

Policy options for sustainable protein consumption in the Netherlands

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Executive summary

Current global food consumption is a major contributor to a degradation in environmental, animal and human health. Population growth and the increased consumption of the Western diet are expected to intensify these impacts. In particular the dominance of meat and dairy in the Western diet is of upmost concern. Animal-based foods are rich in protein and certain micronutrients, but are more resource-intensive, because one gram of animal protein requires several times the amount of protein as animal fodder. The vast majority of experts agree that most countries need to reduce their animal protein consumption (drastically) in order to feed the world population in the future and create a less resource-intensive and polluting agricultural sector.

Some countries have already attempted to change food consumption within their countries. The vast majority of approaches have not proven to be effective enough for the sustainability challenges we face. The dominant approaches are based on psychological theory, behavioral economics or technological innovation, which focus on the individual or on technologies, thereby placing either too little or too much responsibility on the consumer and ignoring the full spectrum of relevant context. Within literature on sustainable consumption policy the notion of reflexive governance has gained attention. The idea is that governance for modern societies, and especially sustainability issues, need a way to deal with uncertainty, complexity, path-dependence, distributed control, and normativity. A practice approach has been brought forward by some prominent thinkers as a frame for understanding social change that focusses policy makers on these aspects of reflexive governance, whereas the dominant approaches often obscure them to an extent. This thesis, thus, adopts a practice approach to policy making, which transcends the individual and focuses on the what large groups of people

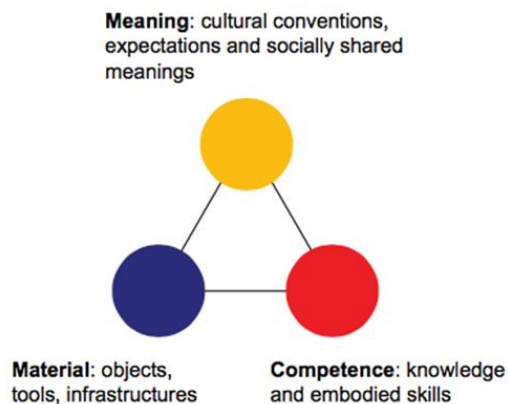
do (their practices). Such a framing, has been shown in previous research to shed light on different, sometimes more radical/innovative, intervention possibilities.

This thesis aims to find intervention possibilities for the Netherlands, through such a practice frame, with as main research question: *what are potential options for sustainable protein consumption and how can they be informed by sustainability governance?* The first sub question inquired about what principles for sustainability governance are according to a literature review (chapter 2). The second sub question inquired about the context of protein consumption in the Netherlands (chapter 4). Thirdly, the constraints and possibilities of relevant actors to contribute towards more sustainable protein consumption was investigated (chapter 5). And lastly, in chapter 6, it is explored how reflexive governance can be applied for more sustainable protein food practices.

Having acquired an understanding of the lock-in of the Dutch protein system and the possibilities for key actors, specific policy recommendations could be made. By using a practice approach it showed that the current low price, lack of attractive alternatives (and their marketing) and confusing labels are the main barriers in the material context of protein consumption in the Netherlands. At the same time animal-based foods are by many people still seen as an essential part of the meal, while plant-based alternatives are seen as less attractive. Also sustainability issues are not a high priority for most people, and therefore will not be a sufficient motivator. Furthermore, there is a lack of essential understanding of the impact of our food consumption, as well as a lack of skills on how to prepare more plant-based meals. A practice perspective allowed for a reframing of the sustainability challenge to: changing the elements of practices (material, meaning, and competence), substituting practices, and changing how practices interlock. As a result it became clear that in order to change the practice of eating, a wide variety of interventions has to be implemented simultaneously, in order to have the greatest likelihood of effect. Information provision, education is

necessary to address the current knowledge gap of the impact and skills to prepare a sustainable meal, but these efforts are likely to be less effective if the material context (labelling infrastructure, more attractive products, prices etc.) are not addressed. Simultaneously, most interventions require collaboration between different actors. Where some interventions can only be changed by (inter)national government (such as the tax system), most require the collaboration of retail, ngo's and health professionals in order to gain legitimacy and effectiveness.

In conclusion, a practice approach allows for a *systemic* approach to policy making, pointing the attention of policy makers to the whole spectrum of contextual factors: material, meaning and competence (see figure below). While some interventions are very similar to the outcomes of dominant policy framings, policy makers are stimulated to envision a more radical future and reflect more on their influence as policy makers. The strength of a practice approach, in my opinion, is mostly that it does *not constrain*, but *enables* policy makers to intervene in a manner that respects reflexive governance principles.



Figuur 1 Elements considered with a practice approach (Shove et al., 2012)

1. Introduction

Eating is one of the necessities of human life, but our current global food consumption is unsustainable. Not just increasing population growth, but also changes in diets have an increasing impact on the environment, our health and food poverty (Westhoek, Rood et al. 2011). On average, people's diets tend to change from a diet rich in starches towards a diet rich in fresh product, processed foods, sugar and animal products when a country becomes more industrialized and income increases (Kearney 2010). Our current food consumption (and therefore production) is the largest contributor to our transgressions of the safe operating space in our interaction with our environment (Steffen, Crutzen et al. 2007). Agriculture impacts the environment by replacing natural ecosystems with intensive agricultural practices, such as irrigation, the use of fertilizers and mechanization (Foley, Ramankutty et al. 2011). It is estimated that before the application of fertilizer on an industrial level, the world population was capped at about 3 billion people (Smil 2000). Both nitrogen and phosphorus in fertilizers are disrupting ecosystems, which leads to biodiversity loss (Rockström, Steffen et al. 2009). In addition to the use of fertilizer, 70% of freshwater, 20% of energy production (Smil 2000), and 30% of GHG emissions (Vermeulen, Aggarwal et al. 2012) in the world are caused by agriculture. The increase in agricultural land has resulted in the conversion of 70% of grasslands, 50% of savannas, 45% of temperate forests and 27% of tropical forests into land for food production with a total of 38% of all land on earth (Foley, Ramankutty et al. 2011). Currently species extinct 100 to 1000 times the natural rate, with land use changes and fertilizer use as a main driver (Rockström, Steffen et al. 2009). Also continuing deforestation leads to an increase in GHG gasses by diminishing the amount of buffer zones for CO₂ (Foley, Ramankutty et al. 2011). All these environmental impacts will be exacerbated by the projected demand for food, which is expected to increase between 60% and 110% (Aiking 2014).

Next to these environmental problems, currently 1 out of 9 people is malnourished (WFP 2015), with slightly less people being obese (WHO 2016). We are, however, producing enough food to feed our current world population, but much of it is wasted or unequally distributed (FAO 2015). It is expected that animal protein demand will rise and as a result more people will go hungry (including in developed countries)(Aiking 2014).

1.1 The case for reducing protein consumption

In particular reducing our protein consumption should be the main objective for achieving a more sustainable diet. The protein partitioning of the (rapidly spreading) Western diet is mainly based on animal protein (Westhoek et al., 2011). It is especially our consumption of animal foods that results in the highest impact of our agricultural system (HCN 2011, PBL, 2011, Odegard and Bergsma 2012, Aiking 2014, WRR 2014, Kramer and Blonk 2015). By eating animal products, we (on average) consume only 15% of the energy and protein that is fed to livestock (Aiking 2014). This means that 35% of all crops produced go to animal feed (Erisman, Cuijpers et al. 2015). In addition livestock is a potent GHG emitter through digestive processes in ruminants and manure (Bailey, Froggatt et al. 2014). It emits about the same quantity of GHG's as all vehicles, trains, ships and airplanes combined (Gerber, Steinfeld et al. 2013).

There also are reasons to believe that diets emphasizing plant products are healthier than diets rich in animal products, as was concluded by a meta-analysis by Katz & Meller (2014). The Dutch Health Council (2011) advises explicitly to limit the amount of animal protein consumption for most people and eat more plant foods. Though they simultaneously conclude that around 40-50% of the current EU livestock can still be consumed sustainably by making use of grasslands that are not suited for other kinds of agriculture and dairy cattle.

