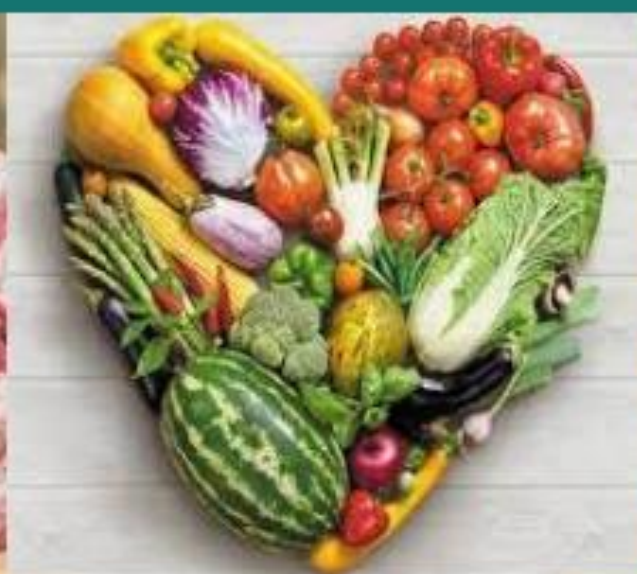




How can small scale organisations successfully contribute to the protein transition by implementing alternative protein initiatives?



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How can small scale organisations successfully contribute to the protein transition by implementing alternative protein initiatives?

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List of definitions

Perspective – Possible advice or way of seeing things, e.g., using social media.

Initiative – Recommendation for a specific activity, e.g., growing lupine or organising a tasting session.

Organisation - Place or project where (a combination of) initiatives and perspectives can be applied, e.g., 'Lokaal voor verlof' or a community centre.

The protein transition - The global shift from an animal protein-focused diet to a more alternative protein focussed diet. Alternative proteins are for example plant-based proteins, insects, and aquatic proteins (1).

Dutch summary

Op dit moment wordt het grootste deel van de wereldwijde landbouwgrond gebruikt voor het houden van dieren voor de menselijke eiwitconsumptie. Deze grond zou efficiënter gebruikt kunnen worden: de productie van eiwitrijke gewassen levert namelijk veel meer eiwit op voor directe menselijke consumptie dan het houden van dieren. Vandaar dat het belangrijk is dat er meer aandacht en mogelijkheden komen voor de transitie naar een goede balans tussen plantaardig en dierlijk eiwit. In Nederland is er nog weinig bekend over de manier waarop kleinschalige initiatieven met succes kunnen bijdragen aan deze eiwitbalans. Het doel van het huidige project was daarom om te onderzoeken welke initiatieven met betrekking tot de eiwittransitie succesvol kunnen worden toegepast door kleinschalige organisaties in Nederland. Om meer inzicht te krijgen in de opvattingen over het toepassen van zulke initiatieven werden twee bestaande casussen bestudeerd: een boerderij die initiatieven rond de eiwittransitie zou willen toepassen en een burger die lokale initiatieven wilde opstarten. De bevindingen uit deze casussen werden onderbouwd en aangevuld met informatie uit wetenschappelijk literatuuronderzoek, bureauonderzoek, interviews en telefoongesprekken, om tot een breed overzicht te komen. De mogelijkheid om het initiatief met behulp van bestaande methodes makkelijk uit te voeren was een belangrijke overweging bij de selectie voor dit overzicht.

Uit het onderzoek volgden meerdere factoren die initiatieven succesvol maken: lokale uitvoering van het initiatief, het gebruik van sociale media en het belang van communicatiestrategieën. Deze succesfactoren hebben geleid tot een overzicht met aanbevelingen voor initiatieven die direct toe te passen zijn. Er zijn verschillende manieren waarop kleinschalige organisaties bij kunnen dragen aan de eiwittransitie, zoals educatie, samenwerking en het groeien van een gewas. Binnen deze categorieën werden 16 verschillende initiatieven geselecteerd, zoals het verbouwen van sojabonen, het organiseren van proefsessies of aansluiting bij een bondgenootschap. Door deze variatie zijn de initiatieven toepasbaar voor een brede doelgroep.

Dit onderzoek heeft een basis gelegd om meer inzicht te verkrijgen in de succesvolle toepassing van initiatieven voor de overgang naar meer plantaardig eiwit. In de toekomst kunnen verschillende stappen worden genomen om nog meer inzicht te verkrijgen in deze initiatieven. Ten eerste zijn marktonderzoek en financieel onderzoek nodig om erachter te komen of een initiatief in de smaak valt bij de lokale doelgroep en om te ontdekken of een initiatief financieel haalbaar is voor een organisatie. Daarnaast kan meer inspiratie geput worden uit andere landen die bepaalde initiatieven al succesvol hebben toegepast. Nog een stap kan zijn om een bondgenootschap op te starten, zodat kleinschalige initiatieven rond de eiwittransitie contact met elkaar kunnen opnemen. Op dit moment bestaat zo een bondgenootschap namelijk nog niet. Het toepassen van alle initiatieven en het uitvoeren van deze toekomstige stappen zal bijdragen aan de nieuwe balans tussen plantaardig en dierlijk eiwit.

Contents

Acknowledgements	2
List of definitions	2
Dutch summary	3
Content description.....	5
Chapter 1. Introduction.....	6
Chapter 1.1 Importance of the protein transition	6
Chapter 1.2 This project	6
Chapter 1.3 Research question	6
Chapter 1.3.1 Sub-questions	6
Chapter 1.4 Project case descriptions.....	7
Chapter 1.4.1 Introduction to ‘Podium voor goed Voedsel’ and ‘Lokaal voor Verlof’	7
Chapter 1.4.2 Introduction of the dairy farm.....	7
Chapter 2. Methods	8
Chapter 2.1 Research methods and phases	8
Chapter 2.1.1 Interviews	8
Chapter 2.1.2 Desk research	8
Chapter 2.1.3 Telephonic interviews	9
Chapter 2.1.4 Literature study	9
Chapter 2.2 Research phases	9
Chapter 2.3 Data analysis	9
Chapter 3. Success factors	10
Chapter 3.1 Operating on a local level.....	10
Chapter 3.2 Social media use	10
Chapter 3.3 Communication strategies to consumers about the protein transition	11
Chapter 3.4 Implication of the perspectives	11
Chapter 4. Recommendations.....	12
Chapter 4.1 Initiatives chart.....	13
Chapter 4.2 The case dairy farm	14
Chapter 5. Discussion	16
Chapter 5.1 Important insights from this project	16
Chapter 5.2 Critical reflection on methods used	16
Chapter 5.3 Recommendations for the future.....	17
Chapter 6. Conclusion	19
Reference list	20
Appendix 1 – List of initiatives, alliances and education programs	23
Appendix 2 – Summary of interview with the initiator of ‘Podium voor goed voedsel’	27
Appendix 3 – Summary of interview with the owner of the dairy farm	28

Appendix 4 – Summary of telephonic interview with Lekker Lupine.....	30
Appendix 5 – Summary of telephonic interview with Tuintje van Adam.....	31
Appendix 6 – Pamphlets (Method: Growing).....	32
Appendix 7 – Pamphlets (Method: Educate)	36
Appendix 8 – Pamphlets (Method: Collaborate).....	38
Appendix 9 – Protein content of different sources.....	40
Appendix 10 – Team contributions	41

Content description

Our report consists of 6 chapters. In the first chapter the background information about the need for this project, the research questions and a short introduction about the cases used in this report are written. In the second chapter the methods used for writing this academic consultancy report are described. After this, in chapter 3 advice on perspectives is given with an explanation and in chapter 4, advice on initiatives is given which is also explained. The last two chapters of this report are a discussion about the findings and a final conclusion. Furthermore, a reference list and 10 appendices can be found at the end of the report.

Chapter 1. Introduction

Chapter 1.1 Importance of the protein transition

In the Netherlands, 79.8% of the population only ate meat 6 days per week or less. Of those people, 49.4% ate meat on maximally 4 days per week, in 2020. Furthermore, approximately 35% of the Dutch population indicated that they ate less meat in 2020 than in the previous twelve months (2). Eating less meat and substituting that with alternative proteins has many benefits. A more plant-based diet is beneficial for human health as it can lower body mass index, cholesterol levels and blood pressure (3). Next to this, moving towards a more plant-based production system is also beneficial for the environment. Right now, animal agriculture takes up 77% of all agricultural land worldwide. Yet, it only suffices in supplying 18% of global calories and 37% of global proteins (4). Global crop production for human consumption, on the other hand, takes up 23% of global agricultural land while it contributes to 82% of global calory supply and 63% of the global protein supply (4). This illustrates that land use for human consumption is more efficient than animal protein production.

In addition to having a positive impact on land use, producing plant proteins also has a positive impact on the emissions that are exhausted during production. Research has shown that plant-based proteins have a lower carbon footprint per unit of protein produced than animal-based proteins. For example, it takes 7.5 times more carbon emissions to produce one gram of beef than it would be to produce one gram of plant protein (5). This is one of the reasons why the Dutch government has decided that the stock of cattle needs to shrink by approximately 30% in the coming ten years (6).

