



Harnessing the potential of public procurement for the protein transition – perceived barriers and facilitators

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Abstract

Shifting dietary patterns from animal-based proteins to more plant-based and alternative protein sources – the protein transition – is urgently needed to improve planetary and human health. Public food procurement is considered to be an effective policy instrument to accelerate the protein transition and to be a potential game changer towards a sustainable food system. However, this potential has remained far from leveraged, and it is largely unknown which barriers and enablers exist in that context. Therefore, this study aimed to gain insight into the barriers and facilitators that are perceived by relevant stakeholders when implementing the protein transition in public food procurement. Our study was conducted in the Netherlands, because of the policy goals set by the Dutch government with regard to the protein transition (50% of the proteins consumed should include animal-based proteins and 50% plant-based proteins by 2030) and because the extent to which the protein transition has been included in the food procurement of Dutch (semi-)public organizations is still largely unknown. However, findings are also relevant for other countries. Semi-structured interviews were conducted with participants from a wide range of (semi-)public organizations (e.g., universities, hospitals, governments), in 2022. Five main themes of barriers and facilitators were identified: (1) support and motivation, (2) food availability and offerings, (3) financial considerations and incentives, (4) policies, processes, and contracts, and (5) environmental factors. The insights from this study can strengthen the scientific evidence base and can serve as a foundation for future research. Moreover, the insights can be beneficial to officials working in (semi-)public organizations to effectively design and execute their procurement process, and can help policymakers in policy development to foster (semi-)public organizations to implement the protein transition in their own contexts.

Keywords Protein transition · Food procurement · (semi-)public organizations · Barriers · Facilitators

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Introduction

Shifting dietary patterns from a dominance of animal-based proteins to more plant-based and alternative sources of proteins – the protein transition – is urgently needed to improve planetary and human health (Willett et al. 2019; Verain and Dagevos; 2022; Paloviita 2021; Aiking and de Boer 2020). In countries in which average animal protein intake is above dietary guidelines, lowering the intake can significantly contribute to the reduction of diet-related chronic diseases as well as to the reduction of greenhouse gas emissions and land use (Willett et al. 2019).

In order to shift the population level consumption of animal-based proteins to more plant-based proteins, structural universal policy strategies are needed (Ronto et al. 2022; Ammann et al. 2023). Such strategies reach the entire population, and evidence highlights the need to structurally change food environments so that they make sustainable (and healthy) food choices the easy choice (European Public Health Alliance 2019; Ammann et al. 2023; Ng et al. 2022). The food and meals offered in (semi-)public organizations are core constituents of food environments and are easily established by public food procurement, i.e. the purchase of food products and meals by these organizations (European Public Health Alliance 2019). (Semi-)public organizations can be defined as organizations that fulfill social public tasks at some distance from the government and in which the government intervenes directly or indirectly, often through regulation or funding (e.g., governments, schools, hospitals, universities and prisons) (Centraal Planbureau 2013). In the European Union (EU), for example, on average 85 million meals per day were catered by public institutions in 2019, with more than 50% through contract catering (project StratKIT 2019).

Considering this influence and the large volume of food purchases in public settings, public food procurement is generally considered to be an effective structural policy instrument to accelerate the protein transition (FAO, 2021; Parsons and Barling 2021) and to be a potential ‘game-changer’ towards a more sustainable food system (Swensson et al. 2021). It offers the possibility to determine what food will be purchased (e.g., more plant-based, healthy foods), from whom (e.g., local, small and medium food enterprises) and from which type of production (e.g., production that ensures environmental sustainability and biodiversity) (Swensson et al. 2021; Swensson and Tartanac 2020). Positive impacts may be direct, through the purchase and consumption within public organizations, but also indirect, by setting norms and inspiring more plant-based diets in other settings (e.g., at home) (Swensson et al. 2021; Wahlen et al. 2012).

However, the potential of sustainable food procurement has remained far from leveraged in most contexts, and

the barriers and enablers affecting the uptake of the protein transition in public food procurement remain largely unknown (Molin et al. 2021). Therefore, this study aimed to gain insight into the barriers and facilitators that are perceived by relevant stakeholders when implementing the protein transition in public food procurement.

The insights of this study can strengthen the scientific evidence base and can serve as a foundation for future research, in order to foster the protein transition through public food procurement. Although some studies have already identified barriers and enablers to shift to more sustainable public food services, most studies focus on specific food types (e.g. organic foods) and origins (e.g. locally sourced) and few studies address a reduction of animal-based products as a sustainable food procurement approach (Molin et al. 2021). In addition, studies often focus on a specific domain such as health care (Alberdi and Begiristain-Zubillaga 2021; Stephens et al. 2021; Carino et al. 2021), aged care facilities (Stephens et al. 2021) or universities (Grech et al. 2020), rather than applying a comprehensive approach. Moreover, other studies focus on barriers and facilitators related to the plant protein consumption in general (Niva et al. 2017; Rust et al. 2020) and not specifically related to public food procurement.

Moreover, the insights can be beneficial to (semi-)public organizations to effectively design and execute their procurement process, and can help policymakers in the formulation of policies and regulations that can foster (semi-)public organizations to contribute to the protein transition within their respective contexts. Although some governments have already set targets to ensure healthy and sustainable procurement and meals in (semi-)public organizations (Lassen et al. 2023), examples are still scarce. An example is Denmark, where the government has developed a strategy “Green Procurement for a Green Future” and several Danish municipalities and regions have already implemented food procurement practices covering areas such as climate-friendly and healthy menus (Lassen et al. 2023). Other examples are Ghent (Belgium), which aimed to reduce meat consumption in school canteens by 50% from 2021, Oslo (Norway) which aimed to reduce meat consumption in half of the municipality’s canteens and institutions by the end of 2023, and Helsinki (Finland) with its goal to increase the percentage of vegetarian food served in public organizations, and halving the use of meat and dairy in the food procured by 2025 (Lassen et al. 2023).

To gain insights into the barriers and facilitators for implementing the protein transition in public food procurement, we focus our analysis on the Netherlands. The Dutch context is relevant because of the policy goals set by the Dutch government with regard to the protein transition (50% of the proteins consumed should include animal-based

proteins and 50% plant-based proteins by 2030 (Ministry of Agriculture, Nature and Food 2022)) and because the extent to which the protein transition has been included in the food procurement of Dutch (semi-)public organizations is still largely unknown. Moreover, whereas meat consumption has stagnated, or even slightly decreased in recent years in the Netherlands (National Institute for Public Health and the Environment 2023), the consumption of meat still exceeds dietary guidelines and overall meat consumption has remained high in the past decades (National Institute for Public Health and the Environment 2023; Dagevos et al. 2022). Although focusing on the Netherlands, findings are also relevant for other high-income countries with similar food system challenges and ambitions.

Methods

Study design and participant recruitment

Semi-structured interviews were conducted with participants from various professional backgrounds and a wide range of (semi-)public organizations and settings in the Netherlands

(Table 1). The study entailed two phases. In the first phase, exploratory expert interviews were conducted to map existing initiatives and identify perceived barriers and facilitators with regard to the protein transition in (semi-)public settings, such as schools, universities, hospitals, prisons and government agencies. In the second phase, in-depth interviews were conducted with stakeholders of the included (semi-)public organizations, with different roles, to identify barriers and facilitators for implementing the protein transition in public food procurement in more detail. The steps are explained in more detail below.