1.2 The Dutch case

In the Netherlands we are the seventh largest consumer of animal protein in Europe (Westhoek, Rood et al. 2011). There currently is a decrease in the amount of people who eat meat every day in the Netherlands, however this has not resulted in significant changes in the total amount of animal products consumed (Dagevos, Voordouw et al. 2012). Eating meat is still very normal in the Netherlands (Dagevos, Voordouw et al. 2012). However, a 50% reduction in current Dutch meat and dairy consumption would mean a reduction of 25% of current land use for Dutch food consumption (PBL 2013). If the Dutch followed a diet that focusses either on the more sustainable type of a specific animal's product or choosing for a less impactful animal source (chicken is better than beef), reducing protein consumption or substituting with plants, a reduction in all environmental categories between 32-55% is expected (Odegard and Bergsma 2012). These numbers show that even slight reductions can have a profound positive impact.

1.3 Policymaking for sustainable protein consumption

Recent policy recommendations (Vijver 2005, Bakker and Dagevos 2010, Dagevos, Voordouw et al. 2012, WRR 2014) argue that current policy for sustainable protein consumption barely exists and when it does it is often not effective enough. The literature about sustainability governance provides some insight in why dominant policy approaches are not as effective.

Various authors (Spurling et al., 2013; Keller et al., 2016; Walker, 2015; Shove, 2010; Spaargaren, 2011) agree that dominant policy approaches focus too much on the individual or on technology. The individualists approaches are based on psychological and behavioral economics literature. These approaches see individual choices as the main driver of social change, thereby placing too much responsibility on the individual and too little on contextual factors shaping consumer behavior. In the sustainable consumption policy literature, there is a consensus on the need for reflexive governance: a type of governance that

acknowledges the complexity, uncertainty, path-dependency, normativity and distribution of control that are inherent to the dynamics of modern societies and its government (especially for sustainability purposes) (Voss & Kemp, 2005).

In this thesis I will expand on the work of Spurling et al. (2013), by using Social Practice Theory as an alternative frame through which policy interventions can be formulated. Social practice theory allows an understanding that is in line with the principles for reflexive governance (Spurling et al., 2013; Shove et al., 2012). SPT focuses on the social, material and cultural context that is behind the behavior of large groups of people. I expect that a SPT approach will reveal new options for policy intervention as has been the case in a variety of previous case-studies (Spurling et al., 2013).

1.4 Main research objectives & questions

The aim of this research is, thus, to give policy-recommendations for sustainable protein consumption that acknowledge the principles for reflexive governance and go beyond the dominant approaches that focus too much on individuals or technology. The focus of this research will be on the Netherlands.

Main research question:

- *What are potential options for sustainable protein consumption and how can they be informed by sustainability governance?*

To answer the main research question I chose the following sub questions:

- *What are the principles of sustainability governance? (chapter 2)*
- *What is the context of protein consumption in the Netherlands? (chapter 4)*
- *What are the constraints and possibilities of relevant actors to contribute towards more sustainable protein consumption? (chapter 5)*
- *How can reflexive governance be applied for more sustainable protein food practices? (chapter 6)*

1.5 Structure of this thesis

In chapter three (literature review) I will go more in-depth into why dominant approaches for sustainable (protein) consumption are inadequate, and what principles should guide sustainability governance according to the literature and how to operationalize these principles.

Chapter four will be describing the barriers for sustainable protein consumption in the Netherlands, as based on literature. The context will be described by making use of a practice approach, focusing on the unsustainable practice of eating. The focus of this chapter is on describing the barriers that need to change if the current practice of eating will result in more sustainable protein consumption. To achieve this understanding, the barriers for sustainable protein consumption in the practice of eating are described according to the practice's three constituent elements: material, meaning and competence. The information for this chapter will be based on a literature review. I aim to base this chapter on research from different disciplines, adhering as much as I can to the strategy requirement for reflexive governance *integrated knowledge production*.

Chapter five will be a description of the relevant actors and their capacities and willingness to promote sustainable protein consumption according to expert interviews. This chapter will be entirely based on expert interviews. The experts will be selected from as wide a variety of actors as possible, to adhere to the principles of reflexive governance (integrated knowledge production, as proposed by Voss & Kemp (2006)). The questions that have been asked inquire into the power dynamics in the Dutch protein system, capabilities of actors and normative stances about responsibility:

- What are the relevant actors necessary to make our protein consumption more sustainable?
- What can these different actors actually do?
- How willing are these actors to change their practices?

Chapter six, will be the formulation of policy interventions through a practice lens (based on the findings of chapter three and four). Policy recommendations will be made through a practice lens, making use of the three frames as coined by Spurling et al. (2013): recrafting practices, substituting practices and changing how practices interlock (see table 2). The formulation of interventions through these frames will be based on chapter five and six. These chapters give an understanding of both the context and barriers of the unsustainable practice and the constraints and possibilities of relevant actors.

Table 1 Policy framings from a practice perspective (Spurling et al., 2013)

Policy framings from a practice perspective	
1. Re-crafting practices	Reduce the resource-intensity of existing practices through changing the components, or elements, which make up those practices.
2. Substituting practices	Replace less sustainable with more sustainable practices. How can new or alternative practices meet the same needs and wants?
3. Changing how practices interlock	Social practices interlock with each other—for example: mobility, shopping and eating. How can we harness the complex interactions <i>between</i> practices, so that change ripples through interconnected practices?

And finally, chapter seven, will be a reflection of the findings of the study: reflecting on how well a SPT approach allow more reflexive governance, and a reflection on the research process as a whole.

1.6 Relevance for industrial ecology

This thesis is written for a master’s degree in Industrial Ecology. Industrial Ecology is a systems perspective that is about analyzing how industrial activity can be made more sustainable, functioning more like an eco-system. Industrial ecology is originally about ‘local, regional and global uses and flows of materials and energy in products, processes, industrial sectors and economies and focuses on the potential role of industry in reducing environmental

burdens throughout the product life cycle' (IS4IE 2015). By studying the environmental impacts of flows, products and processes industrial ecology has provided an understanding in the impact of many consumer activities, among which the impact of our food and specifically protein consumption.

More recently the field of Industrial Ecology is getting more and more involved with how to affect social change, next to assessing the environmental impact. The desire and necessity of understanding how social change can be effected is seen as a good fit with the already interdisciplinary and systems approach that is Industrial Ecology (Tukker, Cohen et al. 2010). This thesis aims to contribute to this understanding of social change.

2. Governance for sustainable consumption: a literature review

This chapter aims to answer the first sub question: *what conceptualization of social change is most appropriate for sustainability issues?* Through a literature review I concluded that much of the dominant policy interventions for sustainable development could be improved, because they are based on understandings of social change that reduce complexity too much. To be able to do more justice to the complexity of consumer behavior, I agree with some authors that a more reflexive approach to governance is necessary and that social practice theory (SPT) provides a promising operationalization of the principles of such a reflexive type of governance. But let us first explore the problem with the most dominant policy approaches for sustainable consumption.

2.1 Dominant policy approaches for the sustainability challenge

Policymaking for sustainable consumption is mostly based on theories from psychology, behavioral economics and technological innovation studies (Spurling et al., 2013). The frame of ‘innovating technology’ assumes that technological innovation will result in reduced resource intensity of consumer behavior, while leaving our way of living unaltered. However, it is uncertain and doubtful that technological innovation will bring sufficient improvement in resource use, (Shove and Walker 2010, Hargreaves, Longhurst et al. 2012). Such a frame also ignores much of the complexity of reality, such as rebound effects and social relations. As Spurling et al., (2013: 18) put it: ‘new technologies result in modified or new practices, and so the impact of new technologies on existing patterns of consumption is unpredictable’.

The frames of ‘shifting consumer choices and changing behavior’ have their roots in psychology and behavioral economics. Both frames focus on individuals. The psychological approach understand change in consumption as the result of a

change in the values and attitudes (A) of an individual, which drive behavior (the B) that individuals choose (the C) to adopt' (Shove 2010). Much emphasis is thus on voluntary action of the individual, laying almost all responsibility with the individual. This 'ABC' approach assumes that consumers make rational decisions based on a products price and information and results in two types of policy strategies: persuasion attempts to influence people's attitudes and values towards more sustainable ones and the removal of barriers that obstruct acting on these attitudes (Shove, Pantzar et al. 2012). These interventions focus on the price of products, information provision and social learning/marketing (Spurling, McMeekin et al. 2013).