Chapter 1.2 This project

Moving towards a new dietary balance requires effort from many different parties. Trying to create a new dietary balance between plant-based and animal-based protein sources can be supported by many kinds of small scale organisations, from local farms to restaurants or even community centres and supermarkets. The question has been raised *how* these organisations can *successfully* contribute to the protein transition. This project will answer this question in the following ways. To start, we will evaluate the case of the foundation 'Podium voor goed voedsel'. This foundation wanted to contribute to the protein transition by starting up the initiative 'Lokaal voor Verlof'. The implementation process of the initial initiative called 'Lokaal voor Verlof' will be evaluated to gain insight into how organisations can successfully contribute to the protein transition. Additionally, the question will also be answered by investigating present Dutch protein transition initiatives and by investigating how these initiatives can be implemented on the dairy farm that will be used as a case study for this project. This project will produce an informative and practical document that small scale organizations interested in contributing to the protein transition can use and apply.

Chapter 1.3 Research question

Our research question is: What kind of initiatives, regarding the protein transition, can be successfully implemented by small scale organisations?

Chapter 1.3.1 Sub-questions

To answer our main research question, the following sub-questions will be addressed in this order:

- 1) What worked and what did not work regarding the implementation process of the initial initiative called 'Lokaal voor verlof' and why?
- 2) What is the vision of the case dairy farm? What is their "why?" and "dream outcome" of this research?
- 3) What kind of initiatives related to the protein transition are currently present in the Netherlands, what made these initiatives successful or unsuccessful?
- 4) Which communication methods can be beneficial to create support and to promote an initiative aiming at the protein transition?

- 5) What are possible initiatives to implement on the case dairy farm or any other small scale organisation in the future?

Chapter 1.4 Project case descriptions

In the introduction, two cases were shortly mentioned that will be investigated to gain more insight into how organisations can successfully contribute to the protein transition. In this section, a more elaborate description of these cases can be found, so that the reader understands the context of these cases.

Chapter 1.4.1 Introduction to 'Podium voor goed Voedsel' and 'Lokaal voor Verlof'

The foundation 'Podium voor goed voedsel' is an example of a party that contributes to setting up initiatives to stimulate the protein transition. This foundation has the mission to stimulate the shift towards a more plant-based diet. One of the initiatives that this foundation wanted to set up, together with other parties, was 'Lokaal voor Verlof' in the municipality of Lievelede. The foundation intended to transform 'Lokaal voor Verlof' into a food-related education and information centre. This initiative aimed to provide knowledge and share experience regarding the transition to a more plant-based diet. The focus of 'Lokaal voor verlof' would have been on alternative food production methods, innovative information provision methods and education to create awareness amongst the visitors of the centre. However, the subsidy of this project fell through and another partner needed to be found to integrate a similar initiative. A new partner for the foundation was found in a dairy farm, this farm was then used as a case for this project. Furthermore, the Wageningen University & Research (WUR) Science Shop was contacted to provide knowledge and expertise in an evidence-based way. The mission of the foundation 'Podium voor goed voedsel' to stimulate the protein transition aligns with the long-term goal of the science shop to generate direct social impact.

Chapter 1.4.2 Introduction of the dairy farm

The dairy farm that was used as a case, is an example of a small scale organisation. The farm is located in Lievelede and produces dairy products. The farm sells a large amount of their dairy to Friesland Campina. A small part of the dairy is sold locally via a milk tap at the farm. Besides the dairy, the farm also has a small farm shop where they sell their products in combination with flowers. The farm got interested in producing plant-based by one of the initiative takers of 'Lokaal voor verlof'. Because they recognise that plant-based might be the future, they would like to orient on the possibilities to implement initiatives regarding the protein transition on their farm.

Chapter 2. Methods

Chapter 2.1 Research methods and phases

To answer our research question, four different methods were used. These methods will be described in the following subchapters.

Chapter 2.1.1 Interviews

Two interviews were performed:

1. An interview with one of the initiators of the foundation 'Podium voor goed voedsel', during which questions were asked about previous initiatives in which he was involved, the implementation of these initiatives and the communication about these initiatives.
2. An interview with the owner of the dairy farm case. The questions that were asked during this interview were related to the situation on the farm, what the farmer wanted regarding the protein transition on his farm and what he hoped and expected from our project.

Three members of our team went to Lievelede to conduct these interviews. The interviews lasted about 1 to 1,5 hours. For both interviews, a semi-structured setup was chosen. This means that the interviewer followed a list with questions but was also allowed to talk about other topics that would flow out of the conversation. It allowed for the interviewer to have control over the topics that were discussed, while still giving the interviewee the freedom to discuss other important topics on the side. Another benefit of semi-structured interviews is that they provide the interviewer with the freedom to ask unscripted follow-up questions which enables a deeper understanding of the interviewee's situation. Furthermore, as the topic of protein transition initiatives is still relatively uncharted, this way of interviewing also allowed for a very exploratory approach (7).

The interviewees provided consent for recording the interviews and for incorporation of their interview data in this report.

Chapter 2.1.2 Desk research

Desk research was performed to investigate initiatives that met two requirements: they were located in the Netherlands, and they focused on plant-based products or the protein transition. These initiatives were placed on the long list (Appendix 1). To come up with these initiatives for the long list, the following terms were searched in Dutch: 'plant-based protein', 'innovative farming', 'soy farming', 'protein transition', 'protein transition alliances', 'insect farming', 'oyster mushrooms', 'plant-based restaurants', 'plant-based education', 'collaboration' and 'alliance'. We chose to conduct desk research for these data about initiatives to gain as much information as possible in a limited amount of time. As a lot of initiatives have an online website, this seemed like the best method.

To make the long list more applicable for our research we shortened it (Appendix 1). This was based on the relevance of initiatives for the implementation by small scale organisations. Initiatives were considered not relevant if they could not be (readily) implemented on a small scale organisation. For example, water lentils are not approved for human consumption and are, therefore, not on the short list. Another example is alliances that only have big companies as members.

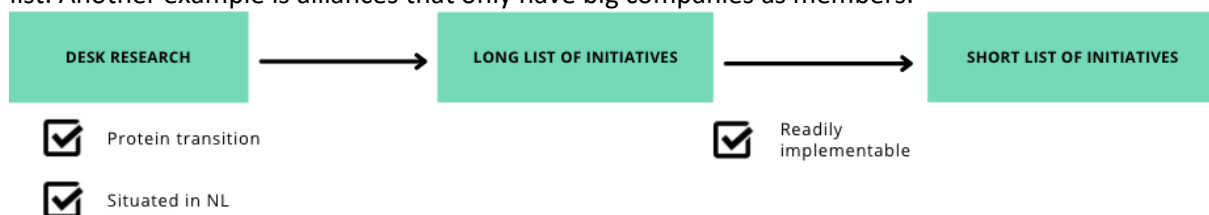


Figure 1. Graphical presentation of the selection process of initiatives

Chapter 2.1.3 Telephonic interviews

Information was available on the websites of most of the initiatives that were found through the desk research, but for some initiatives, the information displayed on their website was not sufficient for formulating a recommendation. When not enough information was found on the websites of the initiatives a telephonic interview was performed. Due to time constraints, we were only able to schedule two days for ourselves to perform these telephonic interviews. Within this time, two organisations responded. The telephonic interviews with those organisations took about 30 minutes. During these telephonic interviews, we first introduced ourselves, asked whether they wanted to contribute to our project and whether they agreed with us recording the phone call. Next, questions were asked about the implementation process, the financial aspect, time and effort needed and challenges that they came across concerning their initiative(s).

Chapter 2.1.4 Literature study

We searched for scientific literature to explore how consumers can be persuaded to become more aware of and open towards a plant-based diet. The following search terms were entered in Google scholar: “communication strategies behaviour change”, “communication plant-based diet”, “communication food choice”, “communication different target groups food”. These terms were searched without Boolean operators because the search started quite broad and exploratory. The scientific databases Scopus, PubMed and Google Scholar were searched for information on the health and sustainability aspects of the crops that we advise. These databases were also searched for information about the advantages and disadvantages of local production of crops.

Chapter 2.2 Research phases

We used the four research methods during various stages of the project. The literature study about strategic communication, the interviews and the desk research were all started at the same time. After the interviews were performed, the short list of interesting initiatives was made, and phone calls were performed. Lastly, the literature study about the health and sustainability aspects was executed.

Chapter 2.3 Data analysis

Our data analysis included making transcripts of the interviews on a word level and writing an English summary of both the interviews and telephonic interviews (Appendix 2-5). The data analysis provided information that was used to create an initiatives chart. This chart contains information on which initiatives can be implemented by small scale organisations depending on the type of method(s) (grow/collaborate/educate) one wants to use and the resources they have available. Furthermore, three perspectives were identified that need to be considered for the successful implementation of the recommended initiatives.

Chapter 3. Success factors

Three perspectives were identified for the successful implementation of the initiatives recommended in chapter 4. These perspectives were based on the analysis of the interview with one of the initiators of 'Podium voor goed voedsel', the content of the 16 initiatives on the short list identified and the literature review. The three perspectives that were identified are: operating on a local level, the use of social media, and making use of communication strategies to raise awareness amongst consumers about the protein transition. In the subsequent paragraphs, these perspectives will be discussed in more detail.