Phase 1: Exploratory expert interviews

In the first phase of our study, we invited seventeen experts known for their expertise on the protein transition and/or food procurement in (semi-)public organizations in the Netherlands, to participate in our study by sending them an e-mail invitation with information about the aims of the study and topics of the interview. Of these seventeen experts, five experts did not respond and two experts declined (due to no time and insufficient knowledge). In total, we conducted ten expert interviews to explore the presence of public food

Table 1 Characteristics of included experts and stakeholders

Study participants		
Phase 1: Exploratory interviews – experts		
Number of included participants	Expertise and organizations	
<i>N</i> = 10	Experts on sustainable and healthy foods, the protein transition, and/or public procurement working at: food organizations; food alliances; governmental organizations; trade associations of schools, hospitals, or the catering industry	
Phase 2: In-depth interviews – stakeholders		
Number of included participants	(Semi-) public organization	Occupations
Total: <i>N</i> = 14	(<i>N</i> = 10)	
1	Local government	E.g., program managers food, senior advisors food, service/contract managers catering or facilities, heads of business operations or facilities, procurement coordinators/advisors, team leaders food/catering
2	Regional government	
1	National government	
1	University A	
2	University B	
1	Secondary school	
1	International (primary and secondary) school	
2	Organization responsible for the day-to-day care of the detainees and their rehabilitation	
1	Hospital A	
1	Hospital A	
1	Hospital B	
Number of included caterers/cook	Caterer organizations/cooks	Occupation
Total <i>N</i> = 5	<i>N</i> = 4	
1	Catering organization A	Managers sales of caterers, cooks
1	Catering organization B	
2	Catering organization C	
1	Local government (cook)	

procurement initiatives in the Netherlands that were related to the protein transition, from which lessons could be drawn to accelerate the protein transition in (semi-)public organizations (i.e. examples from practice). Experts were included if they had a good overview of initiatives related to the protein transition in public food procurement in the Netherlands. They were selected based on their broad knowledge on sustainable and healthy foods, the protein transition, and/or public food procurement and were working at different kinds of organizations: food organizations; food alliances; governmental organizations, or interest groups representing schools, hospitals, or the catering industry (Table 1).

Additionally, these exploratory interviews aimed to give a first insight into perceived barriers and facilitators regarding accelerating the protein transition in public food procurement.

Phase 2: In-depth stakeholder interviews

Based on the results of the exploratory expert interviews, we made a selection of case studies from a variety of (semi-)public sector settings (schools, universities, local, regional, and national governments, hospitals and prisons) to conduct the in-depth interviews. These cases were identified by the experts in phase 1 as examples of organizations that are developing and/or implementing policies to improve the food offerings, and/or more specifically the protein transition in their procurement and/or food offerings. The interviews aimed to gain insight into the perceived barriers and facilitators to implement the protein transition in public food procurement and the changes that would be required to accelerate the protein transition in public food procurement. We approached fifteen (semi-)public organizations, by sending an e-mail to relevant stakeholders working at these organizations with an invitation to participate in our study: one governmental organization at national level, one regional government, one local government, three hospitals, two universities, one organization responsible for the day-to-day care of the detainees and their rehabilitation, and six schools. Of the approached organizations, two schools did not respond and three declined (two schools due to insufficient knowledge ($n=2$) and one hospital due to no time ($n=1$)). In total, we ended up with ten (semi-)public organizations that were selected as cases that were developing and/or implementing policies to improve the food offerings, where we conducted eleven semi-structured in-depth interviews with fourteen stakeholders of different roles (e.g., team leader, policy advisor, procurement official and contract manager) involved in public food procurement and food offerings (Table 1). Per organization we also invited the caterer or cook for an interview to get more insight in their experiences regarding the implementation of the protein

transition in their organization; we invited seven caterers and one cook of whom four caterers did not respond. In total, we interviewed three caterers and one cook (Table 1).

Data collection and analyses

Data was collected from June to September 2022. Interviews were held online, by two members of the research team (SD and MV). The interviews were held in Dutch, using semi-structured interview guides (one for the exploratory interviews and one for the in-depth interviews with stakeholders from (semi-)public organizations and with the caterers/cook), with questions to identify barriers and facilitators (Cowie et al. 2020) (see Supplementary file 1). The interview guide for the exploratory interviews included questions about which current examples from practice exist regarding the protein transition in public food procurement, the perceived barriers and facilitators for the protein transition in public food procurement, and the settings and stakeholders that are involved in these transitions. The interview guide for the in-depth interviews included questions about the protein transition in public food procurement in the specific organization, the different stakeholders involved in this transition, the perceived barriers and facilitators, and more specifically the perceived policy- and contractual changes needed to foster the protein transition in public food procurement. The interviews lasted approximately 60 min and were audio-recorded. An interview report of each conducted exploratory and in-depth interview was drafted, which was checked on accuracy with the interviewees. Anonymity of the participants was assured by using identification numbers instead of names.

Interview reports were analyzed with Nvivo Qualitative Data Analysis Software (Version R 1.7). A thematic content approach was used via which inductively thematic codes were identified. Through comparing quoted quotations we distilled common barriers and facilitators, as well as recommendations to accelerate the protein transition in public food procurement. The exploratory and in-depth interviews were analyzed using the same approach. SD coded the interview reports inductively line-by-line which was checked by MV. Emergent subthemes and overarching themes were discussed between SD and MV, and overarching themes were also discussed within the project team until consensus was reached. This led to the development of a final codebook (See Supplementary file 3 for the codebook). Initial results of this thematic map were discussed during project team meetings. The main themes and some subthemes derived from inductively coding the interviews were used to describe the perception of the experts and stakeholders on the barriers and facilitators to implement the protein transition in public food procurement in the Netherlands (See Results section). All quotes in this section below have been translated from

Dutch into English. The identified themes are visualized in a figure (see fig. 1) which may help to gain insight into the complexity of the protein transition in public food procurement and the multiple levels on which barriers and facilitators may occur.

Ethical approval

The study protocol was evaluated by the Social Ethics Committee of Wageningen University and Research, and it was concluded that the proposal deals with ethical issues in a satisfactory way and that it complies with the Netherlands Code of Conduct for Research Integrity (reference 2022–48-Verain). Written informed consent was obtained from all participants.

Results

Perceived barriers and facilitators to implement the protein transition in public food procurement in the Netherlands

Experts and stakeholders identified several barriers and facilitators that may influence the implementation of the protein transition in the procurement and food offerings of (semi-)public organizations in the Netherlands. Five main themes of barriers and facilitators were identified: (1) support and motivation (2) food availability and offerings, (3) financial considerations and incentives, (4) policies, processes, and contracts, and (5) environmental factors. Table S2 (Supplementary file 2) shows whether experts and/or stakeholders from certain organizations mentioned the specific topics.

Support and motivation

Both experts and stakeholders identified a lack of support and motivation across organisations' levels as an important barrier to increasing the proportion of plant-based products in their food procurement and food offerings. Firstly, it was indicated that resistance of consumers or staff may hinder the implementation of the protein transition. The head of business operations of a secondary school mentioned: *“resistance exists about the food offerings, [with as a result that] students go outside more often [to buy food].”* The team leader food of a hospital mentioned: *“in the beginning, there was resistance regarding the implementation of a more plant-based/vegetarian offering among staff, who then conveyed this [resistance] to the patient. They thought that vegetarian food is not tasty and [had the opinion that] others ought not to decide about their choice of eating meat.”*

Secondly, a lack of managerial will and priority may hinder the implementation of the protein transition. Some

stakeholders mentioned that organizations and their managers are often driven by budgetary concerns, prioritizing financial interests above sustainable practices. Furthermore, it was indicated that organizations may face a lack of decisiveness, in which case nobody in the organization dares to take a decision to implement the protein transition in public procurement.