The main criticism of the ABC approach is the prevalent value-action gap: the fact that people do not simply act according to their attitudes (Shove, 2010). This gap exists, because the ABC does not explain how social phenomena, such as cultural conventions, shared understandings, learned competence, and access to resources influence consumer behavior (Spurling et al., 2013). People have a socially shared understanding of what a proper meal is, which is historically shaped by 'the organization of the food system, domestic technologies, cultural representations and previous policy interventions' (Spurling et al., 2013: 17).

Policy making from an ABC perspective, might only increase environmental awareness (Spaargaren 2011), while ignoring the ways governments sustain unsustainable institutions and ways of life (Shove, 2010: 1274). To move beyond the ABC 'it would be necessary to reopen a set of basic questions about the role of the state, the allocation of responsibility, and in very practical terms the meaning of manageability' (Shove, 2010: 1283).

Behavioral economics or the 'nudge' approach, is the other strand of knowledge that underpins the two individualist frames (shifting consumer choices and changing behavior). This approach has been made famous by Thaler & Sunstein's book *Nudge* (2009), This theory's main premise is that people are predictably irrational (Kahneman 2012) and that understanding these irrationalities makes it

possible to optimize the environment of consumers, making people (often unconsciously) choose the greener option. An example of nudging would be making the lunch options at a canteen by default vegetarian or vegan, unless someone asks for the version with meat. Such nudging approaches are shown to be effective to a certain degree, but is however deemed insufficient to deal with more radical behavioral change, (HOL-STSC 2011). Also on a moral level there is a discussion about whether it is legitimate for governments to manipulate choices behind consumers backs to this degree (Shove, Pantzar et al. 2012, Keller, Halkier et al. 2016).

The lack of results of policy made from dominant framings, demands a different approach. For the protein problem there is also a consensus that government should do more than just focusing on individual choice or technology, by doing more justice to the complexity of consumer behavior and the requirements for governance in modern, networked, societies (Aiking, 2014; Bakker & Dagevos, 2010; Westhoek et al., 2011; WRR, 2014). In the next section, I will argue that social practice can provide such an understanding of social change in our current day and age.

2.2 Social practice theory as a more reflexive form of governance

To illustrate the benefits of a practice approach for understanding how more sustainable (protein) consumption can occur, I want to place the discussion in a broader context first. In the next parts I will propose that we are currently in need for reflexive governance, and that a social practice approach better explains how social change occurs, because it respects these principles for modern-day governance.

2.2.1 Reflexive governance

Reflexive governance is an idea coined by Voss & Kemp (2005), and will provide guidelines for a search for a better understanding of how change happens. To my understanding this idea of governance is widely shared among researchers in the field of sustainability governance, even though it is not always called the same. Reflexive governance is based on the idea that modern day societies are different than just after WWII. The period just after WWII (1950s/60s) has been coined simple modernity: a society where the national government is the sole governor of society and capable of *managing* on the basis of primarily the scientific rationale (Beck, Giddens et al. 1994). In contrast, our current society (reflexive modernity) refers to a society that is increasingly aware of the negative side effects of its own activities (such as the consequences of agricultural intensification and a diet shift towards more animal consumption) (Spaargaren et al., 2012). In reflexive modernity (a description of modern day society) the nation-state has lost much of its managing potential due to increased complexity of society (largely as a result of globalization) and trust in experts and scientific knowledge has decreased (Spaargaren, Oosterveer et al. 2012). From a situation where governments mainly controlled consumption, currently consumers, producers, ngo's and especially retailers have more capacity to influence consumption patterns than ever before (Spaargaren 2008).

Governance in modern society is thus more complicated than a few decades ago and sustainability issues such as the protein problem are especially complex, 'wicked' problems. A wicked problem can be defined as 'problems in which there is neither agreement on the norms and values at stake, i.e. the goal of policy, nor on the knowledge that is needed to solve the problem, i.e. the means of policy' (Pesch and Cuppen 2015).

According to Voss and Kemp (2005) reflexive *governance* is needed to deal with issues facing modern day societies (especially for sustainable development). Voss

and Kemp (2005) define reflexive governance as a form of governance that aims to prevent unintended consequences from their own policies, by anticipating long-term effects, and creating opportunity for feedback. Reflexive governance is aimed to address five challenges for governance for sustainability: complexity, uncertainty, path-dependency, value tradeoffs (sustainability is a subjective concept), and distributed capacity for action (see table 2). To overcome these problems Voss & Kemp propose five strategies: 1) trans-disciplinary knowledge production, 2) experimentation and adaptivity of strategies and institutions, 3) anticipation of long-term systemic effects, 4) iterative participatory goal formulation and 5) interactive strategy development. The first three strategies provide a way to better understand the system (society), whereas the latter two deal with goal formulation and strategy implementation. Each of these strategies will be explored a little more in-depth below.

Table 2 Strategy requirements for reflexive governance (adapted from Voss and Kemp 2005)

Aspect of problem treatment	Specific problem features	Strategy requirement
System analysis	<i>Complexity</i> : co-evolution of heterogeneous elements across multiple scales (society, technology, ecology)	Trans-disciplinary knowledge production
	<i>Uncertainty</i> and ignorance about transformation dynamics and effects of intervention	Experiments and adaptivity of strategies and institutions
	<i>Path-dependency</i>	Anticipation of long-term systemic effects of measures
Goal formulation	Sustainability goals involve <i>value trade-offs</i> and are endogenous to transformation	Iterative participatory goal formulation
Strategy implementation	Capacities to influence transformation are <i>distributed</i> among actors	Interactive strategy development

Complexity requires transdisciplinary knowledge production

Sustainability issues are inherently complex; they are about the relationships between society and nature, which comprises many different systems and feedback loops. For example, the impact of our current protein consumption has negative consequences for land, water, biodiversity, climate change, all part of complex interactions between nutrient flows and feedback loops. At the same time 'what and how we eat is about tastes, sociability and conviviality, cultural conventions (e.g. a 'proper meal'), competency, routines (e.g. three meals a day) and income' (Spurling et al., 2013: 35). Additionally, many actors influence food consumption: policy makers, retailers, producers, ngo's, (celebrity) chefs etc. (Vijver 2005, Bakker and Dagevos 2010, Spaargaren, Oosterveer et al. 2012).

This complexity makes it impossible to identify cause and effect of an intervention (including its unintended consequences). However, policy makers and researchers should acquire an understanding of what is necessary for large-scale change as best as they can. Voss & Kemp (2005: 9) argue that conventional science cannot deliver the required knowledge about the 'interlinked and complex nature of reality'. The specialized disciplines for the scientific method necessarily decrease complexity. To overcome too much reductionism and reliance on formal scientific knowledge, interdisciplinary science and non-scientific, experiential knowledge are needed. Knowledge acquired through practical experience can be knowledge that is hard to attain with the scientific method.

Uncertainty requires experimentation and adaptivity

Sustainability issues cannot be predicted due to the above-mentioned complexity of such problems, creating a lot of uncertainty about possible outcomes of interventions. Small changes can cause large changes down the line (also known as the 'butterfly effect'). To deal with non-linear systems we should accept uncertainty by aiming to be as *adaptive* as possible, making room for mistakes and learning (Voss & Kemp, 2005). Experimentation, monitoring and evaluation

are necessary to 'systemically work with new experiences, altered interpretations and changed circumstances' (Voss & Kemp, 2005: 11).

Path-dependency requires anticipation of long-term effects

However unpredictable the effect of government interventions might be, this does not mean that one should not try to inform oneself of possible scenarios (albeit with a healthy skepticism). Current states of affairs are still the result of past developments. Future developments are therefore influenced by the current situation, because 'cognitive, institutional, technical and economic patterns work as a selection environment for innovations and future change' (Voss & Kemp, 2005: 12). Therefore a variety of development paths should be anticipated through modelling the future, making a more informed decision.

Normativity of sustainability requires participatory goal formulation

Sustainability does not mean the same for everyone. How can we intervene in a consumption pattern when we do not agree what sustainable consumption actually is? Let us first define sustainable development in the terms of the often-used Brundtland definition: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. This variety of perspectives on what sustainable development (and a sustainable diet) is means that broad participation of affected societal actors is necessary: participatory goal formulation in the words of Voss & Kemp. Also new information and the dynamic nature of perspectives and values make it necessary that sustainability goals should be reassessed regularly.

