the experimental phase requires smaller volumes. Furthermore, as mentioned, representatives from retail and wholesale say that they are only interested in a small number of FGL products because of the very broad selection of products in general that they are offering. Both wholesalers and retailers acknowledge that apart from peas in pods in season, FGLs do not currently have a high priority in their businesses. As retail and wholesale constitute an important link between growers and consumers, the lack of valuing and prioritisation of FGLs by these actors affects the possibilities of producing or accessing FGLs for other actors (see e.g., [47]).

### 3.3. *Cooking FGLs: Knowing and Speaking about Taste, Toxins and Use*

Despite working to promote FGLs, we identify different foci of valuing among actors cooking with FGLs. A chef argues that he thinks we ought to eat what is best for the soil, which then becomes an argument for using FGLs in cooking. A consultant in public kitchens argues that FGLs should not be eaten for their environmental function, but rather because of the sensory enjoyment. She explains: "... I don't talk about health, I don't talk about nutrition, I don't talk about vegetarians or vegans; I only talk about good food." To her, emphasising the FGLs' ecosystem benefits as the main value might undermine the focus on preparing and eating delicious FGL meals. The quotation thus indicates an actor's awareness about how co-existence of several values (ecological and sensory) can create distraction and accordingly disturb a transition process.

In the interview with actors who work to cook and prepare FGLs, taste is articulated as a core value. However, despite the seeming importance of taste, we find few detailed descriptions of taste in the interviews. This is confirmed by a chef who argues that there is a lack of language to describe the taste of GLs in general. Several actors refer to a *nutty* taste, but sweetness, umami, and bitterness are also mentioned. A consultant in public kitchens explains that she was once involved in a research project to describe the taste of a range of dry GLs. In doing so, she used the smell or taste of something already known, such

as elderflower, to explain the taste of GL species and varieties, illustrating how valuing can be linked to something already known. Associations and language are, therefore, also important means of understanding and noticing values. As a breeder describes, the pea varieties on the market today do not apply to the taste qualities that are possible to breed for today. Having a language to describe and thereby make visible the qualities of FGL in all parts of the agrifood system must be the first step to ensure awareness of and be able to communicate the needs and wishes of different actors. In this regard, the study indicates an imbalance between the language available around growing FGLs and the lack of terms referring to taste and other values in the cooking sphere. Such inequalities might indicate a lack of historical and current focus on FGLs in these spheres but may also have consequences for future valuing processes around FGLs.

Despite an unclear definition of the taste of FGLs, the actors still talk about good and bad taste. For peas, a good taste is particularly associated with sweetness. In contrast, when describing a pea with a bad taste, the agricultural advisor associates it with a mealy texture. A large-scale grower of fresh peas for fresh market explains that the larger the pea, the more mealy the taste. In this way, taste is closely related to other sensory experiences and characteristics, such as texture and size:

*“I think it’s about people confusing taste and texture. Because when you eat red beans in chilli con carne, they taste like chilli con carne. And when you eat chickpeas in chicken curry, they taste like curry. But what is unfamiliar to people is the mouthfeel. The slightly floury, mushy consistency.”* (Consultant in public kitchens)

Cooking brings FGLs into being through combinations of ingredients in actual meals, where associations and sensing melt together. Valuing is, therefore, also about context and involves confusion, recognition, and preferences. The social aspect of valuing individually (e.g., through preferences and memories) and in communities (e.g., through recipes and traditions) also means that the practice of valuing both carries and shapes a cultural heritage.

Another way of valuing FGLs in the cooking spheres is through their health qualities. In 2021, Denmark’s national dietary advice included the recommendation of 100 g of GLs per day [18], a recommendation that public kitchens are expected to mirror in their meals. Protein, fibres, and vitamins in particular are emphasised in the interviews as healthy qualities of FGLs. However, several of the species also contain toxins [48], which require preparation (e.g., soaking, blanching, cooking). The risk associated with the toxins has given rise to regulations about the preparation in public kitchens. According to a consultant in public kitchens, the caution incorporated into food regulations can be a barrier for increased use in kitchens because lengthy preparation, for example, reduces the sensory value and possibilities of variation in meals. The balance between food safety and the potential for a more interesting taste and more diverse use illustrates another dilemma in valuing.

A chef and a large-scale grower (referring to consumer requests from the Middle Eastern immigrant community, with which he has recently established direct contact) express an interest in eating not only the grain but also the pod of FGLs. In this regard, a breeder mentions the potential of breeding a soft and eatable pod (e.g., snow pea and snap pea). In contrast, a large-scale grower of fresh peas in pods explains that due to a lack of workforce, he expects to start harvesting with machinery instead of by hand. This will require new pea varieties with a hard pod to avoid damaging the product while machine harvesting. Thus, for some actors the pod should be robust enough to contain an undestroyed surface since its appearance is the selling point. For others, the pod becomes not the packaging, but the product itself, which calls for quite different values related to digestibility, taste, and texture. The chef explains that being able to use the whole product would make FGLs much more economically attractive to him due to a larger number of eatable parts in relation to price. Thus, looking differently at *what* is valued allows for other enactments of FGLs.