Thirdly, there may also be a lack of acceptance and motivation among caterers or cooks. For instance, an expert indicated that caterers are not pro-active in offering more plant-based foods. Moreover, the head of facility services of a primary and secondary international school argued that for schools there are only few caterers who are willing and able to offer more plant-based proteins in school canteens and meals, as *“they already have overall [food] concepts for schools, and schools are not very interesting for caterers, [it is] difficult to earn money with that.”* This stakeholder also mentioned the common problem that the caterer's team that does the bidding differs from the team that has to implement the protein transition in the food offerings.

Finally, the fear for resistance of consumers experienced by organizations was mentioned as an important barrier. A stakeholder noted: *“the protein transition in penitentiaries is extra scary, because managers say that their institution is full of ‘carnivores’, which makes them afraid of dissatisfaction”*. However, this fear often turned out to be unwarranted. An expert said: *“so the most impediment is actually often that organizations think that consumers do not want it, which makes them afraid to take the first steps. But if they do it anyway, it is often not that bad in practice and they get a lot of positive response.”* Furthermore, the extent of resistance and the difficulty of implementing the protein transition may depend on the type of organization and the specific consumers working, studying or staying in these organizations. For instance, a caterer noted: *“[at the university] it went very smoothly, it is more difficult in other public organizations, people there want to have their croquette.”* The head of business operations of a secondary school indicated: *“the majority of our students is not in that white, highly-educated bubble. So that means that we do more ‘development’ work targeting specific groups who are usually not confronted with it.”*

Contrary to the lack of support and motivation that acts as a barrier, the presence of support and motivation among officials in (semi-)public organizations (e.g., managers or a project team), caterers, and food producers was identified as an important facilitator for the protein transition in the procurement and food offered by (semi-)public organizations. It was mentioned that such leadership is needed as (semi-)public organizations have an exemplary role. Stakeholders inside and outside organizations can play an important influencing role in advocating the protein transition and creating support and motivation, such as managers, team members,

work or student councils, doctors to patients, parents to children, and influencers to youth. The coordinator of food and drinks of a university mentioned: “*you need internal drivers and ambassadors and people who dare to take decisions.*”

Factors influencing support and motivation Several factors were found to possibly contribute to the lack of support and motivation and/or were identified as possible facilitators for creating support and motivation, namely: communication and framing; capacity, knowledge and skills and behavioural routines and habits.

Communication and framing First of all, a lack of communication within the organization may result in a failure to create support among guests or consumers. A caterer mentioned: “*I miss the communication from [the public organization], [and from] the assessment team to their employees, our guest. We can explain why we are doing what we are doing, but [when the protein transition is not communicated within the organization] we are [being cursed for being] the caterer who only sells plant-based dishes*”. Secondly, and contrary to the previous point, it was indicated that explicitly communicating that meals or products in the restaurants (have) become vegetarian or vegan may also act as a barrier for support among consumers, since it can be seen as patronizing, taking something (e.g., meat) away from them. Moreover, a caterer experienced that communication outside the organization about the protein transition (e.g., in the media) can even lead to resistance among consumers or interest groups in the wider population.

In contrast, the presence of good communication and framing around the protein transition was identified as a facilitator for accelerating the protein transition in public food procurement. Adopting an appropriate framing of the protein transition can facilitate its implementation, for instance, by connecting it to broader societal goals (e.g., sustainability) or using it as a unique selling point. The program manager food of a local government noted: “*we bring it as part of the message: [we have the] ambition [as] local government to offer healthy and sustainable food, from the region, which is available and that also tastes good*”. In addition, it was indicated that timely involvement of and communication to employees and/or consumers of (semi-) public organizations helps to create motivation and support. The advisor facility management of a national governmental body noted: “*start communication much earlier, awareness is so important, it is a [sensitive topic]*”. Storytelling and tastings were mentioned as instruments that could be used in communicating to and involving people. A caterer noted: “*we have a stimulating menu [and] tell many stories about what we serve, why we buy products, where we get them from, etc.*” Besides, it was mentioned that consumers can

be stimulated to eat more plant-based foods by giving them positive experiences and not communicating too explicitly that products are plant-based. The program manager food of a local government noted: “*our experience is, and research has also been done into that, that if you mention it very explicitly, then people no longer feel like it. So, communicate it positively, as a beautiful product, without listing all the health benefits, or just do it and see what happens.*”

Capacity, knowledge and skills A second factor that was identified which could possibly influence support and motivation was the lack of capacity, knowledge and skills inside the organization and at the level of the catering organization. If people do not have the knowledge on sustainability (and the impact of animal-based products), or there is a lack of skilled people who know how to cook/prepare tasteful plant-based meals, a protein transition will be less likely supported and thus less likely implemented.

A lack of knowledge and skills appeared to be barriers inside the organization as well as at the level of the caterer organization. An expert indicated: “*lack of skills is causing prejudice (carrots/tofu are not tasteful)... if you do not have the knowledge about the impact it has and you do not associate it with being tasteful...then you do not pay attention to it [the protein transition].*” Moreover a lack of capacity was mentioned a barrier, mainly at the level of the caterer organization. A caterer noted: “*it is a challenge to have culinary trained people on location, there is a shortage of staff. Currently, many chef cooks are trained in a different craft. Now, a generation arises educated about what you can do with vegetables and legumes. The increase of capacity, knowledge and skills among employees of caterer organizations, employees and/or consumers of organizations, and food producers was thus also mentioned as a way that can facilitate the implementation of the protein transition in public food procurement. For instance, a caterer noted: “our own cooking school will also start in the autumn, for which we are already training people (in a more limited form). Training is also about putting vegetables at the center. We also adhere to the guidelines of Dutch Cuisine, in which everything happens in a ratio of 80/20.”* The importance of having capabilities inside the (semi-)public organization was also mentioned, illustrated by a quote from this expert: “*you not only have to ensure that the person who has initiated the project is motivated and enthusiastic but also the executing party, ensure that the team is well educated and that employees on the floor understand it.*”

Moreover, specifically related to offering meals for patients in hospitals, experts mentioned the lack of scientific evidence as an important barrier for the protein transition appropriate for this specific group and for creating support and motivation among managers in hospitals. As an expert

indicated “*There is insufficient scientific evidence that plant-based proteins are just as strong or good (bio-available) as animal-based proteins for the recovery of the patient. And this scientific substantiation is important to be able to ask for managerial commitment.*” It was indicated that scientific evidence can help to convince managers of the possibilities of a more plant-based offerings for every target group (e.g., patients).

Behavioral routines and habits A final factor mentioned as possibly acting a barrier for creating support and motivation were strong behavioral routines and habits among consumers, procurement officials and caterers. An expert noted: “*everyone is pushing the ball to the other and ultimately to the consumer who then has to decide for himself. But he a) is a sheep and b) thinks it will take his time before the planet extinguishes. If there is not a huge transition, consumers will just keep doing what they have been doing.*” Moreover, next to consumers, procurement officials are also used to certain routines regarding public procurement which can have a negative impact on their support and motivation. A stakeholder indicated: “*When you purchase as a government organization, you deal with people who are used to procurement in a certain way. So you have to fight it with a procurement advisor, procurement manager, lawyer, etc.*” In addition, certain habits among caterers were mentioned as a barrier for the presence of support and motivation, as has been illustrated by a quote from an expert: “*The people working there [at the caterer organization] are preparing the same sandwich for already 10, 20 years...there is a lot of routine, time scarcity and stress. If you would like them [the caterer] to make a beautiful vegetarian sandwich...you have to get them on board in that change*”.