Distributed capacity requires interactive strategy development

Who can actually influence what we eat? Voss & Kemp (2005) argue that in modern society the state has lost its relative monopoly of authority and a wide variety of actors can influence society. Even within the state increasing

specialization has occurred, resulting in a wide variety of governmental agencies, which often do not have the same perspective on sustainable development. Sustainable development goes beyond the control of a single party, because these issues 'touch upon fundamental institutional and technological structures of modern society' (Voss & Kemp, 2005: 15). Voss & Kemp conclude that in order to bring about socio-ecological change we need to coordinate a variety of relevant actors, which requires policy makers to interact with them and work together in the formulation and execution of the strategy.

2.2.2 Social practice theory

Social practice theory seems to be able to provide an understanding of social change that allows for system analysis, goal formulation and strategy development according to the principles for reflexive governance (Shove, 2012; Spurling, 2013).

Social practices are socially recognizable activities (things we do and say), such as shopping, cooking and eating. To perform a practice (for example cooking) you need materials (e.g. food, kitchen (utensils), etc.), competence (cooking skills, knowledge about recipes etc.) and meanings that are socially shared (what constitutes a proper meal) (see table 3). The profound distinction with theories of practice and theories of behavior is that the first sees people as the carriers of a practice and the latter as autonomous agents of choice and change (Shove, 2010). A practice can thus change due to any interaction of its constituent elements with other (elements) from practices. They are dynamic and emergent and therefore our practices are to a large extent beyond individual control. Consumption in itself is according a practice approach not a practice, but 'a moment in almost every practice' (Warde, 2005: 137).

Table 3 The elements of a practice (Shove et al., 2012)

Materials	Objects, tools, infrastructures
Competence	Knowledge and embodied skills
Meanings	Cultural conventions, expectations and socially shared meanings

A practice (for example cooking) exists only through the performance of the activity, which is dependent on the required materials (including technical space and infrastructure, in the case of cooking, utensils, kitchen, food etc.), meaning (interpretation of a practice, such as ideas about a proper meal), and competences (cooking skills, knowledge of recipes etc.). The more a practice is performed the more normal it becomes.

By focusing on practices, we move beyond the dichotomous approaches of individual behavior or supply, but instead pay attention to ‘both behaviors and their material, social and cultural contexts’ (Spurling et al., 2013: 19). Instead of focusing on the observable behaviors of individuals, a practice approach focuses on behaviors that are recognized and shared by many members of society (figure 1). See tabel 4 for differences between a practice approach and the a behavioral theory approach. Whereas the individualist (ABC or nudge approach) focus on what people know, do, think and feel, a practice approach focuses on the interrelations of material, legal, social, economic and cultural nodes that shape the way people do what they do (Vihalemm et al., 2016). A practice approach moves beyond the individual by stressing that there large groups of people have the same patterns of behavior, instead of emphasizing individual differences.

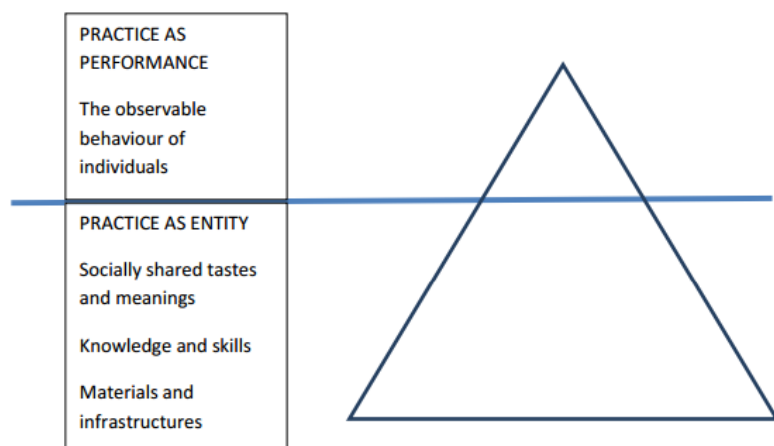


Figure 1 Practice as performances are only the tip of the iceberg (Spurling et al., 2013)

Table 4 Vihalemm, Keller & Kiisel (2015), based on Ajzen (1991), Stern (2000), Shove (2010), Shove et al (2012), Hargreaves (2011) and Evans et al (2012)

Changing individual behavior	Changing social practices
Basic unit of analysis	
Individual	Social practice as an organized bundle of activities, doings and sayings
Nature of human activity	
Mostly rational, calculated and reflective	Often non-rational, ambivalent, often semi-automatic, habituated
Linkage between activity components	
Linear (from attitude to behavior)	No linear connection; possible value action gap
Agent	
Individual	Collective (e.g. the household). Emphasis on social relations and interaction between people (including power relations). Attempt to define relevant parties involved in problematic practices
Drivers of action	
Individual choice, decision	A network of different factors related to practice (relations, material objects, events)

Source of social change	
Individual choices, decisions that change their behavior	Change of practices as collective social entities (braking old ties between practice elements and the creation of new ones)
Role of environment (including institutions and infrastructure)	
Environment as a barrier or motivator for desired individual behavior. External context to behavior	Environment as integral to practice. Constant co-involvement and interaction of everyday life and institutional and socio-technical environments/systems
Position of policy and other interventions	
An external force that has an impact on factors and drivers of behavior	No external force; embedded in the systems of practice; policy influence by the same practices it seeks to influence
Means and instruments	
Mainly texts and symbols; raising awareness, dissemination of knowledge and shaping of attitudes	Focus on bodily and material elements, things and infrastructure (touch-points), as well as regulation. Creation of an environment (both material and symbolic, social) which impedes the spread of undesired practices or favors the desired practices
Transfer of experience and lessons	
Clear universal mechanisms, universal laws. The same question –the same answer regardless of context	Historical, cultural, social specifics of each case. Transfer of experience very limited. New context – new answer to the same question

Spurling et al. (2013) distinguish three ways to look at policy making from a practice perspective: re-crafting practices, substituting practices and changing how practices interlock.

Recrafting practices is about changing the elements of practices. This can mean discouraging or encouraging certain unsustainable elements or intervening in temporal patterns of a practice. The resulting types of interventions might be similar to the ones from policy frames 1-3; such as educational campaigns (meaning and competence) or changing supply (material context). However by

using a practice frame a more systematic approach is taken and a better understanding of the relationships between different elements is facilitated.

Substituting practices is about replacing unsustainable practices with more sustainable practices, or discouraging the performance of unsustainable practices. Practices compete for time, space and resources. Through identification of these patterns and trends policy makers can intervene.

Changing how practices interlock is the third way policy-makers can frame policies. Infrastructure and institutions shape where and when practices are performed. Changing how practices interlock is changing the spatial or temporal organization through institutional and/or infrastructural change (table 5).

Table 5 Contrasting a practice-based policy frame with dominant framings (Spurling et al., 2013)

Dominant policy framings guiding interventions	
1. Innovating technology	Reduce the resource intensity of existing patterns of consumption through technical innovation
2. Shifting consumer choices	Encourage consumer to choose more sustainable options
3. Changing behavior	More broadly, encourage individuals to adopt more sustainable behaviors and discourage them from less sustainable behaviors.
4. Re-crafting practices	Reduce the resource-intensity of existing practices through changing the components, or elements, which make up those practices.
5. Substituting practices	Replace less sustainable with more sustainable practices. How can new or alternative practices meet the same needs and wants?
6. Changing how practices interlock	Social practices interlock with each other—for example: mobility, shopping and eating. How can we harness the complex interactions <i>between</i> practices, so that change ripples through interconnected practices?

One of the major challenges of adopting a practice approach to policy-making is selecting the relevant practices and setting boundaries (Spurling et al., 2013; Keller et al., 2016). A distinction can be made between integrative practices and compound practices. Integrative practices are ‘the more complex practices found in a particular domain of social life (such as cooking, farming etc.)’ (Schatzki, 1996: 98, in Vihalemm et al., 2016). These practices have a higher density and stronger coordinated than compound practices, making them more difficult to change but easier to analyse (Vihalemm et al., 2016: 40). Eating [can be seen as the compound of] four relatively autonomous integrative practices’ (Warde, 2013: 25, in Vihalemm et al., 2016). Compound practices are less tightly coordinated than integrative practices, making them harder to analyze, but easier to change.