Chapter 3.1 Operating on a local level

Operating on a local level, i.e., producing and selling directly to local communities is an important perspective to consider when successfully implementing the initiatives described in chapter 4. While conducting the desk research, we found that operating on a local level was one of the perspectives that made the identified initiatives on the short list successful. Multiple initiatives pointed out that this operation level allowed them to guarantee the best product quality and enabled them to deliver their products as fresh as possible. Often, initiatives made use of innovative production ways such as vertical farming to be able to operate locally. In this way, their products could be produced anywhere and, on any type, and amount of (agricultural) land, even in an urban environment. Therefore, being able to contribute to the protein transition does not require an organisation to be a farm or to have a lot of outdoor space. This enabled many initiatives to be able to operate on a local level, using the space they had available.

One of the initiatives, Urban Funghi, an urban oyster mushroom farm in Ede, also highlighted the sustainability aspect of local production: food has to travel fewer kilometres before it reaches a consumer's plate (8). Research has shown that locally produced food is accompanied by lower transportation costs and reduced CO₂ emissions compared to imported food (9). However, it is important to take the nature of the product into account. Growing a tomato in Spain and importing it takes less energy than growing them in the Netherlands (10). Producing locally is thus only more sustainable if the produced food is suitable to grow in the local environment and for example does not require many amounts of extra energy (10). Furthermore, it was mentioned by Urban Funghi that local production and selling allowed producers to reconnect with their customers. It enabled them to show to their customers who and how they produced the consumers' food.

In addition to the benefits of local production for the producers, local production also has a positive effect on the consumers, which contributes to the success of these initiatives. The sustainability aspect is much appreciated by many customers and is one of the reasons for the growing interest in local organisations (11). Next to this, consumers are very drawn to locally produced food because its origin is visible (12). Being conscious about the environment and one's health has also been a growing trend that supports this (13). Furthermore, local food is also associated with freshness, tastiness and healthiness, which are important drivers for customers' purchase decisions (12). Next to this, the availability of the food also plays a role, consumers do not need to venture far to get their products anymore. Furthermore, social reasons can also influence consumers to buy more local as they can follow local traditions regarding foods and are often loyal to this as a form of patriotism (12).

Chapter 3.2 Social media use

Throughout the content analysis of the selected initiatives, it was identified that most of them are active on the social media platforms Facebook and/or Instagram. Organisations use these platforms to share information about their initiatives with their followers and to interact with them. This can be identified as a perspective that contributes to the success of these initiatives. It enables them to reach their target audience effectively and to build a loyal customer base. Furthermore, the literature review

showed that social media can be efficient and effective for marketing and providing practical information (14).

Another interesting aspect is the fact that the average consumer that often substitutes meat for a plant-based alternative is aged between 18-40 years old (15). This group spends most of their media time on online media while other age groups, from 40 upwards, spend more time on the traditional media such as printed media and television (16). From the interview with one of the initiators of 'Podium voor goed voedsel', it became clear that the communication strategy of 'Lokaal voor Verlof' mainly focussed on those traditional media outlets: multiple newspaper articles were published on the initiative. However, in doing so they might have failed to reach the people that were interested in the initiative, as they typically do not use those media outlets often (22).

Using online media such as social media has become a means to influence the decision making of individuals and has often been used to specifically influence purchasing decisions (17). Social media has become an important part of consumers' everyday life and it allows them to access information at any time of day from anywhere in the world (17). It allows for interaction between producers and consumers. It also enables consumers to share their experiences amongst each other about the initiatives. This allows the initiatives to build an online community and to form a bond with their customers (18). On social media, initiatives can also communicate about their production process which increases the provided transparency which consumers find important (12). Furthermore, social media is a great way to attract new consumers through sponsored posts or the use of smart algorithms (18).

Chapter 3.3 Communication strategies to consumers about the protein transition

Before implementing the recommended initiatives, it is necessary to have some knowledge on how to communicate about the protein transition and plant-based production. For an organisation to change towards a more plant-based focus, their customers need to recognize the need for this change too. Otherwise, the success of the implemented initiatives cannot be guaranteed.

Consumers need to be willing to learn about it and buy plant-based products. However, a big part of the population is not willing to consume a plant-based diet yet (19). We investigated how to change people's views on this and how to make them more aware of the importance of a plant-based diet by doing a literature study. There is a difference in communication strategies between those who are already eating plant-based and those who are not. For people who are not eating plant-based yet, it is needed to start with creating awareness and with showing the benefits of eating plant-based (19). It should be noted that communication is not always effective. Factors like taste, convenience and costs, also play a role in food choices (20). For people who are already eating plant-based food, it is important to provide more practical information about the availability and preparation. Practically, for organisations it is interesting to consider who their consumers are and what their opinion towards plant-based food is, to coordinate what they communicate towards their community.

Chapter 3.4 Implication of the perspectives

In short, we found three perspectives based on our interviews. Firstly, we saw that a lot of found initiatives operate on a local scale. As operating on a local scale has positive influences, we advise this as the base for successful implementation of initiatives. Secondly, we found that social media are a good way to promote plant-based production and products, because the target group of the protein transition, which exists of mostly young people, uses those media outlets a lot. Lastly, the target group should be considered when communicating about the protein transition. The content of communication should be adapted to the target audience. These three perspectives underly the successful implementation of the initiatives in the next chapter.

Chapter 4. Recommendations

Based on the analysis of the desk research, (telephonic) interviews and literature research we conducted, we came to multiple recommendations for small scale organisations that are interested in contributing to the protein transition. In the previous chapter, three perspectives were described that underly successful implementation of the found initiatives. These perspectives are our general recommendations to consider when an organisation wants to contribute to the protein transition by implementing any of the mentioned initiatives. Furthermore, an initiatives chart was created in which an overview is given of all recommended initiatives. This chart was formed using information from the (telephonic) interviews, the desk research and literature study. Detailed information underlying these specific initiative recommendations can be found in the appendices of this report. Based on the information in the chart, interested parties can get an idea of which initiatives would fit their organisation best.

The chart starts on the left side with three categories of methods: growing, educating and collaborating. Interested organisations can choose which method they are interested in implementing. Moving right in the chart shows the amount of resources necessary. From one of the interviews, we took away that time, money and space are important resources that should be considered. For every method, the accompanying initiatives were ranked according to their amount of required resources. Next to that, there is a description per initiative on what it entails followed by the practicalities and possible pros and cons of implementing that initiative.

An interested organisation can follow the whole chart from left to right and make their decisions on which method(s) they would like to focus on and which resources they want to spend. Based on this they can then choose which initiative(s) they like best and can implement on their organisation. Also, the organisation might choose to combine some initiatives. For instance, an organisation can combine growing mushrooms and microgreens in a school with educational signs and tasting sessions.

Initiatives Chart

This chart is developed to help small organisations make a decision on the implementation of initiatives regarding the protein transition. Starting with the method you would like to implement: *growing, education or collaborating*, you can follow the chart and make your own decisions on what fits your organisation. The initiatives recommended per method are ranked based on the resources needed for that. On top is the initiative that needs most resources, like time, money and space. At the bottom is the initiative that needs least.

With the description of the initiatives, the *grow* initiatives required some extra detail: where can you grow it? You can easily decide where you have space to grow something and make a decision on which initiative matches that space based on the pictograms. For all three methods, the next step after the description are some practicalities and pro's and con's to make you consider the practical implementation and come to the best fitting initiative(s) for your organisation.

EXPLANATION OF FIGURES

- Initiative can be implemented both indoors & outdoors.
- Initiative can be implemented indoors.
- Initiative can be implemented outdoors.