Food availability and offerings

Several experts and stakeholders indicated that there is a lack of available tasty, healthy, and attractive plant-based food products. According to them, many meat analogues are unhealthy, containing too much salt or added sugars. As the project leader food from a hospital mentioned: “*currently, there are many vegetarian [replacement] options, but these are or way too salty or contain too few other nutrients [e.g., proteins].*” This project leader food also mentioned that there is a lack of plant-based food products in mono-packaging (e.g. packages with small portions of plant-based bread toppings) which makes it, for instance difficult to offer alternatives for cold cuts that are available and offered in small portions in canteens. Stakeholders from another hospital indicated that many food suppliers still have many unhealthy food products in their assortment which makes the transition difficult when organizations are bound to specific food suppliers. The

team leader food from this hospital noted: “*it is sometimes hard to include new brands. There are many beautiful new products (for instance seaweed-based), but if the supplier does not have these in the assortment, we are not allowed to order them because of the European procurement rules and the agreements made with the supplier.*”

Moreover, experts and stakeholders indicated that an aimed increase in the consumption of proteins not always aligns with the protein needs of specific target groups (e.g., patients in hospitals). The team leader food from a hospital noted: “*meals for patients must contain certain amounts of protein for [optimal] recovery ... we can use a lot of beans and nuts, but it is difficult to make something plant-based for sick patients that also contains a lot of protein without adding a protein-enriched agent ... with meat and cheese you meet protein needs more easily with a smaller portion.*”

In terms of opportunities, to facilitate the protein transition in (semi-)public organizations and ensure a variety of healthy and sustainable foods, experts and stakeholders mentioned the use of food concepts such as Farm Kitchen (a concept that promotes regenerative agriculture by working with local farmers and new generation chefs to inspire people with yummy plant-based food) and the use of knowledge and information from the Dutch Nutrition Centre and other organizations (e.g., the dietary guidelines of the Netherlands Nutrition Centre and the EAT-Lancet Commission). Moreover, it was indicated that it is essential to envision what a healthy and sustainable food offering should look like concretely, so that the procurement policies can be adjusted accordingly. Experts and stakeholders recommended to adjust the ratio plant-based/animal-based foods and make plant-based the default option in the food offered. An expert noted: “*the default of every type of dish should be a plant-based option: plant-based soup, plant-based salad etc.... currently, plant-based is made special, while you'd want to normalize that.*” A stakeholder from a governmental organization mentioned to make a distinction between the banquet menu (i.e. a list of food and beverages intended to be served during a banquet within organizations) and food offered in the canteen. (The banquet case is very relevant, as in (semi-) public organizations a significant proportion of the foods and meals offered are provided via banqueting. For instance, when employees order lunch during meetings and events, or drinks and bites for events.) Because the banquet menu is paid by the organization itself, this offers possibilities to even further adjust the ratio plant-based/animal-based foods on the menu. In general, it is recommended to procure and offer a combination of hybrid food products, healthy meat analogues and traditional (unprocessed) plant-based proteins such as legumes and nuts. In addition, it was indicated that innovation could be stimulated, but that new market entrants should be given more time and space. According to an expert “*new market entrants are now given eight weeks to introduce*

a new product, and if it is not sufficiently purchased, it will disappear again. That is a waste. You cannot expect from the consumer to decide within eight weeks.”

Financial considerations and incentives

Financial considerations were mentioned as a common barrier for including the protein transition in the procurement and food offerings of (semi-)public organizations. Caterers may be afraid that less turnover or profit can be achieved when offering more plant-based foods. An expert noted: *“it is always about whether the caterer achieves sufficient turnover; will the caterer lose turnover, are people going to run away, getting a croquette somewhere else? These are arguments that caterers come up with.”* A decline of profit may either be caused by a decline of sales of food products in canteens or restaurants when people do not buy the plant-based foods, or from the higher costs of plant-based foods. An expert mentioned: *“vegetarian food with meat substitutes is more expensive than cheap meat. Vegetarian food is not more expensive if you start working with other products (e.g., legumes), but that is a bridge too far for many people.”* Experts and stakeholders indicated that these two factors are also related: because meat substitutes and dairy alternatives are more expensive, prices in the restaurants or canteens are higher, which not everyone is willing or able to pay.

Experts and stakeholders indicated that (semi-)public organizations themselves, caterers as well as governments can take financial measures to overcome financial barriers to accelerate the protein transition. First of all, organizations should be willing to invest, as an expert indicated: *“food should be considered as medicine ... we also pay for expensive medicines and good and tasty food cannot be a closing item on the budget.”* Experts and stakeholders indicated that organizations could agree on a minimum revenue with the caterer and provide a compensation to the caterer if needed. It was also mentioned that they could work with another structure, for instance in organizations where consumers do not have to pay for their own meals (e.g., patients, prisoners), with fixed food prices for the core assortment. By taking such measures (semi-)public organizations and caterers could ensure that healthy and sustainable products offered are affordable and less expensive than unhealthy and unsustainable food options.

Moreover, experts and stakeholders indicated that the national government could stimulate the protein transition in (semi-)public organizations by taking financial measures to increase prices of unhealthy and unsustainable foods and to decrease prices of healthy and sustainable foods, such as introducing a meat tax, implementing true pricing policies, and lowering the value-added tax (VAT) of healthy plant-based foods (e.g. fruits, vegetables, nuts, legumes). An expert mentioned: *“true pricing can help: an environmental*

tax on foods, to ensure that it is cheaper to eat more sustainably and thus more plant-based.” In addition, experts and stakeholders indicated that national or local governments could provide subsidies for (semi-)public organizations that meet a certain plant-based food offerings target or compensation for organizations that implement the protein transition, for example by making money available to compensate for any losses or for pilots and education (e.g. training of chefs). Furthermore, an expert indicated: *“a scheme to stimulate sustainable proteins could be developed. The extra price for alternatives would be returned to remove the price barrier for plant-based alternatives.”*

Policies, processes and contracts

Several experts and stakeholders indicated that national government policies may be a barrier for accelerating the protein transition in the procurement and food offerings of (semi-)public organizations. According to them, the national government does not prioritize the protein transition, as the national protein strategy is more focused on developing new proteins than on consuming fewer proteins from animal-based sources. Another critique brought forward is that the section on reducing meat consumption was removed from the Dutch national Climate Agreement, a covenant between the government and business organizations on meeting the country’s climate change targets, and from the media campaign ‘Everybody does something’, which informed citizens on how they could reduce their environmental impacts. An expert mentioned: *“the government is very afraid of this. The entire meat consumption section was removed from the Climate Agreement recently, because it was said to be too sensitive. That is a shame. This could also be a topic in the government campaign ‘Everybody does something’, but that is not happening.”* Furthermore, it was indicated that the Ministry of Agriculture does not provide sufficient support to organizations implementing the protein transition. However, they mentioned that the Dutch Nutrition Centre does provide support to organizations, to help them with implementing the protein transition in public food procurement.