A practice based approach to policy-making, focusing on the compound practice of eating, will be used for the analysis of this thesis. In the next chapter (the methodology), it will be explained how the practice approach has been operationalized to explore policy options for sustainable protein consumption.

2.3 Summary

The literature review conducted for this chapter revealed that reflexive governance is needed for sustainability governance, and that some authors suggest that social practice theory allow for more reflexive governance (for sustainable consumption). A social practice approach will therefore be used in the upcoming chapters. In chapter three the context and barriers for sustainable protein consumption in the Netherlands (problem definition) will be described with use of the concepts of SPT (material, meaning and competence). This will allow for a systematic analysis that takes into account a broader spectrum of the context of behavior than the dominant approaches do. In chapter four it is investigated what actors have the capacity and willingness to promote changed consumption patterns. Therefore the strategies for reflexive governance, as proposed by Voss and Kemp (2005) will be adhered to: a wide variety of experts

will be interviewed to adhere to get a variety of inputs on the problem, doing more justice to the complexity of the protein problem and the normative aspects of sustainability problems. In chapter five, the practice frames as proposed by Spurling et al. (2013) will be employed to come up with my own interventions based on the identified barriers in chapter three and the capacity and willingness of relevant actors as revealed through the expert interviews from chapter four.

3. Methodology

In this chapter I will explain the methods of data collection and analysis used for this thesis.

To answer the first sub question '*what are the principles of sustainability governance?*' I chose to conduct a literature review. The aim of the literature review was to achieve an understanding of guiding principles for sustainability governance and to find some operationalization of those principles that are considered promising in this academic field. The literature was selected based on recommendations from my supervisors, as well as an investigation of the references in these papers. Additionally a google scholar search into the topic revealed various other relevant resources. The used resources exist of peer-reviewed journals, books, as well as some reports of research groups. It became clear that a complex systems approach to governance was seen as most desirable in the literature. Principles of reflexive governance applied such a systems approach to sustainability policy making. To operationalize these foundational principles, social practice theory seemed to provide potential for a more systemic analysis to base policies for sustainable consumption on. This thesis mainly explores the usefulness of SPT from a system analysis perspective. A SPT approach does not translate directly into recommendations for goal formulation and strategy implementation (the two other pillars of reflexive governance), but it is expected that it will provide insights and recommendations in the end.

In chapter three the second sub question will be answered: '*what is the context of protein consumption in the Netherlands?*'. The concepts of practice theory will be used to analyze eating meat and dairy. The emphasis will be on the barriers for more sustainable performances of eating in the Netherlands. The data used for this analysis is based on scientific reports, articles and books about protein and food consumption in the Netherlands. Relevant quality resources were identified by the using some recommended literature from supervisors/external experts

and google scholar searches. It often proved useful to use the references and suggested literature from key resources. In addition expert interviews were used as verification of what the most important barriers are. More on the selection of the respondents in the next paragraph.

The understanding of the lock-in for sustainable protein consumption as provided in chapter four, raises question about who actually can do something (and what?) in order to stimulate more sustainable protein consumption in the Netherlands. The following research question was therefore answered in chapter five: *what are the constraints and possibilities of relevant actors to contribute towards more sustainable protein consumption?*

In order to answer this question, experts with in-the-trenches experience and knowledge about the relevant actors and the dynamics of the Dutch protein system were consulted. Such information was assumed to be more up-to-date, but could also provide a better understanding due the interactive nature of interviews. The selection of the respondents was aimed to comprise all relevant actors (thereby adhering to the reflexive governance principle of integrated knowledge production). The actors were however not randomly chosen, but selected based on the network of my internship supervisor Ingrid Odegard at CE Delft, as well as some experts found through relevant reports/literature. Experts from the retail sector were chosen for their practical understanding on influencing consumer behavior. It was decided to interview an expert with knowledge about the capacity and willingness of supermarkets to move towards more sustainable protein provision. Also an expert from the culinary sector (a chef with a broad knowledge and experience of sustainability initiatives) was chosen to represent the other side of the retail sector. Producers of protein-rich foods were also asked for their perspective on the protein problem and its solutions. The aim was to interview both producers of sustainable alternatives to animal protein, and the dominant animal food sector (but the only the first group proved easy to make an appointment with). Thirdly, Ngo's were selected because

of their expertise on creating awareness and movements for more sustainable food. The Ngo experts interviewed, was chosen for a particular strong involvement in food and sustainable protein campaigning. Fourthly, various researchers were selected either for their knowledge of the environmental impact of different protein foods and/or their knowledge of consumer behavior and policies on the subject. Policy makers were interviewed. It was chosen to interview policy makers involved with food consumption (and protein in specific) from inside the Netherlands as well as a neighboring country (in this case Belgium). This decision was made, because it was expected to enlighten possible differences or similarities between these countries. Lastly, a respondent from a government agency was chosen for his expertise on communicating nutritional guidelines that combine both health and sustainability recommendations to consumers. See appendix 1 for an overview of the questions asked.

Eventually the composition of the respondents was as follows:

Table 6 Respondent distribution

Expert category	Number of respondents
Retail	2
Producers	2
Ngo's	3
Researchers	5
Policy makers	2
Other government agencies	1

As you can see, the distribution of respondents is not evenly spread, but the goal of data collection of this chapter is to get as much quality interviews from a wide variety of expert perspectives. These perspectives are opinions and can therefore not be viewed as facts, however there was such a great degree of consensus among the respondents and a high level of expertise, that I think the interviews are very valuable. The interviews were semi-structured in nature to leave room

for follow-up questions. The conversations were recorded, summarized and sent for review to the respondents (the full summaries can be found in the appendices).

I decided that the understanding of the barriers to sustainable protein consumption and the possibilities and constraints of relevant actors it was possible to give policy recommendations in chapter six, thereby providing the foundation for answering the main research question. To approach policy making for sustainable protein consumption from a more reflexive perspective, this chapter makes use of a practice frame. Therefore I made use of three different practice frames as coined by Spurling et al. (2013): recrafting practices, substituting practices and changing how practices interlock (see 7). The aim of this chapter was to be specific, concrete examples of types of interventions, as well as how to implement them by collaboration with different actors (therefore adhering to the reflexive government strategy requirement of participatory strategy development).

Table 7 Practice framings (Spurling et al., 2013)

Policy framings from a practice perspective	
1. Re-crafting practices	Reduce the resource-intensity of existing practices through changing the components, or elements, which make up those practices.
2. Substituting practices	Replace less sustainable with more sustainable practices. How can new or alternative practices meet the same needs and wants?
3. Changing how practices interlock	Social practices interlock with each other—for example: mobility, shopping and eating. How can we harness the complex interactions <i>between</i> practices, so that change ripples through interconnected practices?

And finally, in chapter seven, the main research question is answered: ‘*what are potential options for sustainable protein consumption and how can they be informed by sustainability governance?*’ To do so, the analyses of chapter four, five

and six are used. Furthermore, this chapter will answer the last sub question: *'how can the principles of reflexive governance be applied for sustainable protein food practices?'*. And lastly, a reflection of the findings of the study will be given: reflecting on how well a SPT approach can illuminate more reflexive policy options, and a reflection on the research process as a whole.

4. Eating animals in the Netherlands

In this chapter I will analyze the current practice of eating. I will emphasize the eating of animals, as this is the practice with the highest contribution to the protein problem. Eating animals is for instance much more prevalent than eating a plant-based meal. This chapter will focus on the lock-in that the current practice of eating animals provide for more sustainable alternatives.

To analyze the practice of protein consumption I have used various sources of literature. I have used recommended resources (and their bibliographies) as suggested by the respondents.

To organize the information from the literature I employed the practice concepts of material, meaning and competence (as coined by Shove et al. (2012)). By doing this, I argue that a more contextual understanding of the barriers for sustainable protein consumption in the Netherlands will emerge, than one that is possible by relying on the dominant approaches.

4.1 Material context

Animal food consumption is a prominent part of almost every meal for most of the Dutch. Dinner is currently the most important moment for meat, fish, legumes and egg consumption (RIVM 2016). People who eat meat every day at dinner only constitute 18.4% of the population in 2012, compared to 26.7% in 2009 (Dagevos, Voordouw et al. 2012). However, animal foods are for the vast majority still part of (almost) every meal (RIVM, 2016). Meat is eaten on 90% of the days by people, dairy products as well more than 85% (RIVM 2016) (see for a comparison with other food groups figure 2). Other protein sources such as legumes and fish were only consumed on respectively 4 and 13% of the days of a year (RIVM 2016).