### 3.4. Clashes between Valuing Practices

As shown above, valuing can be contradictory, and in some cases the practices of valuing involve exclusion of other values. In this way, valuing can also be a matter of power. Below, we use different examples from the interviews to explore clashes between valuing practices, and how this can help us understand how inequalities in valuing practices affect the possibilities for change in the agrifood system.

#### 3.4.1. Promoting Values through Concrete Shaping of Materiality

Breeding of crop species and varieties is a quite concrete practice of valuing. Breeding is primarily handled by large-scale global companies [49] who need a high volume demand in order to start a breeding programme. According to a seed trader for an international seed company, this challenges the development of new varieties for large-scale production of FGLs, which on a global scale is relatively limited. A representative of a seed preservation organisation explains that after 1950 (with the industrialisation of agriculture), breeding criteria for GLs changed to focus specifically on compliance with modern production methods and durability, for example. These are criteria that support and promote specific ways of cultivating and distributing. He argues that distributing through alternative value chains (selling directly and locally) would make some of these breeding criteria (especially those related to transportation and storage) unnecessary, thus illustrating the effects of networks on valuing. Furthermore, the FGLs' ability to cover ground and produce organic material for soil improvement has been *bred away* in order to produce a higher yield and make management with machinery easier (large-scale grower of frozen peas). This shows how the values that breeding companies prioritise has a direct consequence for growers' production. Here, we can ascribe a new meaning to the term *value chain*. Despite perceiving the agrifood system as a network, the FGL travels through different spheres from field to plate. The genetic material of FGLs is a key part of how the plants develop and how they interact with the networks in which they are involved. Thus, there seems to be a power of valuing attributed to those actors positioned in the early parts of the chain, as their valuing practices (e.g., breeding) limit the supply of FGLs and thereby the diversity of potential enactments of FGLs among actors later in the chain. Again, a shortage of concepts concerning the more sense-based qualities appreciated by actors further along the value chain (kitchens, chefs, etc.) makes it hard for breeders to actually take these into consideration when breeding and selecting FGLs.

#### 3.4.2. The Value of Bad Taste

Positioned early on in the value chain, growers choose what species and varieties of crops to grow and consequently bring to market. The values that are part of such choices are described above, including price, N fixation, harvest time, potential for diversification, reduced workload, and risk. However, yet more actors interfere with how values are enacted and re-enacted. Birds present a widespread challenge when growing GLs, as they are quick to embrace FGLs as a valued foodstuff. As a consequence, one large-scale grower of FGLs explains that they choose to grow a specific bean variety, as they observed that birds do not like to eat it, thereby enacting *good taste* as a bad thing, while *bad taste* (from a bird's perspective) becomes a way of valuing FGLs for this grower. Despite the lack of clarity about whether birds and people have the same preferences regarding the taste of beans, the example reveals the grower's lack of prioritisation of taste compared with the risk of losing yield. A farming and horticulture advisor confirms that they focus on yield stability and not on valuing parameters such as taste when giving advice to growers. As in the previous example of selecting breeding criteria, valuing, thus, has actual consequences for which products are brought into being and tells us something about the dominance of some interests over others as part of valuing practices.

### 3.4.3. Translating as a Way to Promote Some Values over Others

We observed different ways of translating values between actors and how these contain elements of power. Growers and the processing company evaluate the value of the product by a specific T-number, which indicates the dry matter of the pea and, thus, the state of maturity. A large-scale grower of fresh peas in pods for the fresh market values the peas by their juiciness, which he tests by pushing the pea to register the amount of juice released. Both examples are simple indicators of value that can be used to communicate and negotiate the price of the product between actors in the agrifood system. The lack of participation or systematic use of methods by professionals in the cooking sphere in selecting varieties and assessing value in the production sphere excludes a more complex and ambitious valuing of the final FGL product. The risk is that the price fails to reflect the values of the product appreciated by relevant actors and instead reflects the power relations within the agrifood system. As price becomes the authorised norm for value, it has a determining impact on the actors' ability and willingness to grow, trade, or buy FGLs. Having the relations and being in a position to set the price, therefore, represents a power of valuing across the agrifood system.

### 3.4.4. Reproducing Cultural Meaning as a Barrier for Valuing Differently

GLs have historically been associated with old-fashioned and relatively tasteless dishes or as part of a poor person's diet (see e.g., [50]). This might still be the case, despite its sustainable potential. For example, health authorities have emphasised the importance of legumes in our diets in their recent dietary advice. However, GLs are placed at the bottom of the food pyramid together with other low-price products such as cereal. This is despite the fact that they ought to substitute meat products, which are placed at the top of the pyramid. This indirect ranking of food categories might have an influence on what we perceive to be *high-quality* products, thus creating lock-ins in the agrifood system [26], and again illustrates the power of the valuing processes that lies with health authorities. Studies show that GLs score highly on health and sustainability, but have difficulty competing with meat, which is perceived "as more fun, popular, suitable in diets and for festive occasions, and tastier" [47]. Food is part of our everyday lives of celebration, habits, skills, and entertainment, and carries with it a strong cultural meaning [51–55]. This raises questions about how to change the image or revalue ingredients across the agrifood system. New trends of sustainability and local production might help increase the value of FGLs, not just in monetary terms but also in terms of their meaningfulness among actors in their everyday lives.