METHOD	RESOURCES NEEDED	INITIATIVES	DESCRIPTION	PRACTICALITIES	PRO'S	CONS
Grow	↑ HIGH ↓ LOW	Algae	You probably know seaweed as a food source, this is very nutritious and it belongs to the algae family. They are simple, photosynthesizing organisms, belonging to the oldest organisms on earth!	<ul style="list-style-type: none"> The cost price for algae is very high. Algae need light to grow but don't require much fresh water, soil or fossil fuels. 	<ul style="list-style-type: none"> Very efficient crop: yields 5 x more compared to other crops 	<ul style="list-style-type: none"> Dutch consumers are not very familiar with algae. Intensive production process
		Insects	You may be surprised about this one, but insects are actually a good alternative protein source for human consumption. They are very nutritious and some just taste like meat!	Breeding insects for human consumption requires registration at the NVWA.	<ul style="list-style-type: none"> Producing insects is very efficient and requires less effort than producing animal meat. 	<ul style="list-style-type: none"> Dutch consumers are not very familiar with consuming insects as food.
		Soy	You might know this bean for its many different uses, like dairy and meat substitutes! By producing soy you can contribute positively to the environment, because of a lower impact compared to animal products.	Get inspired by De Nieuwe Melkboer who are producing soy milk on Dutch soil and are in the middle of their developments. They are looking for Dutch soy cultivators.	<ul style="list-style-type: none"> Contrary to popular beliefs, soy can actually grow well in the Netherlands 	<ul style="list-style-type: none"> Requires regular crop rotation for the soil to remain healthy.
		Lupin	This is a very versatile bean, different things can be done with it! You can eat it as a whole, but it can also be processed into various products like hummus, bread or meat substitutes!	<ul style="list-style-type: none"> You can join Lekker Lupine their cultivation program to become a lupin cultivator. <ul style="list-style-type: none"> You need a SKAL certificate to be an eligible Lekker Lupine cultivator 	<ul style="list-style-type: none"> Lupin seeds are constantly innovated to adapt to the Dutch climate 	<ul style="list-style-type: none"> Some types of lupin seeds are vulnerable for diseases which can limit cultivation.
		Quinoa	Quinoa is known as a superfood that is easy to grow, contributes to food security and is very nutritious!	You can join the cultivation program of Greenfood50 to become a quinoa grower. They provide you with seeds developed at the WUR and use the harvested quinoa for meat alternatives like quinoa burgers.	<ul style="list-style-type: none"> Very suitable crop for Dutch soil. 	<ul style="list-style-type: none"> Weed control can be difficult.
		Nut trees	Nuts, such as almonds, cashews, hazelnuts, pecans, pistachios and walnuts are a good meat replacement and a handful of nuts each day is good for the body.	<ul style="list-style-type: none"> Nut trees like chestnuts, walnuts and hazelnuts have the most favourable characteristics for growing in the Netherlands. Trees can be planted in the fields where cattle is kept too. 	<ul style="list-style-type: none"> Nut trees can grow well in the Netherlands and require little maintenance. 	<ul style="list-style-type: none"> It takes a while before trees start to produce nuts. This could take around 5 years.
		Microgreens	You might be familiar with those tiny plants on your food in a restaurant. Those are microgreens! You harvest them when they are just germinated and they are very nutritious.	<ul style="list-style-type: none"> Microgreens grow in warm, light conditions. Microgreens can be grown anywhere! Good combination with growing mushrooms. 	<ul style="list-style-type: none"> Very effortless crops and can be harvested within a week. 	<ul style="list-style-type: none"> Only specific microgreens contain a lot of protein.
		Mushrooms	Did you know mushrooms are very nutritious? very useful addition to a balanced diet. Some oyster mushrooms even have the same texture as meat!	<ul style="list-style-type: none"> Mushrooms can be grown anywhere! Very little maintenance required during the cultivation. 	<ul style="list-style-type: none"> Not much space or effort needed and can be grown at home through vertical farming 	<ul style="list-style-type: none"> More effort is needed when you want to guarantee production continuity
Educate	↑ HIGH ↓ LOW	Tasting sessions	You can organize tasting sessions with new plant-based products or alternative protein sources to let visitors taste the food and learn more about it.	<ul style="list-style-type: none"> You need to find a space to organize the tasting sessions. You need to purchase and prepare the food and equipment for the sessions. 	<ul style="list-style-type: none"> Tasting sessions can help increase awareness regarding the protein transition. People will become familiar with your products 	<ul style="list-style-type: none"> Only works well for unknown foods.
		Educational visits	By opening up your organization for educational visits the visitors can learn more about your production processes and awareness for the protein transition can be increased.	To save time, you can join national organizations that take care of these educational visits. Like kiekeboer'n	<ul style="list-style-type: none"> People will become aware of how you contribute to the protein transition. 	<ul style="list-style-type: none"> Having lots of visitors might not always be handy.
		Educational programs	Educating kids about different types of proteins can make them more familiar and conscious consumers in the future. This can for example be done through the free online education program " Smaakmissie " that is developed by the WUR.	<ul style="list-style-type: none"> The specific program "Smaakmissie" is free for all schools in the Netherlands. A combination with other initiatives like e.g., growing mushrooms in the classroom can enhance the experience. 	<ul style="list-style-type: none"> Starting education at a young age can be beneficial in the future. 	<ul style="list-style-type: none"> Most existing educational programs only focus on kids not on adults.
		Informational signs	An effortless way to provide your visitors with more information regarding your contribution to the protein transition.	The signs can be placed inside and outside your building. Anyone who passes by can read it and learn more about your initiatives.	<ul style="list-style-type: none"> Not much space or effort needed. 	<ul style="list-style-type: none"> It might take some effort to develop effective content for the sign.
Collaborate	↑ HIGH ↓ LOW	Boert bewust	Boert bewust is an alliance that connects farmers to society by providing them with a platform to share their story and stimulating societal involvement.	<ul style="list-style-type: none"> Membership cost: €550 to cover the first 3 years. Activities: seminars, networking sessions, workshops. 	<ul style="list-style-type: none"> Collaboration with others. Get more involved with your environment. 	<ul style="list-style-type: none"> It requires time to attend all events.
		FoodValley	FoodValley is a very diverse network of around 250 organisations who work on a more sustainable, healthy and affordable, tasty food system. One of the most important topics for foodvalley is a sustainable protein system. Members range from big companies to start-ups.	<ul style="list-style-type: none"> Membership cost: range from €175 - €3.000 <ul style="list-style-type: none"> Depends on size & type of company. Activities: congresses, networking events, collaboration sessions. 	<ul style="list-style-type: none"> Expanding your network. Develop & innovate together. 	<ul style="list-style-type: none"> Only accessible for companies, not for all different kinds of organisations.
		Collaborate with local farms	Farms can sell plant-based products to local restaurants and supermarkets, so they can acquire locally grown plant based protein. Purchase of large quantities of products by supermarkets or restaurants can be economically attractive for the farms.	Local systems like this are not readily existent in the Netherlands as a whole yet. Inspiration can be drawn from the Lokale Kilo's initiative in Groningen	<ul style="list-style-type: none"> Economically attractive. Good for the environment. Interesting for customers 	<ul style="list-style-type: none"> Collaboration systems like this still have to be set up.
		Offer your space to others	Do you have unused space, indoor or outdoor, but don't have the time or resources to implement an initiative on it? You can work together with organizations that are in need of space for their initiatives!	Any free space you have can be used to grow protein alternatives by others that are able to spend their time and resources on it.	<ul style="list-style-type: none"> Very low-effort. This is an efficient way to use your free space. 	<ul style="list-style-type: none"> You can't really control what others do on your land.
		De nieuwe boerenfamilie	De nieuwe boerenfamilie is an alliance for innovation in Dutch agriculture. It brings farmers and non-farmers together who want to make Dutch agriculture smarter. Innovative solutions can be useful to develop plant based initiatives	<ul style="list-style-type: none"> Membership cost: no cost Activities: the 'boerenfamiliedag' (a semi-annual event), access to content and course materials, online lectures, opportunity to make appeals on their platform. 	<ul style="list-style-type: none"> Collaboration with others to further develop your innovations. 	<ul style="list-style-type: none"> It requires time to attend all events.

Chapter 4.2 The case dairy farm

In the following section we will apply the initiative chart from the viewpoint of the case dairy farm, to provide a practical example of how the initiative chart can be used by a small scale initiative. First, we will shortly describe the situation at the dairy farm and then we will walk through the chart with the wishes of the farm owner in mind.

The case dairy farm of this project showed interest in implementing a local and small scale initiative regarding the protein transition on their farm. For this project, an interview was held with the owner of the farm. At the time of this project, the farm owners kept 135 cows for which they also grew maize and grass as feed. Next to this, they had a little farm shop in which they sold meat from their cows and flowers. Part of the milk from their cows could be tapped by their customers from a tap outside of the farm. The rest of their milk was sold to Friesland Campina. The owner acknowledged that due to the protein transition, a change is required in what is produced on the farm to stay futureproof and economically thriving. Due to the upcoming shrinkage of livestock that was announced by the Dutch government, space will also become available on the farm for new farming opportunities. Implementing initiatives regarding the protein transition on their farm may therefore be beneficial for the continuity and image of their dairy farm. However, the farm did not have a lot of time and money to spend on this project.

If we follow the initiative chart, considering the information from the interview, we would come to the following advice; growing, educating and collaborating are all possible methods for the dairy farm.

We will start with some advice on growing. As the owners of the farm do not want to spend too much money and time, they can consider working together with people who do have those resources. Another possibility is that they can grow mushrooms and/or microgreens inside and nut trees outside, as they have both indoor and outdoor space. Mushrooms take little space and little effort and they can be sold in the farm shop, as mentioned by 'Tuintje van Adam'. As the telephonic interview with 'Tuintje van Adam' showed us the mushrooms can be grown on the waste of the microgreens, which can be easily sold at their farm shop as well, we advise combining these two. In addition, nut trees are easy to implement in combination with the dairy farm (41) and nuts can be sold in the farm shop as well. We advise not to breed insects, because our interviewee was not very enthusiastic about that specific initiative during the interview and because it requires the investment of a lot of resources. In addition, we do not advise growing algae, lupin, quinoa or soy, because they require a large number of resources. Especially algae require significant resources. In the future, the farm might produce more plant-based food and has more resources to spend on the implementation of other initiatives. In that case, we would advise growing lupin, quinoa or soy anyway, as the benefits do outweigh the costs eventually.

If we continue to the education method, we come to the advice to place information signs on the farm. We suggest placing this next to the milk tap, as this is the place where most customers would come. Furthermore, the farm owners can expand the visits of the little train in the summer season, by opening their farm for visits from elementary school classes during the year. As the dairy farm owner said that he did not want to spend too much time, we advise him to investigate whether it is possible that someone else would give the tours to the elementary school classes. An example of an initiative that takes over these tours is Kiek'nboeren, which operates in Twente. When in the future, the farm might have some more time, they can look at educational options again. They could for instance organise tasting sessions at the farm with their own produced products.