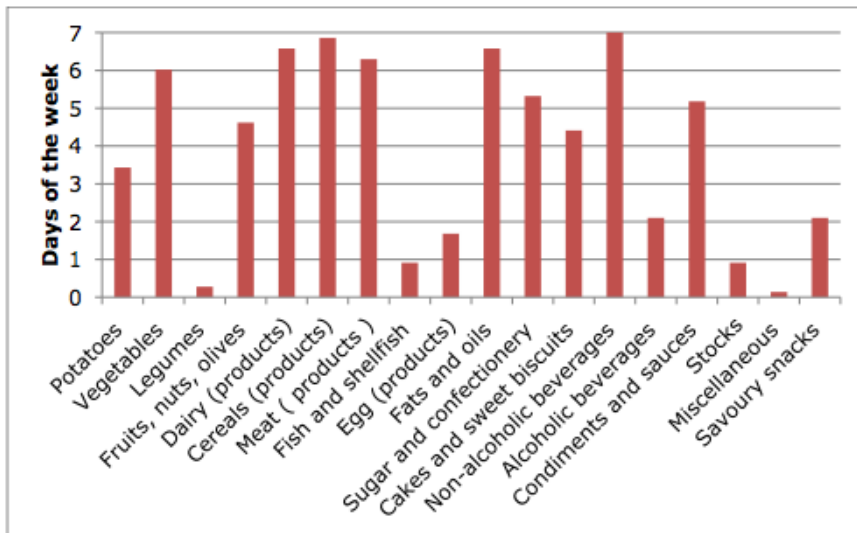


Figure 2 Frequency of consumption of different product group (RIVM, 2016)

My review of the literature has revealed that relatively low prices of animal foods, the emphasis of retail on animal foods, and unregulated information infrastructure are the major factors locking us into current unsustainable protein consumption habits. Each is discussed below.

The price of animal foods

Marika Vijver (2005) explains in her dissertation about protein policy in the Netherlands that at the beginning of the nineteenth century animal foods were scarce and expensive. This was the result of rapid population growth in the nineteenth century. During the second half of the nineteenth century, potato disease and food shortages resulted in more active government involvement in agriculture. Export and free trade were seen as the solution to the problem, which led to more and cheaper animal products at the end of the nineteenth century. Because of higher demand for food, food production became more mechanized and large-scale. The emergence of the food processing industry during the end of the nineteenth century was the result of the realization that you could add value to whole foods by processing them into new products. Raw meat

conversion into other products proved to be a particularly profitable venture. At the end of the nineteenth century, more (variety) in food was available and eating meat on a Sunday had become affordable for many.

From 1895 until 1950 government policy continued to emphasize and protect export interests. Agriculture increasingly depended on export. The profitability of agriculture led to the so-called 'OVO' (Onderzoek, Voorlichting en Onderwijs, which translates to Research, Information, Education) policies, which consisted education, research and consultation to promote agricultural trade. As a result, agriculture became more specialized and rationalized. Other government food interests (such as health and small farmers) existed, but agricultural trade interests remained dominant. Animal food production proved to be more lucrative than plants its price slowly continued to decrease, while its availability grew.

Price and availability would seem to be the only reasons people would refrain from eating meat on a daily basis, according to Vijver. When between the 1950s and 1970s incomes roughly tripled, eating meat became affordable on a daily basis. During the period 1950-1970 new cooling technologies made transportation of perishable products (such as animal products) and storage possible, which also reduced its price. During the period 1992-2001 livestock production continued to be intensified. People started to consume more pork and chicken and less beef and consumed meat at an average of 5-6 days a week. Cheese, eggs and fish consumption also increased during this period. After 1992 the ratio of plant to animal protein did not change significantly anymore. Dairy and meat consumption recently have slightly declined from 2007 to 2014 (RIVM 2016). Between 1995 and 2011 the decline in meat consumption has been 3 kg/capita per year (Dagevos, Voordouw et al. 2012). The amount of people who eat meat every day has also decreased from 29 to 7% in the past 5/6 years (Dagevos, Voordouw et al. 2012). The current Dutch protein intake is one of the highest in Europe, partly because of our relatively large consumption of dairy

products (mainly cheese). We consume the third highest amount of dairy in Europe, following Sweden and Finland (Westhoek, Rood et al. 2011). Our current protein consumption consists for 29% out of meat(-products), 23% dairy, 4% fish, 22% wheat(-products), 3% potatoes and 3% nuts, accounting to 60-75g/day for women and 61-98g/day for men (RIVM 2016).

Growing welfare, and increased availability made animal products relatively cheaper throughout the years. Meat, fish, eggs and dairy have become 35% cheaper (in real terms) than in 1960 (CBS, 2010, from Westhoek et al., 2011). The share of household expenditure for meat also recently has decreased for instance from 5.1% in 1996 to 3.7% in 2007, because the price of meat did not rise as much as other consumer goods (Westhoek et al., 2011). In 2011 in the Netherlands, only between 2.1% and 2.6% of the food budget was spent on meats, which is relatively low compared to 4-5% in Italy, France and Spain and 9% in Romania (Westhoek et al., 2011).

Westhoek et al. (2011) showed that a higher income (and therefore, more relative cheapness of animal products) is the most significant explanation of higher consumption of animal proteins. At the same time a relatively low price is one of the main motives for people to eat meat (Verain, 2015). The type of animal product consumption, seems to be less related to income, and more cultural specific (Westhoek, Rood et al. 2011). In the Netherlands the relatively lower meat consumption compared to the other EU-15 countries is compensated by the third highest dairy consumption in Europe; almost 50% more than the EU average is consumed in the Netherlands (Westhoek, Rood et al. 2011).

Retail and production emphasis on animal products

In the section above it was illustrated how the more unsustainable animal foods have become widely available for relatively low prices. Simultaneously, alternatives are not present in the same amounts, varieties and against the same low prices (Bakker & Dagevos, 2010, PBL, 2011). Dagevos et al (2012) en De

Bakker and Dagevos (2010) conclude that a lack of retail marketing for alternatives, and the sheer lack of availability (of ready-made) of sustainable protein foods and meals in retail is limiting the normalisation of more sustainable eating habits, because unfamiliarity of alternatives leads to misconceptions about taste of these alternatives.

Also according to consumers themselves the relatively higher price of meat replacements is a barrier for them to eat a more sustainable diet (PBL 2014). The Dutch government also states that more alternatives to animal protein are necessary (Dijksma and Schippers 2015). Currently the government promotes the development of alternatives through Green Deals and the Top sector policies. The goal of these initiatives is to support and collaborate with producers, retail and sometimes ngo's, in order to develop alternative protein sources, such as legumes, algae, seaweeds, insects and cultured meat (Dijksma and Schippers 2015).

Unregulated information infrastructure

The lack of a regulated information infrastructure means that consumers are bombarded with sustainability and health claims on food products. It is especially the labelling infrastructure that is in need for change. There never have been more (sources of) information out there, potentially influencing our consumption habits. Nowadays we are overwhelmed by (often contrasting) information. Our eating behavior is therefore influenced by a diverse mix of information. Especially the infrastructure and regulations aimed to inform consumers about more sustainable or healthy dietary patterns is contradicting and not transparent (WRR, 2014). There is only a limited amount of information that is required by law to be present on products, which consists of fairly abstract nutritional terms. Also the origin of products is often presented in an incoherent way or is missing. Consumers, for most food products, do not have any sight on where the product is originated, how sustainable it is and how it was produced (WRR 2014).

The current overload of information and the amount of different labels, makes it very hard for consumers to filter through this information and decide what labels to trust. Currently there are more than 170 labels on the food we buy in stores (Schyns 2016). In the Netherlands, often ngo's are involved in the creation of labels, with the aim to provide the consumer with a better understanding of what to buy (Schyns 2016). The Netherlands ranks, together with the UK, as one of the two countries in Europe with the most prominent labelling culture (Kjaernes and Torjusen 2012). Kjaernes & Torjusen (2012) argue that this is because of the characteristically competitive, specialized, global and concentrated agricultural sectors in the Netherlands and the United Kingdom.