Moreover, some experts mentioned that public organizations themselves take a too small exemplary role. An expert noted: *“public organizations, no matter how much intention they express, are not frontrunners while they could be. And actually, it is low hanging fruit, but in practice it is still unruly, and they are mobilizing more external parties instead of applying it in their own organization.”*

Experts also indicated that procurement rules and contracts can hinder the acceleration of the protein transition in (semi-)public organizations. One expert indicated that in many tenders there is still too much emphasis on low prices. Moreover, it was indicated that some contracts are restrictive or difficult to change, for instance because of the level

of detail in contracts or because of lease agreements with caterers (when caterers rent a space within an organization's building) that do not always allow organizations to oblige caterers to sell or not sell certain food products. An expert mentioned: *“old-fashioned contracts state, for example, that milk or cheese should be available, or specify requirements for maximum prices per sandwich, or include all kinds of sample menus. That can be hindering.”* In addition, some (semi-)public organizations may be restricted to certain food suppliers or caterers, which leaves limited space to change food policies or practices. The team leader of restaurant outlets and catering of a hospital noted: *“if we want to adjust things now, we have to keep seeking and peddling, what are the costs and do suppliers have that. Suppliers are always looking for products that also sell well.”* Furthermore, it was indicated that there is a lack of monitoring and evaluating policies and agreements regarding the protein transition. In addition, it was mentioned that it is difficult to monitor the proteins in composite food products. A caterer argued that monitoring changes in organizations is difficult, because *“contracting parties often do not provide a baseline measurement at the previous caterer. That is a loss, [because] then we cannot make an action plan.”*

To facilitate the protein transition in a wide range of (semi-)public organizations, experts and stakeholders indicated that policies at national government level as well as in (semi-)public organizations themselves should be adapted. At national level, it was recommended that the government should include the protein transition in a clear vision about the future food system, and formulate concrete and ambitious targets. Furthermore, it was indicated that the government could stimulate the protein transition in (semi-)public organizations by implementing more mandatory measures regarding the food offered. An expert noted: *“as a government you can be much stricter about the responsibility for health and the planet. This entitles [the government] to steer on food offerings ... patronizing is often a [counter]argument, but now it is going the other way [in which] there are often no healthy/sustainable choices available.”* The team leader of food of a hospital mentioned: *“when the national government would impose obligations ... that so many % have to be plant-based proteins, then we'd have to comply with that. That is then also an explanation you can give to your customer or patient.”* However, other experts and stakeholders did not see much room for improving national government policies as they argued that there are already governmental ambitions to accelerate the protein transition. Also, an expert argued: *“policies need to be adjusted, but that often comes across as patronizing [I am] working daily with so much resistance ... it is better to work bottom-up instead of top-down.”*

Other incentives that the national government could implement include fostering demand for plant-based proteins by prioritizing them in governmental canteens, and

benchmarking and awarding organizations. Finally, the national government could provide model contracts and criteria, and adjust the national dietary guidelines.

Experts and stakeholders also indicated that policies, processes and contracts in (semi-)public organizations themselves could be adjusted to accelerate the protein transition. (Semi-)public organizations are recommended to include the protein transition in their organizations' vision on health and sustainability. Moreover, it was recommended to develop ambitious, specific and realistic targets that can be included in a vision and Program of Requirements (i.e., a written collection of requirements and wishes with regard to a possible product or service to be purchased). It was recommended to link these targets to other issues such as reducing CO₂ impact and formulate these targets at a high level (e.g., X% plant-based proteins in [Year]) to challenge the caterer to take steps, while leaving room for the caterer on how to achieve these targets. The coordinator of food and drinks of a university mentioned: *“For monitoring purposes, you must agree on X% [plant-based and X% animal based foods] ... we want to use a certain lower limit in any case (e.g., 80–20) and certain locations can then go completely vegetarian. [We] have as target to be CO₂ neutral by 2030 and we oblige the caterer to make a maximum contribution to this.”* A stakeholder noted: *“[during the procurement process,] we asked how the supplier is going to minimize the impact on the environment. We do not want to sit on the supplier's chair to see what is possible to minimize CO₂”*. In addition, experts and stakeholders suggested to use the protein transition as a Key Performance Indicator (KPI) in procurement and include this in the bidding of caterers.

Regarding the transition process of the protein transition, some experts indicated that in some organizations a stepwise approach would have preference, whereas other experts recommended that a more radical turn in food offerings could work better. Moreover, it is important, according to a stakeholder from an organization responsible for the day-to-day care of detainees, that there is enough space for dialogue during the procurement process between the (semi-)public organization and the caterer *“to ensure the alignment of bid-dings with the invitation.”* Also, stakeholders recommended to establish the collaboration between the (semi-)public organization and caterer via a partnership, in which they work together toward the realization of the goals via a more equal relationship instead of via a top-down relationship. Finally, it was indicated that it is essential to monitor and evaluate agreements and to hold stakeholders accountable for achieving the protein transition goals.

Environmental factors: the broader food environment and crises

Experts and stakeholders indicated that physical food environments outside organizations play an important role in

the protein transition process. The food environment can be a barrier if there are food providers (e.g., fast-food) located near the (semi-)public organization. The senior advisor food of a regional government noted: *“at our location, people can also go to the city if they are not happy with the food offerings.”* The head of business operations of a school noted: *“resistance exists about the food offerings, [with as a result that] students go outside more often [to buy food]. There are food providers in the neighborhood such as kebab and sandwich shops.”* The head of facility services of another school said that the location can indeed be a barrier for fully offering plant-based foods, but that they take measures to prevent that students go outside and divert to other food providers: *“100% plant-based is impossible, as students will then go to the [fast food outlet] around the corner, but we try to seduce our students, nudging to plant-based food that is good and tasty.”* Conversely, a caterer who catered at a university noted that an isolated location of an organization can facilitate the acceleration of the protein transition: *“then students/guests will not walk to another location, so it was an ideal test location ... it was a very smooth transition.”*

Besides the food environment, stakeholders indicated that the COVID-19 pandemic slowed down the implementation of the protein transition in (semi-)public organizations. This is because restaurants and canteens were closed during the lockdowns, resulting in lower revenues for caterers. The head of location facilities of a university noted: *“the past two years have been difficult. Now too. Few people come to campus and there are staff shortages.”* However, an expert and the senior advisor food of a regional government mentioned that crises (e.g., a natural disaster) could also facilitate the acceleration of the protein transition. An expert noted: *“the best thing would be if something spontaneously arises. Just like we now work 50–50 at home and at the office due to corona. It must be almost some kind of disaster, [for the protein transition] to become normal.”*

Visualization of the themes related to the barriers and facilitators for implementing the protein transition in public food procurement

Based on the results of the interviews and the themes that were identified using inductive coding, we visualized the identified themes of barriers and facilitators in a Figure (Fig. 1). This visualization gives a clear overview of the multiple levels on which barriers and facilitators may occur and may help to gain insight into the complexity of implementing the protein transition in the procurement of (semi-)public organizations. These insights can guide future research and help to formulate policy recommendations for accelerating the protein transition to policymakers and officials working in (semi-)public organizations.

In Fig. 1 the identified themes are presented as distinct categories, whereas we acknowledge that these themes may influence each other. Some of these influences and relations appeared also from the interviews. For instance, a lack of managerial will and priority to implement the protein transition in public food procurement may be caused by budgetary concerns, and the prioritization of financial interests above sustainable practices by managers. This can hinder the development of public food procurement policies that include the protein transition and has in the end impact on the food that is offered in the organization.

Discussion

In this study, we aimed to gain insight into the barriers and facilitators perceived by various groups of stakeholders when implementing the protein transition in public food procurement. Below we will shortly discuss and reflect on the five themes of identified barriers and facilitators separately as well as on the overall themes identified, based on our findings and the literature. Furthermore, we will address the strengths and limitations and policy implications of our study.