Considering the chart about collaborating, it can be seen that some alliances require a lot of resources, which is why we would not advise the dairy farm owner to join more alliances. Especially because he told us in the interview that he is already a member of a lot of alliances and groups and that he gets

too many messages to stay up to date already. An alliance that needs fewer resources, is 'De Nieuwe Boerenfamilie'. The owner can consider joining that alliance if he does want to join an alliance that requires less time and money to be spent. If in the future he decides that he wants to invest more resources in joining alliances, he could reconsider the other alliances as well. Besides these recommendations on alliances, we advise him to work together with supermarkets, restaurants or other local companies to sell his products to. This can be an addition to what he is already doing with the croquette company and the butcher. Furthermore, his existing collaborations can also be expanded. For example, he can sell the mushrooms to the croquette company, to make mushroom croquettes from them, which then could be sold in their farm shop or to local restaurants and supermarkets.

Our last advice is to keep communicating through the social media outlets the farm owners are already using and expand to this. For example, they can add information about their plant-based protein production or the protein transition in general.

Chapter 5. Discussion

This academic consultancy report aimed to answer the question “What kind of initiatives, regarding the protein transition, can be successfully implemented by small scale organisations?”. This research question was answered using four different methods that all have their advantages and disadvantages. Furthermore, points to take away for the future were also developed during this project.

Chapter 5.1 Important insights from this project

Through the interviews, desk research and literature study, we were able to gain clear insight into what makes initiatives that contribute to the protein transition successful. We identified three perspectives for successful implementation. These perspectives are; operating locally, the use of social media and the communication towards consumers about the protein transition. These three perspectives can be seen as an important takeaway from this project. Every small scale organisation that is looking into implementing one of the recommendations, should consider them. Operating on a local level will allow them to reconnect with their consumers, showcase their production processes and take the environment into account through lower transportation costs and emissions. Making use of social media will make sure that their initiatives stay on top of the mind of their consumers. In addition, it can help build a community around the initiative and generate loyal customers, together with reaching and acquiring new customers. Furthermore, gaining information on the right communication strategies to use towards consumers is important since it allows consumers to be informed about and persuaded towards the protein transition.

Another important aspect that was considered for this research was that only readily implementable initiatives were considered for the recommendations. For example, crops that were not approved for human consumption yet were excluded from the list. This allowed the recommendations to be very practical and provided the reader with the possibility to implement these perspectives easily and start benefitting from them fastly. By applying these selection criteria, very accessible and easy to implement recommendations could be formed. This was the main purpose of our project.

Chapter 5.2 Critical reflection on methods used

We started the research by performing two semi-structured interviews. One was with one of the initiators of ‘Podium voor goed voedsel’, who was interested in initiatives regarding protein transition. The other was with the owner of the case dairy farm, who was willing to implement some initiatives on his farm. The number of interviews (two) can be seen as a limitation because theoretical saturation is not reached. Theoretical saturation is the point at which no data can be found that provide new information (21). In qualitative research, often more interviews are conducted until this point is reached. In a high number of interviews, new themes can be continued to be found in the data, until saturation is reached. We only conducted two interviews, so this larger number of interviews was missing in our project. Despite this limitation, these two interviews added value to our research by providing two very different viewpoints: that of a farmer who was willing to innovate and that of a citizen who was interested in setting up certain initiatives. Conducting interviews provided the specific information that was needed to investigate the evaluation and potential implementation of such protein balance. Performing semi-structured interviews benefited our research because the semi-structured interviews allowed the interviewees to talk about all the topics which they found important within the limits of our interview questions (22). Inspiration for the interview guides was drawn from sections about process evaluation from the book by Bartholomew Eldredge et al. (22). As explained above, because of the limited number of interviews, a lack of theoretical saturation could be expected. These gaps in the theoretical saturation were filled by the desk research for initiatives and the accompanying literature study. The combination of these methods gave us in-depth information about the initiatives and perspectives and what made them successful, which provided us with important insights about the implementation of such initiatives.

Desk research was conducted to identify initiatives regarding the protein transition. For this, Google was used to find information in the form of news articles or websites of the initiatives, as this would provide more extensive information on initiatives that exist in the Netherlands than scientific articles. The information that was stated on many of the websites was not underpinned with references. Therefore, we performed a literature search to scientifically back up the arguments/recommendations that we drew from these websites.

In addition to the desk research, we performed telephonic interviews with two initiatives (a microgreens- and oyster mushroom farm and a lupin cultivator). This was performed to get extra insights in their initiatives as there was limited information on their websites. In the end, we were able to form theoretically underpinned recommendations on the implementation of initiatives for the protein transition by using scientific literature. Therefore, we believe that we have given solid academical advice. This approach enabled us to explore protein transition initiatives that can be implemented by small scale organisations in the Netherlands. Our explorative research provided insight into these initiatives and can form a good basis for further investigation on this topic.

Chapter 5.3 Recommendations for the future

As our project served as a first exploration in this research area, certain aspects remain uncovered. For example, the financial aspects of our recommendations did not receive any attention. Due to a lack of expertise in this area and the exploratory nature of our project we decided to not focus on this. We aimed to provide a first overview of what can be done to contribute to the protein transition that was very simple and practical. If any recommended initiatives will be deemed interesting by the readers of this report, a financial analysis of the initiative can be conducted to get a better view of the economic background.

Furthermore, in multiple instances, the consumers played an important role in the success of an initiative. However, not much is known about the local consumer's perception on locally produced plant-based proteins. Therefore, market research in this area is recommended. It is important to gain a better insight into whether an initiative that is now located in Amsterdam could also thrive in Groningen, for example. This is interesting because the attitude of the local customers might be different. Next to this, when a better insight is gained into who the customers of certain initiatives are and what they want, it might be possible to increase the sales of these producers by focussing more on the demand and interests of these customers.

Our project limited itself to initiatives that operated only in the Netherlands. However, by doing this the recommendations might not be that innovative, because they have already been done before in the Netherlands. Inspiration could also be drawn from other countries that are more advanced in certain initiatives like the consumption of insects. Countries with a similar climate to the Netherlands are especially interesting to draw inspiration from as the environmental conditions for certain initiatives will be the same. These countries could serve as an example that might help innovate and develop the Dutch protein transition as well.

A more practical recommendation for the future is to start up more alliances that focus on small scale initiatives. At the moment of writing this report, we were only able to find alliances that focussed on bringing farmers together or on connecting rather big companies. No national alliance was found in which smaller organisations that want to contribute to the protein transition could connect. We believe that this transition is still in its early stages and a lot of innovation and development collaboration between all kinds of parties is needed to effectively contribute to it. By opening a space for smaller like-minded parties, they can jointly contribute to the protein transition and make a bigger impact. In the end, this will be beneficial for the organisations willing to contribute as they then need to invest less time figuring everything out on their own.

Our research has set a basis for recommending interested parties in implementing initiatives based on the protein transition. However, the above-mentioned recommendations can extend the thoroughness and reach of these recommendations.

Chapter 6. Conclusion

To conclude, there are a lot of different initiatives regarding the protein transition that could be successfully implemented by small scale organisations. The type of initiative that an organisation should implement depends on their resources and preferences. To choose what can be implemented, the initiatives chart we made can be used. The initiatives that are advised in this chart are all backed up by information from scientific and practical experience of the initiatives. However, there is no financial information, so this still needs to be considered by organisations that want to implement certain initiatives. The initiatives chart can be distributed different local organisations interested in contributing to the protein transition. Furthermore, the three identified perspectives should be considered for a successful implementation of the initiatives.

As a takeaway message for small organisations that want to contribute to the protein transition, it is important that they make their own choices based on the chart of what initiative(s) fit(s) their organisation and they should consider the three perspectives to make implementation successful.

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Appendix 1 – List of initiatives, alliances and education programs

Type of initiative	Website	Name	Information	On the short list?
Soy	https://nieuwemelkboer.nl/	De nieuwe Melkboer	Two brothers who grew up on a milk farm decided to tap into the growing trend of plant-based milk. They now produce soy beans in Twente that they use to produce the first-ever Dutch soy drink. It is a sustainable and plant-based product that is tasty and healthy. Together with other farmers, they want to pave the way from plant to consumer.	Yes
Insects	https://protifarm.com/about-us/who-we-are/	Protifarm	Protifarm offers planet-friendly food solutions in the form of insects.	Yes
	https://www.hetwittewater.nl/	Het witte water	An organic pig farm that also produces mealworms for animal feed and human consumption.	Yes
	https://entobreed.com/nl/	Entobreed	An agrotech startup that sustainably produces edible mealworms. These mealworms are used in foods for human consumption	Yes
Algae	https://www.plent.nl/blog/hoen-onze-nederlandse-chlorella-wordt-gekweekt	Plent	Supplement company making products in an environmentally friendly way.	Yes
	https://www.algaeinnovations.nl/	Algae innovations	Produce algae	Yes
Mushrooms	https://oesterzwammerij.nl/	Oesterzwammerij	An oyster mushroom farm that grows the mushrooms on coffee grounds. The mushrooms are used for foods and sold separately.	Yes
	http://www.urbanfunghi.com/nl/nederlands/	Urban Funghi	Locally grown mushrooms that are delivered freshly & daily to a community of local shops, restaurants and consumers.	Yes
Water lentils	https://www.nextgarden.nl/projecten/waterlinzen.htm	Next garden	A foundation that has set up a research project to get Water Lentils approved for human consumption.	No