To deal with the plethora of labels certain initiatives have risen (such as the Keurmerken Wijzer by Milieu Centraal, the website of the Dutch Food Centre (Voedingscentrum)¹), to guide consumers towards more health and sustainable alternatives. 70% of respondents to another large-scale survey said that they find food labels difficult to understand and would like manufacturers to help them (PERIscope 2015). It is thus clear that the labelling infrastructure is still growing in diversity and confusion. This is one of the challenges that policy makers should address in order for people to be able to easily discern what foods are more sustainable than others.

This barrier has much overlap with skills and competence as well, but I chose to discuss it under materials, because it was the first to be discussed.

4.2 Meaning and socially shared tastes

What we eat is about more than choices based on individual attitudes, it is also about the shared understandings of constitutes a proper meal. The current meaning of eating animals in the Netherlands will be discussed in this section, enhancing our understanding of why the less sustainable sources of protein consumption are so popular. Literature shows the following reasons:

¹ <http://www.voedingscentrum.nl/nl.aspx>

- Meat is seen as an essential part of a proper meal
- Plant-based alternatives are perceived as relatively unattractive
- Sustainability issues are not a high priority for most people

Animal products and especially meat are seen as an essential part of a proper meal

Animal products have not always been considered as an essential part of a proper meal. Vijver (2005) explains that the meaning of animal protein foods has changed throughout the years. From 1895 until the 1950s cooking teachers at household schools started to base their nutrition advice increasingly on scientific findings. This resulted in the normalization of the typical Dutch dinner, consisting of meat, vegetables and potatoes (Grin, 2012). Scientific findings started to exclaim the health benefits of eating meat and dairy. Also new conservation techniques and price decreases made eating meat more convenient. Meat had become normal and highly desirable, while vegetables had become something reserved for the higher classes. Tasty in this period was synonymous with thick, sturdy and nutritious food (Jobse-van Putten 1995, p. 445 in Vijver 2005). Legumes did fit this idea of tasty and health, but were not considered as convenient as animal products. Rise in income went hand in hand with the rise of the consumer, who rather bought pre-prepared foods than did the cooking (Vijver, 2005). Van Otterloo (2012) argues that cookery teachers have played a part in the normalization of the standard Dutch meal (meat, vegetables and potatoes).

People differ in their disposition towards reducing meat and the amount of meat they eat, but even those differences are not just individually different, but are shared by large groups of people. However in general, the main motives for eating meat are health benefits, taste and enjoyment, routines, price, convenience and food safety (Verain, 2015). Almost 83% of the Dutch sees themselves as a meat

eater, 63% sees meat as an essential part of the meal, and the vast majority prefers animal products over plant products (Dagevos et al., 2012).

Dagevos et al. (2012) conclude that health is an important reason for food choices, but that only 30% of their respondents think that you do not consume sufficient nutrients if you do not eat meat.

The pre-WWII image of meat as an elite product has changed drastically. Currently a proper meal is considered by many people to involve meat (or other animal protein). Roughly 60% of the Dutch sees meat as an essential part of the meal (Dagevos, Voordouw et al. 2012). Especially a festive meal, such as a family BBQ or a Christmas dinner, meat plays a central role in Dutch culture. Research shows that masculinity, being a bon-vivant or 'coolness', are still associated with meat by more than 40% of the Dutch (Bakker and Dagevos 2010). When Dutch consumers were asked what alternatives to meat would be the best replacements, it became clear that meat is seen as unique and essential by many. From the eight replacement categories to choose from, the only three animal product alternatives to meat were seen as a good replacement. All plant-based alternatives were negatively perceived as a proper replacement (Dagevos, Voordouw et al. 2012).

In the Netherlands, much of the toppings for bread are animal products, and dairy is used for cereal consumption. This is something culturally specific to the Netherlands, because we are among the top two cheese consumers (which most often is eaten on bread) in Europe (Westhoek et al., 2011). During breakfast and lunch, meat products account for about 30% of meat consumption in the Netherlands (Dagevos, Voordouw et al. 2012), so changing what constitutes a proper breakfast or lunch, might significantly improve the amount of animal protein consumed.

In sum, despite recommendations to eat less meat having become mainstream in society no minimum requirements for meat are being recommended by

governmental and research agencies (HCN 2011, Voedingscentrum 2016). However, still roughly 30% of the Dutch population thinks that not eating meat means getting insufficient nutrients from the diet (Dagevos, Voordouw et al. 2012). Health is still among the primary reasons for people to eat meat (Verain 2015).

Plant-based alternatives are perceived as relatively unattractive

In the Netherlands there also is a widely shared perception that certain plant-based alternatives, such as vegan burgers, sausages, tofu etc., are not tasty. The Dutch proverb *what the farmer does not know, he does not eat*, thus applies to the consumption of many plant-based alternatives. The main reasons for the negative taste perception of plant-based alternatives is probably unfamiliarity (Dagevos et al., 2012). The literature explains that we can speak of a hierarchy of foods in Western cultures (Twigg, 1983). This hierarchy means that red meat is most appreciated, followed by poultry, which is followed by fish. Next, eggs and dairy products are most appreciated, followed by vegetables, fruits and grains (Dagevos et al., 2012 based on Twigg, 1983). In a study aimed to identify preferences for protein sources in the Netherlands (Dagevos et al., 2012) this hierarchy did not proved to be as clear cut. In this study it became clear that people who ate the most meat tend to put only animal products in their top ten of most desired protein foods, whereas people who ate the least meat tend to only have a top 4 of exclusively animal products. Plant-based alternatives for meat, for instance, are only chosen 30% of the time when replacing meat (Dagevos, Voordouw et al. 2012). And only 38% of the largest survey into protein consumption, stated to enjoy a meal that is meat free (Dagevos, Voordouw et al. 2012). Around 60% of the people who do not want to reduce their meat consumption say they do not want to, because they love the taste of meat (PBL 2014).

The literature shows that more than 50% of the Dutch population thinks that meat is worth its money, whereas only 15% disagrees. At the same time, for instance, only 18% of the people think that vegetarian burgers are worth their money (Dagevos, Voordouw et al. 2012).

When Dutch consumers were asked what alternatives to meat would be the best replacements, it became clear that meat is seen as unique and essential by many. From the eight replacement categories to choose from, the only three animal product alternatives to meat were seen as a good replacement. All plant-based alternatives were negatively perceived as a proper replacement (Dagevos, Voordouw et al. 2012).

Sustainability issues are not a high priority for most people

The literature states that despite sustainability issues' prominence in public debates, the vast majority of people does not take those issues into account when buying food (Dagevos et al., 2012). For instance, only about 40% of the population would like to know whether their meat is produced in an animal friendly manner (Dagevos, Voordouw et al. 2012). And only 7% of the Dutch says to eat less meat, because of environmental reasons (PBL 2014). A variety of studies conclude that eating meat is mostly a habit, with not too much symbolic meaning attached (Bakker and Dagevos 2010, Dagevos, Voordouw et al. 2012, PBL 2014, Verain 2015).

4.3 Skills, competences & knowhow

Behind the practice-as-performance, the observable individual behavior, also lies the knowledge and skills that are shared by large groups of people. The literature shows two major enabling factors of eating unsustainable protein sources: insufficient knowledge about the sustainability impact of our meals and insufficient skills of preparation of a tasty and more sustainable meal. This section will show that the barriers found in skills and knowledge is largely due to

the previously discussed barriers of the material context and meaning and the practice of eating meat and dairy.

Insufficient knowledge about the sustainability impact of our meals

A lack of knowledge of people about food in general and especially about the impact of what they eat is a problem for sustainable protein consumption. 50% of the people does not think that abstaining from eating meat on a daily basis has a large environmental benefit (PBL 2014). People are more removed from food production than ever before in history. Currently our food comes from all over the world, where its exact origin is often hard to track. Also the rise of the retail sector (supermarkets, restaurants, canteens) has resulted in decreased interaction between producer and consumer (WRR, 2014). The sustainability impact of food is very complicated to understand. Even when people want to understand the impact of their food consumption, this proves to be not so easy. There is an abundance of information that contradicts each other (see the section on information infrastructure under *materials*).