Support and motivation

The first identified theme of barriers and facilitators, concerns support and motivation of people inside (semi-)public organizations (e.g., employees and consumers). Our findings indicated that support and motivation can be increased by means of internal motivators and ambassadors, organizing tastings, communication and storytelling, and involving all levels of the organization. Indeed, in line with these findings, other studies also indicated that the influencing role of specific people (e.g., food bloggers, celebrities, doctors) may play an important role in normalizing plant-based foods and meals (Niva et al. 2017). Moreover, literature has shown that the successes of sustainability efforts are reliant on individual, motivated frontrunners taking leadership (Carino et al. 2021). Furthermore, support and motivation can be increased by actively involving staff and consumers within organizations in the protein transition and by framing messages in positive culinary terms (Lassen et al. 2023). Another important factor to increase support and motivation is to teach and learn new cooking skills for making tasty vegan or vegetarian dishes, but also that chefs, other catering staff and consumers learn to appreciate these foods and meals (Niva et al. 2017; Martin et al. 2022; Magrini et al. 2021). Furthermore, related to some subgroups in specific (semi-)public organizations (e.g., hospital patients), concerns exist about whether protein needs of these groups will be met when consuming more plant-based foods, as

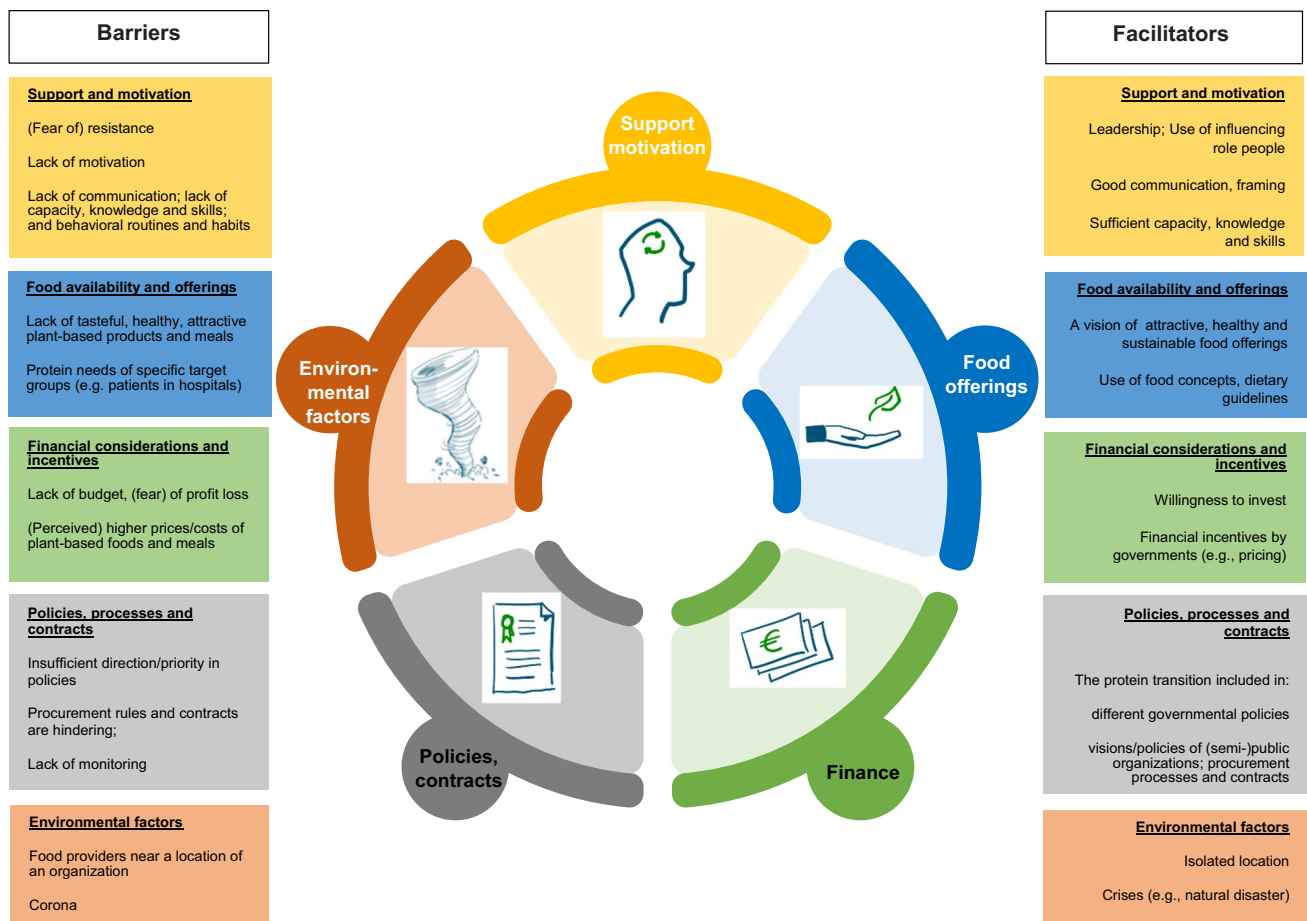


Fig. 1 Themes of barriers and facilitators for accelerating the protein transition in public food procurement *Design by PresentationGO.com*

indicated by participants in our study and in the literature (Tuso et al. 2013). This implies that more knowledge and evidence is needed to show positive effects of plant-based diets on protein synthesis and health outcomes of vulnerable groups (Ewy et al. 2022; Van Vliet et al. 2015) which can also contribute to creating support and motivation among managers, employees and/or consumers within organizations. All these factors can help to overcome experienced or anticipated resistance of consumers regarding sustainable protein consumption, which is still an important barrier in European countries (Hartmann and Siegrist 2017).

Food availability and offerings

Another identified theme of barriers and facilitators was the food availability and offerings within organizations. In line with findings of our study regarding the importance of having a vision on the healthiness and sustainability of the food offered, previous studies have shown the value of using mixed food concepts consisting of both plant-based and animal-based proteins, such as mixed (instead of meat-centered) dishes and hybrid protein products (Aiking and

de Boer 2020). Reducing meat-centered meals or replacing them with meals that are based on alternative protein options (e.g. pulses, vegetables, nuts, mushrooms, algae, seaweed, insects) are key to a protein transition (Aiking and de Boer 2020), in which public catering institutions can have an important role by changing menus (Stiles et al. 2022; De Laurentiis et al. 2019). Moreover, making plant-based options the default is considered a promising tool to change behavior (Reisch and Sunstein 2021). Furthermore, as our study addressed using dietary guidelines as a facilitator, it is very helpful in that respect that dietary guidelines, such as the Dutch Wheel of Five, are increasingly addressing sustainability in addition to healthy nutrition (Aiking and de Boer 2020; Voedingscentrum 2020).

Financial considerations and incentives

A third identified theme of barriers and facilitators is financial considerations and incentives, i.e., the budget available, willingness to invest, and the financial incentives associated with implementing the protein transition in public food procurement. Our study indicated that the protein transition

in public food procurement can be facilitated when organizations themselves are willing to invest, and when governments take financial measures, provide subsidies to organizations and ensure that healthy and sustainable foods are cheaper than unsustainable and unhealthy foods (e.g., by introducing a meat tax, true pricing and/or lowering prices of fruits and vegetables). Indeed, a review has shown that in order to implement a sustainable food procurement strategy it is needed to have a long-term commitment from the organization and invest accordingly both in time and money (e.g., in on-site kitchens, infrastructure of local smallholder producers, training of staff and suppliers) (Alberdi and Begiristain-Zubillaga 2021). Moreover, according to literature, application of taxes on animal-based products coupled with subsidies for food groups with positive environmental and health impacts could be used to make the healthy and sustainable food choice easier, and increase healthy and sustainable food consumption (Manners et al. 2020; Broeks et al. 2020). Furthermore, analyzing and communicating the external or true costs of food items could stimulate the protein transition in public food procurement (Kretschmer and Dehm 2021). Greater adoption of methodologies based on life-cycle costing will play an important role in helping to address concerns about costs (UN Environment 2017).