Microgreens	https://milligreens.nl/onze-productie/	Milligreens	A vertical farming company specialized in growing microgreens and cress. Microgreens are seedlings of edible vegetables and herbs.	Yes
	https://microgreensholland.nl/over-ons/	Microgreens	A start-up that wants to make locally produced microgreens available to everybody. They produce fairly and sustainably by not using any pesticides and only using organic seeds.	Yes
	https://tuintjevanadam.nl/duurzaamheid/	Tuintje van Adam	An organisation focussed on the urban farming of microgreens and mushrooms in Amsterdam.	Yes
Beans	https://www.cosun.com/actual/new-plant-protein-isolate-with-neutral-taste/	Cosun	The company Cosun introduces a protein isolate from the Fava Bean that can be used in dairy alternatives	No
	https://www.denieuweboerenfamilie.nl/oproepen-blog/waas-zoekt-melkveehouders	ReNature	Was from the organisation ReNature works together with an Amsterdam-based cheese maker (Willicroft). Is looking for dairy farmers who also want to grow white beans to make vegan cheese	No
	https://vakbladvoedingsindustrie.nl/artikel/me-at-zet-in-op-plant-based-eiwitten-van-eigen-bodem	ME-AT	ME-AT, together with Herba Ingredients, Agrifir, and ZLTO want to stimulate the Dutch cultivation of protein crops to tap into the growing market for meat replacers. For this project, field beans are used.	No
	https://open.overheid.nl/repository/ronl-6ea7577b-85a6-425a-9dad-b9b9cf695495/1/pdf/20298471.bijlage.pdf (pg. 20/21)	Dutch government	The Dutch government has set up "Green Deal vlinderbloemigen" with parties from the whole protein chain. These crops grow well in the Dutch climate and can contribute to soil quality and biodiversity. These crops can be used as meat replacers (field beans, peas, and beans). Subsidies are given to local chain projects and cultivation programs.	No
Nut trees	https://janmiekeshoeve.nl/ontmoeten-en-beleven/	Janmiekeshoeve	Combine trees and shrubs with livestock farming	Yes
Lupin	https://www.lekkerlupine.nl/overons	Lekker Lupine	Lekker lupine stimulates the consumption and production of lupine in the Netherlands to contribute to the protein transition	Yes

Cricket farm	https://cricketfarm.nl/	Cricket farm	Cricket farm that also likes to share their knowledge. They have an experience centre in Barneveld	Yes
Alliances	https://www.theproteincluster.com	The protein cluster	Assisting plant-based protein suppliers with eg. commercializing their products. Can help with plant protein business ideas that need further development, upscaling or marketing	No
	https://greenproteinalliance.nl/leden-partners/	Green protein alliance	Alliance of public organisations, governments, big and small producers, supermarkets, education centres. They want to make the Dutch more aware of their protein consumption and strive for a balance: half animal protein, half plant-based protein. Started the initiative '#zokanhetook` about bringing plant-based food to consumers	No
	https://www.smaakacademieachterhoek.nl/over-ons/	Smaak academie achterhoek	Education, entrepreneurs and experts work together to create a more sustainable food system.	Yes
	https://www.boertbewust.nl/over-boert-bewust/	Boert Bewust	Boert bewust makes farmers more visible and educates them so they act well in society, gives them a platform to tell their story and makes them more involved with society. The farmers can get more contact with their environment and their environment can get more involved.	Yes
	https://www.denieuweboerenfamilie.nl/	De nieuwe boerenfamilie	For innovation in Dutch agriculture. Network of farmers and non-farmers who want to make Dutch agriculture smarter. Organise the boerenversneller (farming accelerator), an (individual) entrepreneurial project where farmers can discover and analyse their innovation possibilities.	Yes
	https://greendish.com/duurzame-transitieprogrammas/	Greendish	Initiative in the province Gelderland to improve the offer of plant-based food and to reduce food waste.	No
Similar initiatives	https://www.foodagribusiness.nl/dit-melkveebedrijf-stapt-over-op-plantaardig-eiwit/	Farm Kottelenberg	A dairy farm that wants to switch from cows to plant-based protein production like hazelnuts. They won €10.000 in a contest to further carry out this plan.	Yes

	https://boerderijdeenzaamheid.nl/	Boerderij de eenzaamheid	This dairy farm is located on an island close by Leiden. They focus on regenerative agriculture	Yes
Quinoa	https://greenfood50.com/nl/	Greenfood50	A company that sells products based on quinoa.	Yes
Education	https://www.smaaklessen.nl/	Smaak lessen WUR	Starting to educate kids at a young age about making healthy and sustainable food choices can help them when they are adults: raise more conscious and sustainable consumers.	Yes
Collaboration restaurants and farmers	https://www.lokaalkilosschuiven.nl/	Lokaal kilo's schuiven	An initiative that connects farmers and restaurants so supply and demand can meet. Restaurants can jointly buy products from farmers as it is easier to produce in big quantities. The focus is on local.	Yes
Collaboration farmers & supermarkets	https://van-onze-grond.nl/	Van onze grond	An initiative that brings local products to the big supermarket under the Van onze Grond brand so they can reach a bigger number of consumers than through their farm shops.	Yes
Vertical farming in supermarkets & restaurants	https://www.infarm.com/	Infarm	A company from which you can buy a vertical farming greenhouse to grow herbs, microgreens, mushrooms. Can be put in any kind of space like a supermarket or restaurant. Urban agriculture	Yes

Appendix 2 – Summary of interview with the initiator of ‘Podium voor goed voedsel’

In Lievelede there was a piece of abandoned land with a little gatekeeper’s house. The municipality gave permission to do something with this gatekeeper’s house and a plan was made to build a visitors’ centre, called ‘Lokaal voor Verlof’, where there would be education, information, and experience. However, after a few years, the municipality wanted that the plan would include something with food. Then plans were made to renovate the building and a tender was held to gather ideas on what to do inside the building. However, only ideas from one group were sent in. These ideas included starting a cricket farm and growing oyster mushrooms and microgreens inside the building. This group also had already planned to let people from care farms or students from schools in the area take care of the plants and insects. Besides, they planned to get money from the municipality and the LEADER program. LEADER is a subsidy program from the European Commission for rural development. To get all this funding done, the foundation ‘Podium voor goed voedsel’ was started, which would coordinate all these projects.

However, it took a lot of time to get all the information and licenses for the cricket farm and then the municipality stopped the funding and the man who planned to work together with ‘Podium voor goed voedsel’ to start the cricket farm had already started a new cricket farm in Barneveld. So, the money fell away and one of the ideas fell away. After this LEADER also stopped the funding and the plans for ‘Lokaal voor verlof’ needed to stop.

The only communication about the plans for the ‘Lokaal voor Verlof’ towards the community, was via the local newspaper, called the Elna. It was thought that it was not necessary to give monthly updates in the papers, so there were around 3 articles placed over a period of 2 years.

Furthermore, the people from ‘podium voor goed voedsel’ had contact with different people:

- The founder from Krekelutions
- The founder from the Oyster mushroom farm
- The man from Loco (a hotel that wanted to buy the microgreens)
- The municipality of Oost Gelre -> portfolio manager for leisure economy
- A dietician from Winterswijk (not very useful for us)
- LEADER
- Lievelede Belang, a foundation that is committed to the general interest and the quality of life in Lievelede

It was known that the community was very sceptical towards the ideas for ‘Lokaal voor verlof’. New ideas do not get a lot of support in this area. However, it was thought that when the ‘Lokaal voor Verlof’ would have been renovated and the plan implemented that there would have been a lot of people who would have been interested and would visit the centre.

Furthermore, it was also thought that the outcome might have been different when there was no Corona. Cause, this made the communication way harder, everything needed to be online and because of this people did not memorise the plans for ‘Lokaal voor verlof’ as much as wanted.

Appendix 3 – Summary of interview with the owner of the dairy farm

The farm

The farm has dairy cattle, with 160 ha of land. Besides, they have hardwood in 2,5 ha woods and they grow grass and corn to feed the cows. They are searching for more nature inclusive farming, for instance, hazel or nutrient trees. They also have herbaceous and flowery grassland. The biggest part of their milk is going to Friesland Campina, and they also have a milk tap (and in summer ice cream) on the farm for visitors. They produce 1.3 million litres of milk per year, with 5-8 thousand going to the milk tap. In the coming years, the farm will probably have to shrink due to government regulations. Before reducing the focus on cows, they want to broaden the scope a bit, by for instance making his ice cream and opening a web shop.

Plant-based

The farm owner is already thinking about doing something with nut trees. Within Friesland Campina, he also made it clear that going plant-based might be needed. For him, there is also an economic interest in going more plant-based. On his farm, he is not implementing it yet, but he wants to find out what is possible. He thinks it is important that it has financial benefits in the end. If small scale plant-based production becomes profitable, he is interested. He is still holding back from getting a lot on his plate, but he would like to explore the options.