## 4. Discussion

*"(R)eframing is its own potentially powerful form of intervention, political and otherwise, because it shows that the assumptions embedded in current arrangements could be otherwise". [40]*

This study illustrates how multiple realities exist in the agrifood system and that some actors or networks have more power than others in their valuing practices. Thus, we argue that understanding actors' practices of valuing (and the decisions that follow it) is part of understanding transition processes. In this regard, relational ontologies allow for new ways of analysing agrifood system change and combining it with everyday socio-material and ecological practices (see also e.g., [45]).

To Mol (2002) it is clear that "if reality is multiple, it is also political" [37]. Undoing the dominance of specific realities is, therefore, not easy, but the multiplicity points to the fact that it is possible [40]. This helps us perceive the agrifood system as less static or fixed than actors might experience in their everyday lives or than it might appear through other theoretical lenses.

This also implies that valuing *in practice* can be an active engagement among actors in changing the agrifood system:

*“I think it’s super interesting because I’ve started . . . to be interested in how things are developing with climate, sustainability, our nature and so on, and so on. I think it’s cool to be a part of it.” (Wholesaler)*

As the wholesaler from the interviews explains in this quotation, valuing can include a broad range of parameters beyond price, and noticing this can create meaningfulness in people’s everyday lives. Starting to value differently, therefore, represents potential for change. Continuing this, Heuts and Mol (2013) argue that valuing is not just a mere evaluation of qualities, but actors are also playing an active role in creating values through their practices [32]. Breeders are improving FGL varieties, growers provide the conditions for the plants to grow, and chefs are working to provide meals that are valued by those who eat them. Practices to actively engage in making FGLs *good* are, therefore, also an important part of valuing differently. This requires know-how and skills [56,57]. Increasing FGLs role in future agrifood systems must, thus, require acknowledging the importance of the work done to make good FGLs in practice, what Heuts and Mol (2013) describe as *care* [32]. This means being attentive to and supporting learning and valuing processes among all actors in the agrifood system (including the conditions enabling these processes) in political initiatives that aims at supporting transitions towards more production and consumption of FGLs.

Acknowledging the ambitions and potential of FGLs and GLs in general, this study highlights the need to continue to explore how these (new) ingredients can become an interesting and luxury part of our diets in the future. As exemplified in the study, we suggest that the lack of (authoritative) concepts about the taste and sensory qualities of legumes contributes to displacing the balance of power of valuing and provides different conditions for policy in this area than if such language was available. We argue that paying more attention to such concepts could challenge simple indicators and permit exchange of valuing practices between kitchen and field. As Carolan (2015) suggests: “if we wish to maintain agro-biodiversity we must maintain cultural diversity, which means we must maintain a diversity of tastes for food” [58]. Perceiving food professionals as crucial actors in developing new ways of valuing FGLs might support a more just transition towards sustainable and delicious food for both consumers and growers. Doing so can require distribution actors to renegotiate what is perceived as valid value parameters in the distribution sphere and question existing logics and infrastructure. Making new relations across the agrifood system can, thus, disrupt some of the power dynamics that challenge the production and use of FGLs today. Engaging in new relationships and increasing dialogue about the diverse range of qualities appreciated by different actors are some first and important steps towards valuing differently in the agrifood system.

## 5. Conclusions

The study dealt with understanding the practice of valuing in the agrifood system and how it reveals potentials and barriers in a transition process. The case study of FGLs in Denmark shows that many different actors involved in producing, distributing, or cooking have different ways of valuing FGLs. This includes differences in *what* and *how* FGLs are valued. Contradictory and conflicting values exist alongside each other, and, in some cases, power relations are able to exclude valuing parameters in favour of others. This affects which species and varieties are valued and considered when breeding, cultivating, or promoting future FGLs. The study reveals imbalances in the conceptualisation of values between the production sphere and food professionals. We argue that an extended language about values could generate new understandings between actors along value chains and may even be a prerequisite for the development of new and more sustainable agrifood systems. Action is required in order to redistribute knowledge across established actor positions and build new relations between actors in the agrifood system.

Analysing valuing processes as social and relational practices indicates the importance of analysing changing dynamic interactions and relations of actors in time and space as part of a sustainable transition. It shows that the changes needed are systemic rather than

linked to specific parts of the agrifood system. Acknowledging that valuing takes place every day in the agrifood system reveals how valuing differently, revaluing, and creating value are ways in which the agrifood system can be changed in both theory and practice.

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