Policies, processes and contracts

A fourth theme of barriers and facilitators is related to policies, contracts and processes. Our study indicated that the protein transition in public food procurement is facilitated when this protein transition is included into policies and contracts and progress on implementing the protein transition is monitored. This can be done by government regulations which for instance prescribe a mandatory percentage of plant-based proteins, by including the protein transition in visions/strategies and by formulating measurable goals in policies and contracts to achieve the protein transition. A global review also concluded that sustainable public procurement seems to be largely driven by policy and top-down leadership, with the existence of national legislation as the strongest driver, followed by strong political and organizational leadership and policy commitments (UN Environment 2017). Indeed, a study on the drivers of sustainable food services in hospitals has shown that policy ambitions may spark organizations to progress to the ‘compliance’ phase, while incentives such as governmental awards could help to recognize achievements and to build a supportive culture and motivation for promoting sustainable food services (Carino et al. 2021). Moreover, factors such as having sustainable public procurement criteria, and a follow-up or monitoring system in place to evaluate progress are identified as preconditions for accelerating sustainable public food procurement (UN Environment 2017). These policies and

procedures are essential, as most (semi-)public organizations still have standard public procurement procedures that favor the options with the lowest price instead of taking into consideration broader, social, economic and environmental aspects (Swensson and Tartanac 2020).

Environmental factors: the broader food environment and crises

The final theme includes barriers and facilitators related to environmental factors which can hinder or accelerate the protein transition in (semi-)public organizations (e.g., crises, food environments). In line with our findings, a study indicated that a global crisis can provide unique possibilities to examine how the innovations and coping strategies adopted by state and non-state food system actors facilitate – or hinder – the transition towards more sustainable food production and consumption systems (Nemes et al. 2021). Moreover, in relation to the food environment outside (semi-)public organizations, we may conclude that it would be helpful for organizations to map the food providers in the environment of the organization, which types of foods they offer and the prices of the foods. This gives insights into the possibilities to prevent that customers divert to other food providers (e.g., by offering attractive, varied, and affordable foods in the restaurant/canteen and providing specific promotions/saving actions, e.g. free coffee with an [X] amount of plant-based foods/meals). Indeed, a study emphasized the importance of providing desirable, healthy and affordable food items in canteens, to be able to compete with the appeal of local shops (Chortatos et al. 2018).

Identified themes of barriers and facilitators for implementing the protein transition in public food procurement

There are various studies related to our study, however, as far as we are aware these studies predominantly address barriers and facilitators or drivers to sustainable public purchasing in general, food (environments) in general, or the protein transition in general (and not specifically related to public food procurement). Nevertheless, some of the themes or factors identified in these studies are in line with or similar to the themes of barriers and facilitators identified in our study. For instance, in a study on barriers and facilitators related to sustainable public purchasing (SPP) (Behravesht et al. 2022), identified themes for SPP adoption included capacity, culture, stakeholders and institutional settings (Behravesht et al. 2022). Moreover, in another study that addressed barriers and facilitators influencing sustainability in a specific organizational setting (i.e., hospitals) (Cowie et al. 2020), similar themes as in our study, such as funding, capacity, regulatory forces, support and opposition, and people involved have been addressed (Cowie et al. 2020).

Other related studies do focus on food (environments), however, they do not specifically address barriers and facilitators related to the protein transition in public food procurement. For instance, in a study a conceptual model was developed to understand the complexity of elements that constitute organizational food environments (De Castro and Canella 2022). Some of our identified themes of barriers and facilitators are related to the four components of the organizational food environment identified in this model. For instance, ‘food availability and offerings’ relates to the components ‘institutional level’ (e.g., elements of the physical environment in the organization that influence food choices and practices, and the set of eating spaces) and to ‘internal level of eating spaces’ (i.e., elements of the food environment inside each eating space). Moreover, ‘financial considerations and incentives’ and ‘policies and contracts’ relate to the component ‘the decisional level’ (i.e., the governance of the organization’s food environment). The theme ‘support and motivation’, -if related to the motivation of people at management level- is also related to this ‘decisional level’. Last, our identified theme ‘environmental factors’ aligns with the component ‘surroundings’ (i.e. the physical and virtual contexts that are available to people who attend a particular organization and that are not interfered with by the management of the organization) (De Castro and Canella 2022).

Furthermore, a study by Paloviita (2021) which focuses on the protein transition in general (but not on public food procurement), provides a framework to understand the interdependencies of domains and scales of the protein transition and includes five domains (i.e., food quality, environmental, health, sociocultural and socio-economic) and five levels (i.e., ingredients, dishes, diets, regions and supply chains) (Paloviita 2021). This framework shows that every transition project is unique in terms of context and participants (Paloviita 2021), an issue also important in our study, as the relevant stakeholders and transition processes can differ for types of organizations (e.g., schools, hospitals) and specific geographical areas (e.g., countries, food environment outside the organization).

Some studies do focus on the implementation of the protein transition or certain food groups that are important for this transition in public catering, but again not specifically on public food procurement. For instance, a study by Magrini et al. investigated legume use in institutional food services and ways to foster legume use, based on cook’s training, recipes, technical infrastructures and consumer recognition of legume benefits (Magrini et al. 2021). Although these themes are in line with some subthemes we identified (e.g., capacity, knowledge and skills; support and motivation), this study mainly focused on practices of caterers, while our study also included perceptions of other stakeholders involved in public food procurement and looks at

the protein transition more generally. An example of a study that included perceptions of a broader range of stakeholders for the protein transition in public catering, but neither specifically focused on public food procurement is a study that analyzed public actors’ rationalities to explain actions and inactions for the use of local plant proteins in public catering (Kortetmäki 2023). This study is also different from ours, in that it took place within the context of a development project that promoted food system sustainability in a Finnish semi-rural, livestock dominated region, whereas our study was conducted in various types of (semi-)public organizations. Moreover, this study used the analytical framework of Weberian rationalities for their abductive content analysis, whereas we used inductive coding to identify the themes of barriers and facilitators. Results of the study of Kortetmäki demonstrate how the dominant catering rationalities (e.g., institutional logic of performance and risk aversion), and mismatches between regime (e.g., public catering actors) and niche actor (i.e., plant protein actors) rationalities, hinder the mainstreaming of local plant proteins (Kortetmäki 2023).

Strengths, limitations and future research

Our study has some important strengths. First, this is one of the first studies that provided insights into the perceived barriers and facilitators by various stakeholders to implement the protein transition in public food procurement. Second the qualitative design of our study provided in-depth and rich information regarding these barriers and facilitators, and led to useful recommendations for policy makers, (semi-)public organizations and caterers on how to accelerate the protein transition in public food procurement. Third, we visualized the multiple themes of barriers and facilitators, which gives insights into the complexity of accelerating the protein transition in the procurement of (semi-)public organizations. These insights can guide future research and help to formulate policy recommendations for accelerating the protein transition to policymakers and officials working in (semi-)public organizations (Niva et al. 2017).