Community

The dairy farm has a lot of local consumers from Lielvelde and Groenlo. Most of them are average consumers, but some are conscious eaters and want to eat good meat when they eat it. The protein transition is not a thing in the Achterhoek, it is more a Randstad thing. To know what would sell in this place, market research should be done. There are a lot of regular customers (80%). The other 20% are new customers. Communication goes through word-of-mouth, Facebook and Instagram. For the protein transition, it might be hard to find a sales market in the Achterhoek, although people are getting more and more aware. The farm owners are interested in online selling in a webshop.

Neighbourhood partners

The farm is located in a very touristy area. In summer a small train is coming by with tourists multiple times a day. They let a company make bitterballen and croquettes. They sell a typical 'Achterhoekse' bread topping. They also try to connect to local catering/restaurants. They are connected to the neighbourhood.

Motivation

The farm owner did not explain an intrinsic motivation to join the protein transition, it mostly came from talking with one of the initiators of 'Podium voor goed voedsel' because there was some space left on the dairy farm. The farm owner is interested in new things. He believes that the protein transition has a future in the Netherlands, and he wants to join in on time. A movement is needed. He expects demand for plant-based products, so his motivation is also market-driven. They would like to explore the possibilities for the farm and see if it is financially interesting. Immediately benefiting from it is not needed, he is open for trial and error. 0,5 ha of land for it or space in the shed is possible.

Possibilities

Protein transition initiatives that he already knew are oyster mushrooms, soy growth for soy milk, someone making milk directly out of the grass, and more options. He keeps a curious and open mind towards the ideas of 'podium voor goed voedsel'. The first time, he found it vague, but someone needs to be the first to innovate. About the initiatives we found, he finds nut trees, lupin, and soy interesting. They are interested in initiatives that can be an extension of their existing practices on the farm. For instance, another crop. Algae in combination with fertilizers, nuts are very good applicable or beans as

feeding crop. Soy is interesting but is hard to do according to him. The first challenge is replacing soy with more protein from your land, second is replacing the protein of your milk protein.

The farm owner does not want to spend too much time on implementing the initiatives and maintaining them. Growing a crop is not taking too much time, that would be fine. There is also space for growing new crops or in the shed. The farm owner does not have a clear view of what's achievable, it depends on us. His investing capacity and time are very limited. Something like a 'Febo wall' can be interesting, you do not need to be present for it to work. Also, crickets or mushrooms have possibilities. Cows take a lot of time. Stopping with that is not an option (yet). Phasing this out and replacing it with other valuable products is interesting. Starting small and building on that is needed.

Alliances

If they want to join an alliance, it is dependent on the plan we come up with. They are already part of a lot of groups and chats. He is also already a member of 'vruchtbare kringloop Achterhoek', which is focused on efficiency, but not really the protein transition. This year it is a bit broader about involving the neighbourhood and consumers.

Our advice

He said he'd like us to take on the orientation step of the process. We should keep it a bit broad and general. Focus on education/information/experience: would be okay if he does not have to organise it himself. It should fit within the complete picture. The advice should also be applicable to other farmers. Reaction about the act project: he thought 'Oh, now it is really getting serious (seemed a bit taken aback by it). Marketing research intrigued him.

Appendix 4 – Summary of telephonic interview with Lekker Lupine

Lekker Lupine is a platform that focuses on stimulating the consumption and cultivation of organic Lupin in the Netherlands. Lupin is a type of bean that has the highest protein content of all crops. It is now mostly used in animal feed, but it is gaining popularity as an ingredient for human consumption. This is due to the protein transition trend. Lupin provides a great alternative to soy as it can be cultivated in the Netherlands easily and does not need to get imported from other parts of the world. Lekker Lupine is occupied with 3 topics: cultivation and cultivation development, market development and product development, and the community: from consumer to seed producers.

Farmers can join Lekker Lupine and become Lupin cultivators by reaching out to them through phone or email. Lekker Lupine operates in the same way as a cooperation would do but their real business structure is a BV. Their focus is always on creating a chain as short as possible. Lekker Lupine provides their cultivators with the Lupin seeds who can then grow it for them. During the entire process, Lekker Lupine wants to involve their cultivators because Lupin is a new and unknown crop in the Netherlands. So, they do not have to do everything on their own or figure it out themselves. This is all based on a contract between the cultivator and Lekker Lupine. Lekker Lupine pays the cultivators a down payment and sells the Lupin for it to be processed into food products. They are either sold as dried Lupin beans or coffee is grounded from it. Tempeh or vegan cheese are also options. The profits made on these food products are then split 50/50 between the cultivator and Lekker Lupine because they also have costs for processing the Lupin.

The farmers can sell the lupin products on their farm but selling it as a private label food is not profitable. Consumers that are interested in Lupin are often located close to big cities or live in the *Randstad*, so they are more urban consumers. Another term for this type of consumer is the *early adapters*. They are aged between 25-50 and are extremely interested in and concerned with the protein transition.

For a farm to be allowed to produce for Lekker Lupine they need a SKAL certification (a certificate for organic farming). Lupin does not require animal manure to grow, making it suitable for vegan agriculture systems. As lupin is still relatively new and uncharted, it contains many hidden advantages that will be able to come through in the future. Lupin is sown around the end of March and can be harvested around August; this is a long growing period.

If a farm wants to operate organically doing something low effort is paradoxical. Growing organic Lupin requires more manual labour than doing it the old-fashioned way. You really must be on top of it the whole time. Many farms must create new initiatives for the future due to the shrinkage of the livestock, what will they do with the land that is left after the animals disappear? Lupin is a good future initiative as it is easier to grow than soy. However, it is not as established yet and many consumers are not aware of its existence yet.




Appendix 5 – Summary of telephonic interview with Tuintje van Adam




This initiative is set up by a man in Amsterdam, and they focus on growing mushrooms and microgreens. The founder of Tuintje van Adam was always interested in growing these products and already did this on a very small scale from his home. However, then the pandemic arrived, and he was unsure of his job as he was working in a restaurant. From then on, he started to expand his hobby to a large-scale production which eventually turned into his new company. They first grew their produce in a shack in the centre, but they are now moving outside of the city where there is more space, and the rent is less high. Tuintje van Adam had to take on a lot of loans from people in their inner circle. They knew revenue would come eventually but first needed money to get the initiative started.

In the case of Tuintje van Adam, their production is quite time-consuming as they need to be able to guarantee an output for the orders that are made by restaurants. A lot of work goes into climate control and executing the growing as good as possible, this makes it pretty labour intensive.



The production of oyster mushrooms is very easy, it can be done on wood so all you need is a space to put them. It requires minimal costs and is very low maintenance while also appealing to a lot of consumers. Tuintje van Adam supplies their mushrooms to restaurants and a smaller part is bought by locals online. Their consumers are not specifically the vegans or conscious ones but often they are just people from Amsterdam that like to buy local and enjoy the taste of mushrooms. Tuintje van Adam thinks this could be successful anywhere as mushrooms are a very accepted food for consumers.



Appendix 6 – Pamphlets (Method: Growing)



Lupin	
<i>A versatile bean: it can be eaten as a whole or can be processed in various products like hummus, bread or meat substitutes (23)!</i>	
Benefits	
	<ul style="list-style-type: none">• Lupin is constantly developed to fit cultivation in the Dutch climate better (24).
	<ul style="list-style-type: none">• Contains 10 g of essential amino acids per 100 g lupin, necessary for your body functions (25).• Lupin is very rich in minerals (25).
Remarks	
	Some types of lupin seeds are vulnerable to diseases that can limit cultivation.
Practicalities	
	<ul style="list-style-type: none">• Types to grow in NL: blue lupin, white lupin (23).• Join the Lekker Lupine cultivation program to become a lupin cultivator. They use the harvested lupin to create products such as coffee or meat replacers which can be sold to consumers.• A SKAL certificate is required to join this program.

Quinoa	
<i>Quinoa is known as a superfood that is easy to grow, contributes to food security and is very nutritious!</i>	
Benefits	
	<ul style="list-style-type: none">• Quinoa crops can tolerate dry/saline soil (26).• Quinoa can grow on nutrient-poor soil (26).
	<ul style="list-style-type: none">• Quinoa contains all essential amino acids that are necessary for the functioning of your body (25).• Quinoa is a source of minerals (25).
Remarks	
	Weed control can be difficult.
Practicalities	
	You can join the cultivation program of Greenfood50 to become a quinoa grower. They use the harvested quinoa to create meat alternatives like quinoa burgers.

Mushrooms	
<i>You probably already eat them occasionally, but do you know how nutritious they are? A very useful addition to a balanced diet. Some oyster mushrooms even have the same texture as meat!</i>	
Benefits	

 	<ul style="list-style-type: none"> • Can be grown on (food/agricultural) waste (27). • The energy needed ↓ Greenhouse gas emission ↓ (28). • The mushroom substrate can be reused for e.g., biogas and energy production (29). • Low in calories, high in protein, fibre, vitamins, minerals (28, 30). • Can prevent or reduce various human diseases (31, 32).
Practicalities	
<p>Does not take much space, can be grown at home, or through vertical farming. Very little effort is required for the growing process.</p>	

<h3>Soy</h3> <p><i>A type of bean with many different uses, like dairy and meat substitutes. Producing soy is good for the environment because it has a lower impact than animal products.</i></p>	
Benefits	
 	<ul style="list-style-type: none"> • Can be grown well in NL (33). • Does not require the use of fertilizer as it is a leguminous crop (33). • Adequate amount of essential amino acids, which are needed for your body functions (33). • Contains unsaturated fats, iron and vitamin B1 (34). • Good for blood vessels, because soy can lower cholesterol levels (33).
Practicalities	
<p>When cultivating soy, it should occasionally be rotated with other crops to keep a good soil quality</p>	

<h3>Microgreens</h3> <p><i>Small plants which are harvested when they are just germinated. They are used as a food supplement for visual improvement and improvement of taste and texture.</i></p>	
Benefits	
 	<ul style="list-style-type: none"> • Warmth used for production can be regained and used to heat water (35) • Lower burden on climate (35). • High in fibre and nutrients, low in calories (35). • Contain more nutrients than mature plants (35).
Practicalities	
<p>Microgreens grow in warm, light conditions. Growing microgreens is often combined with growing oyster mushrooms and is often done through vertical farming. However, you are also able to grow them in your kitchen! Very little effort is required for the growing</p>	

process as the microgreens can often be harvested after just one week.

Nut trees

Nuts are a good meat replacement and a handful of nuts each day is good for the body. With nuts, you can think about almonds, cashews, hazelnuts, pecans, pistachios and walnuts.

Benefits



- **Agroforestry:** trees can be planted anywhere so it is easy to combine with keeping cattle and other crops (36).
- CO₂: higher uptake, low emissions (37).
- Lower climate load and energy use than meat (38).
- Improved soil quality + biodiversity
- Nuts are high in high-quality protein, fibre, vitamins and minerals (39).
- Consumption of nuts can prevent cardiovascular diseases (38).

Practicalities

Chestnuts, walnuts and hazelnuts have the most favourable characteristics for growing, as they require minimal effort and are relatively cheap to acquire.

Algae

Algae are simple organisms, belonging to the oldest organisms on earth, doing photosynthesis. In the far East algae, mostly seaweed is commonly used as a nutritious food source.

Benefits



- For growing them, you don't need much fresh water, soil or fossil fuels (40)
- Good source of protein, iron, vitamin B1, omega 3- and 6- fatty acids which good for your brain (40)
- Contains iodine, calcium, phosphorus, magnesium, sodium, potassium, vitamin B (40)

Remarks



Not very profitable. The cost price is very high to such an extent that producing algae might not be economically profitable for everyone.

Insects

An alternative protein source is growing insects for human consumption. Producing insects is way more efficient and requires less effort than producing animal meat.

Benefits



- Less space than livestock (41).
- Cows: 25 kg feed->1 kg beef
- Insects: 2 kg feed->1 kg cricket meat (42).
- Greenhouse gas ↓ (42).
- Can be grown on waste (43).
- Can also be used for animal feed (41).
- Insect waste can be used as fertilizer (43).
- Good protein quality: high in essential amino acids that are necessary for your body's functions (44).
- Rich in nutrients: Protein, fat, minerals, vitamin B and fibre (45).

Remarks



- In EU: Only three insects approved for human consumption (46):
- Yellow mealworm larva
 - Migratory locust
 - House cricket

Practicalities

Breeding insects for human consumption requires registration at the Netherlands Food and Consumer Products Safety Authority (NVWA).

Appendix 7 – Pamphlets (Method: Educate)

Organise tasting sessions or educational sessions

Tasting sessions with new plant-based products or alternative protein sources can be organised to let customers taste the food and learn about its production and consumption.

Benefits

Tasting sessions are a good way to **get familiar with a product**; customers can **experience** the product before they purchase it. Taste is an important factor in deciding on the purchase, and the opportunity to taste the product will **reduce the fear of new food**. This is especially interesting for **new, unfamiliar products** like insects. Initiatives like this can **generate publicity** and **attract new customers**, which makes tasting sessions beneficial for both customers and the initiatives themselves (47).



- A smart way to generate publicity and attract new customers (47).
- Especially interesting for new ‘things’ like insects or other unknown protein sources. Taste is an important factor in getting consumers to change their diet (47).

Remarks



Costs time and money to organise.

Open farm for education visits

Visitors can walk around the farm and learn about the production processes and protein transition.

Benefits

Organisations like Kiek’nboeren want to **provide education** about food production, cycles, care and economy to kids and teens. They want to **create awareness** for the food that is produced locally and the work of farmers (48).



- With a small impact on a farm, it is possible to educate people about the protein transition on their farm (48).
- Creating awareness among kids and teens for locally produced food (48).

Remarks



- You need to be okay with people visiting your farm regularly.
- May cost effort to set up an education center

Practicalities

- An education centre that specifies protein education on farms does not exist yet in the Netherlands. However, inspiration can be drawn from ‘Kiekenboer’n’ (48)

Place information signs

Information and education can be given to people about the protein transition.

Benefits

Education on the protein transition can be nicely done with information boards. Those can be placed along the route at the entrance of a farm, in a community centre, restaurant or supermarket.



- Very low effort to place some information boards.
- Possibility to educate people about what is going on the farm or what is sold in a restaurant or supermarket.

Elementary school: 'Smaakmissie' about adventurous protein

Online program developed by Wageningen University to educate kids in elementary school about healthy and sustainable food choices.

Benefits

This online program **raises awareness** amongst children about different **existing alternative protein sources**. Children **interactively** gain knowledge. By telling their parents and their friends about it, this school program will spread information about plant-based or other alternative protein sources throughout all layers of society (49).



- Educating kids about healthy and sustainable food choices can help them to be more conscious and sustainable consumers in the future (49).
- Could be combined with other initiatives like a small mushroom farm to enhance the experience (49).

Practicalities

Easy, because it is online and **free of charge** for elementary schools.

Appendix 8 – Pamphlets (Method: Collaborate)

Join an alliance for more information

Different alliances exist where farmers or (small) businesses can become a member to get in touch with others with similar interests.

Benefits

By becoming a member of an alliance, farmers can gain more **information** about recent agricultural and societal developments. The application of this knowledge **connects farmers and society**. This connection can be profitable for the farmer and can involve citizens, which makes them aware of the origin of their food.



- Alliances can help and give insight into farming innovations
- Farmers can learn more about sustainable farming practices

Remarks



- Costs can be quite high to become a member.
- Some alliances are not a big commitment, but some might require some time investment.

Alliances to join

- Boert bewust
- De Nieuwe Boerenfamilie
- Food Valley

Restaurants working together with farms

Supply and demand can meet when restaurants join forces to acquire their ingredients from local farms.

Benefits

Restaurants can **join forces** in acquiring locally produced plant-based proteins (50). As farms often can only easily **produce large quantities** of produce, restaurants can be the perfect buyers for this produce. Making it **economically attractive** for the farms to produce these crops. Setting up a local plant protein trading system like this is also beneficial for the **environment** as food kilometres are reduced (50).



- Consumers are drawn to locally produced food as they can see how and by whom their food is produced.
- Restaurants can tell the story of the farmer to their visitors.
- Local food systems are good for the environment.

Remarks



Local systems like this are not readily existent in the Netherlands yet. Inspiration can be drawn from the *Lokaal Kilo's schuiven* initiative in Groningen.

Supermarkets and shops can work together with farms to sell local products.

Benefits

Farms often sell their products in their farm shops. However, as these shops are often located outside of the city centre, they do not get as much traffic as the bigger supermarkets and shops (51). These shops can start selling the local farms' products to bring them to the bigger public (51).



- Selling locally produced foods in supermarkets makes it easier for consumers to acquire these products.
- Farms might not have a lot of time to sell their products, handing this over to supermarkets saves time for them.

Remarks



Losing the small scale selling and connection to personal customers.

Appendix 9 – Protein content of different sources

Table 1. Protein content of different sources (25, 30, 34, 44, 52-54).

	Energy content (kcal/100 g)	Protein content (g/100g)
ANIMAL BASED		
Insects (dried)	410 - 509	7 - 48
Chicken filet	158	30.9
Minced beef	331	30.4
Minced pork	243	26.4
Cow's milk (full fat)	62	3.3
PLANT BASED		
Lupin	425.6	30.5
Soybeans (cooked)	251	21.5
Walnuts	708	15.9
Hazelnuts	717	14
Quinoa	428.7	13
Oyster mushrooms	28 – 36	0.92 – 4.92
Soymilk	38	3.3
Microgreens	15 - 25	2

Appendix 10 – Team contributions

We are a transdisciplinary team, and the different backgrounds enabled us to deliver this end product. Reddy's knowledge about plant pathology and entomology has helped us with writing about insects and the sustainability side of different crops. Next to that, the nutrition and health knowledge of Roos and Femke was useful for the health aspects of the different crops. Both Lidewey and Bente were able to share their knowledge on consumer behaviour and marketing and in combination with Ciska's knowledge on communication this allowed us to provide a thorough overview of these aspects in our recommendations. Furthermore, because of the knowledge of Ciska, Bente and Lidewey about performing interviews we were able to perform two semi-structured interviews and a few telephonic interviews. Moreover, they were also well able to share their knowledge with the others and therefore, Roos and Femke could also help with performing the interviews. Lastly, because of everyone's scientific knowledge, we were able to take on a critical attitude and find the right literature for our project.