Besides the strengths of our study, there are also some limitations. First, our list of barriers may not be exhaustive, as we only selected exemplary cases from practice. We thus primarily learn from this study how certain barriers and facilitators are perceived by stakeholders of pioneering (semi-)public organizations. However, this can also lead to important policy recommendations for organizations which have not yet implemented the protein transition. Second, this study focused on (semi-)public organizations in the Netherlands, while this may also be relevant to investigate in other high-income countries. In addition, although the themes we identified are likely generalizable for (semi-)public organizations, the different types of organizations also have their

specific contexts and issues (e.g., protein needs of patients in hospitals). Therefore, future research is required to test our insights in other contexts and/or (types of) public organizations, and as such strengthening the evidence base. Moreover, we have interviewed certain stakeholders of (semi-)public organizations and caterers, but in future research it may also be interesting to conduct interviews among other type of stakeholders (e.g., food suppliers, policymakers) and with actual users of the food services (e.g., students at schools and universities, patients in hospitals, prisoners, employees at governmental organizations and universities). This may lead to new insights and additional barriers and facilitators that may be relevant to accelerate the protein transition in public food procurement. A final limitation might be that, for analytical reasons, the identified themes in our study were presented as distinct categories, whereas we acknowledge that these themes may influence each other (Behraves et al. 2022). For instance, support and motivation for the protein transition among relevant stakeholders within the organization can lead to including the protein transition into organizational policies, and writing a vision on how a more plant-based food offering should look like. Moreover, a lack of budget or focus on the lowest price (instead of sustainability) can hinder the implementation of the protein transition into policies and contracts. Future research could provide more insights into the associations between the different themes and factors within these themes. Applying a systems-based approach, to investigate the most important factors involved in the explanation of implementing the protein transition in public food procurement—as well as how these factors interact—can provide valuable additional insights (Vennix et al. 1996).

Policy implications

Our findings demonstrated that to accelerate the protein transition in public food procurement, action is needed by governments and (semi-)public organizations on different themes of barriers and facilitators, such as support and motivation, food availability and offerings, financial considerations and incentives, and policies, processes and contracts. Our study also indicated that it is necessary for policy makers and officials in (semi-)public organizations to take into account the specific context, when implementing the protein transition in public food procurement. This finding is in line with another study that also concluded that pathways to food system sustainability will differ between places and involve distinct actors and leverage points and that knowledge about the institutional environments is therefore critical to design effective, context-sensitive policies (Williams et al. 2024). We think that our findings are likely also relevant for other high income countries, because of the similarities in issues related to sustainable consumption

patterns, the large volumes of foods and meals purchased via (semi-)public organizations and the general need to shift from animal-based food consumption to more plant-based food consumption within these countries (Willett et al. 2019; Bonnet et al. 2020).

This is also why international organizations such as the World Health Organization (WHO) are increasingly recommending countries to implement sustainable public food procurement. For instance, in 2021, the WHO published an action framework for developing and implementing public food procurement and service policies for a healthy diet (Lassen et al. 2023; WHO 2021). This includes examples of criteria to promote sustainable food systems, such as ‘set limits on the number of servings of eggs, dairy, poultry, fish and red meat per day or week; require that a set number of plant-based meals is offered per day or week’ (WHO 2021). In addition, the WHO European Office for the Prevention and Control of Noncommunicable Diseases has developed a manual for public procurement officers in the WHO European Region to adopt practices that promote a healthy and sustainable diet, of which ‘climate-friendly food’ is brought forward as a theme to formulate minimum requirements and award criteria on (Lassen et al. 2023; WHO 2022). Moreover, sustainable public food procurement practices can contribute to achieving the United Nations Sustainable Development Goals (SDGs), which includes a specific target (12.7) on promoting “public procurement practices that are sustainable, in accordance with national policies and priorities” (FAO 2021, UN Environment 2017).

Regarding current policies at EU level, the Green Public Procurement criteria have been developed, which provide a *voluntary* framework to encourage public organizations to procure green goods and services, including criteria proposals for catering services to provide more plant-based meals (Lassen et al. 2023). In the Farm to Fork Strategy, the European Commission emphasized the importance of creating *mandatory criteria for sustainable food procurement* which would be legislated in the Sustainable Food System Framework (European Commission 2020; Fesenfeld et al. 2023). However, at the moment, the Framework law has been put on hold, and it is still unknown whether the Framework would still be published in the next Commission policy cycle. Even then, it is unclear what the Framework or an alternative legislative initiative would look like and how sustainable foods will be defined (Schebesta and Casado 2023). As a first step, the broadening of the voluntary Green Public Procurement criteria towards Sustainable Public Procurement criteria for food, catering services and vending machines is not unlikely (Schebesta and Casado 2023). However, in the absence of imminent EU action on the matter due to the political deadlock, it is even more strongly recommendable that governments and (semi-)public organizations take

action, facilitated by strong examples of how sustainable food procurement can be (legally) implemented in (semi-) public organizations.

In the Netherlands, the government has set as target for the protein transition: 50% of the proteins consumed should include animal-based proteins and 50% plant-based proteins by 2030 (Ministry of Agriculture, Nature and Food 2022). However, the Dutch Health Council recently concluded that an acceleration of the protein transition is needed to achieve this target and that a further protein transition (60% plant-based and 40% animal based proteins) is needed to reduce the environmental impact of dietary patterns and to improve population health (Health Council 2023). Importantly, the Council stated that this is possible for the majority of the Dutch population without having a risk of nutrient deficiencies (Health Council 2023). The Council recommends stronger policy interventions, instead of emphasizing individual responsibility of consumers, that make it easier for people to consume more plant-based foods. Restaurants and canteens are mentioned as potential locations to get consumers to consume more plant-based and/or less animal based foods (Health Council 2023).

To contribute to these kinds of needed accelerations and to harness the potential of public food procurement for the protein transition, this study can provide important insights to policymakers and officials working in (semi-)public organizations (Niva et al. 2017). This is important, because all of these actors have an important role in enabling a transition toward increasing the use and consumption of plant-based proteins at population level and with that toward improving human and planetary health (Niva et al. 2017). Ultimately, scaling up food procurement efforts may provide a key contribution to a transition of our food system towards more sustainable and healthier outcomes (Willett et al. 2019).

Furthermore, food procurement policies should be implemented as part of a comprehensive package of governmental measures that improve food environments and population diets (Djojosoeparto et al. 2022). Studies at EU-level and in European countries showed that implementation of these food environment policies is still lacking (Djojosoeparto et al. 2022; Pineda et al. 2022). This may be caused by the general reluctance of policy makers to interfere with what people eat as a result of objections to policies by consumers and institutional actors (Bendz et al. 2023). However, a study showed that better policy design, framing and good communication have the potential to increase support for policies targeting food consumption (Bendz et al. 2023). In the end, the desired food system transition will require, amongst other things, public policy leadership and consumers who value, accept and can afford healthy and sustainable diets (Moberg et al. 2021).

Conclusions

Food procurement is considered to be an effective policy instrument to accelerate the protein transition and to be a game changer towards a sustainable food system. However, (semi-) public organizations face several barriers and facilitators when implementing the protein transition in public food procurement. The insights from this study may help to gain insight into the complexity of the protein transition and the multiple themes on which barriers and facilitators may occur (i.e., support and motivation; food availability and offerings; financial considerations and incentives; policies, processes, and contracts; and environmental factors). These insights can be beneficial to (semi-)public organizations to effectively design and execute their procurement process and can help policymakers in policy development to foster (semi-)public organizations to implement the protein transition in their own contexts. Considering the limitations of our study, future research is needed to further develop and test our insights in other contexts and/or (types of) public organizations, provide more insights into the associations between the different themes, and to include views of other type of stakeholders and end users. Ultimately, scaling up food procurement efforts may provide a key contribution to a transition of our food system towards more sustainable and healthier outcomes.

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Declarations

Ethical standards disclosure The study protocol was evaluated by the Social Ethics Committee of Wageningen University and Research, and it was concluded that the proposal deals with ethical issues in a satisfactory way and that it complies with the Netherlands Code of Conduct for Research Integrity (reference 2022–48-Verain). Written informed consent was obtained from all participants.

Competing interests The authors declare that they have no competing interests.

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