Insufficient skills of preparation of a tasty and more sustainable meal

A lack of skill in preparing a more sustainable meal is a significant barrier. Many people do not know how to make tasty plant-based meals. Roughly 40% of people find it difficult to prepare a meatless meal (Dagevos, Voordouw et al. 2012). 40% of consumers even said that more meat free recipes are necessary to help them to reduce their meat consumption (PBL 2014). This lack of skill can also be due to the fact that we do not cook as much as we used to. The modernization of food consumption has led to a decrease in time spent in the preparation of food. A food survey in 2015 (PERIscope 2015) showed that out of 1000 respondents about 50% of them cook a meal from scratch every day. The same study concluded that 38% of the representative sample said to not have enough time to cook as often as they like. Developments in food storage, transportation and product development, as well as the increase of eating out have made it less necessary for people to cook for themselves (Grin 2012).

4.4 Conclusion

In this chapter the three building blocks of a practice approach have been used. A subdivision into these elements made it possible to categorize all found barriers. However, as this chapter shows, the barriers are all interdependent and this categorization is not that strict. We have seen that economic interests have shaped the availability, convenience and attractiveness (think price, product development) of animal foods. This in turn made the consumption of animal products normal, and influenced the meaning of eating animal foods, and have contributed to a lack of skill in preparing alternatives. The omnipresence of information and the lack of regulation of this infrastructure also creates confusion among people, when they decide what to eat. A lack of positive meaning towards more sustainable protein foods can be said to result in a lack of skills to prepare them. A lack of knowledge of the impact of (protein) food can be said to be the result of a lack of attention in the material (information) infrastructure or a lack of value of sustainability issues. A lack of knowledge on its turn can be expected to influence the meaning of animal foods as well.

Now we have an understanding of the most important barriers, according to the conducted literature review. The next question is: *what are the constraints and possibilities of relevant actors to contribute towards more sustainable protein consumption? (chapter 5)*

5. Who can contribute to sustainable protein consumption?

In chapter four we achieved a better understanding of the system of protein consumption in the Netherlands and therefore barriers for sustainable protein consumption. The goal of this chapter is to get a better understanding of the two other pillars of reflexive governance (the ones that are not directly addressed by a system analysis through SPT): goal formulation and strategy implementation. An answer to the sub question *'what are the constraints and possibilities of relevant actors to contribute towards more sustainable protein consumption'* will provide insight into these two other pillars.

This inquiry will be based on expert interviews, since they have the most in-the-trenches knowledge of these dynamics. I interviewed a variety of experts in order to achieve a more representative understanding of the social dynamics of the main actors being able to influence food consumption (policy makers, producers, retail, scientists and, members of ngo's). The experts were selected based on the actors that were found to be relevant in chapter three (retailers, producers, ngo's, health professionals, researchers, media & celebrities, and policy makers). To get in contact with some of the most trusted experts among these different actor groups, I could make use of the network of my internship supervisor.

The questions asked to the respondents aimed to promote an understanding of who the relevant actors were, what they can and should do and how likely it is that they will do so (see appendix 1 for more detail on the questions asked). This information will provide information for chapter 6, in which I propose policy interventions through a practice frame. The interview results of this chapter make it possible to give more realistic options for a collaboration between government and other actors. In the same spirit this chapter continues with a summary of the experts' opinions (in the appendix each of the interviews is described into a greater detail) on what a sustainable meal is, to make better

informed policy recommendations in chapter six. But first we start with which actors have the capacity and willingness to instigate change, according to the respondents.

5.1 Retail

Capacity and freedom to alter practice

Retailers (supermarkets, catering, restaurants etc.) are seen by the respondents as one of the parties who have the most influence on what we eat. Especially supermarkets are seen as influential, because they can decide to a large degree what protein sources to supply, and what labels and pricing to use.

Willingness and breadth change

Some retailers already see the business-case (the possible profit) in providing more sustainable protein alternatives, according to the respondents. But the vast majority of retailers are however still hesitant to make significant steps and they do not employ their marketing strategies sufficiently according to the respondents. Retailers are said to not actively try to convince people to consume the more sustainable protein alternative. Restaurants and catering companies have, for instance, resisted the introduction of a sustainability label. There also is almost no vegan lunch to be found in canteens and restaurants, according to one of the respondents.

The respondents argue that retail can contribute to a shift towards a more sustainable protein diet by providing and giving more attention to alternatives. They can inform the consumer directly in the store/restaurant about how to prepare sustainable meals, what the degree of meat substitution is and what the environmental impact of what they buy is. They can raise their sustainability standards for products and include labels that make people aware of the climate and animal welfare impact. Also retailers can use nudging to give a little push in the right direction and actively market sustainable protein products. Examples were given of meat free days at canteens, and product placement in supermarkets

that make sustainable alternatives stand out. By making use of media, restaurants and celebrity chefs, the hospitality sector is also expected to be influential in influencing people's eating behaviors by popularizing sustainable meals and spreading the message of what a sustainable meal entails and how to prepare it.

5.2 Producers

Capacity and freedom to alter practice

However, many producers (especially at the level of single farms), cannot produce more sustainably, because they lack the funds to do so. Instead they are kind of forced in the direction of government policy and market situations. Some respondents expect that less production will occur, because it is of the bad economic situation of producers (which are driven to compete for price increasingly so).

Willingness and breadth of change

Also producers are shaping the amount and sources of protein we consume. All respondents agree that there currently is too little initiative among producers. The producer often only wants to produce more sustainable protein foods if the customer asks for it. When producers are not trying to produce more sustainable products, it is because of the (fear of) less profit. As one respondent puts it, producers have the task to 'develop products, innovate and invest'. All the respondents agree that producers should become more aware of the good business case that going green can be. One way to do this is to mix plant-protein in prefab animal protein food. This will be a gradual introduction to more plant-based meals. Meatless is an example of how innovative production practices, can lead to a cheap, healthy, alternative.

5.3 Ngo's

Capacity and freedom to alter practice

Ngo's (such as Milieudedefensie, Milieu Centraal and Natuur & Milieu) are seen as important players, because they have the trust of consumers. Deals can for

instance be made with the following of ngo's, in which they state to promise to buy sustainable products. On the other hand, ngo's also play a controlling role, for example when they count the amount of sustainable products in supermarkets and make them public. Ngo's can also mobilize people and inform them. For example, the campaign 'Groente in de hoofdrol' by Milieu Centraal, aims to make people aware of the huge climate benefit if we eat 10% more plants and 10% less animal products. Another example is the collaboration between Natuur & Milieu and Jumbo (supermarket), where they aim to provide recipes, discounts and other campaigns, based on research by Blonk Consultants (Kramer & Blonk, 2015). about what our future diet should look like).

Willingness and breadth change

The respondents all agree that ngo practices are currently good. They are not the one who need to change their ways of doing, but are the ones who call for change. Ngo's are very ready to change the status quo and already arguing for more sustainable (protein) consumption for a long time.

5.4 Health professionals

Capacity and freedom to alter practice

The respondents also identified the lack of sustainability considerations among health professionals that give nutritional recommendations. Nutritionists or dieticians are often informing people to eat more or less of a nutrient or type of food, but are not aware or thinking about mentioning which options are more sustainable. The lack of sustainability considerations in health advice might be especially impacting on the meaning of protein consumption, because health guides more what we eat than sustainability for most people. The capacity of health professionals is not always there, because official curricula do not teach health professionals (sufficiently) about the sustainability impact of foods.

Willingness and breadth change

The respondents do not identify a lack of willingness to change, it is merely a lack of sustainability considerations in health professional practices due to habituation. In order to change the advice of health professionals, the education of health professionals needs to change (so it includes sustainability considerations).

5.5 Researchers

Capacity and freedom to alter practice

Some respondents argue that there is a lack of research into why people who do eat a sustainable diet do so. Often more research is done into understanding what is necessary for more sustainable production or behavior change instead. Research still pays too much focus on productivity and efficiency of protein production, where sustainability issues are being translated in mere technical terms of productivity and efficiency, according to one respondent. Systemic research is lacking according to most respondents. Currently, not much money goes into the protein problem. Where the Netherlands once was leading in research into protein production and consumption, this knowledge is fading away, according to one respondent.

It is however also questionable what the added value of more research actually is. Some respondents argue that what we lack is action, or validating research, and not more research. We do not always desperately need more data, when this leads to inaction. Currently the PEF and OEF processes of the European Commission are aiming to come to a communal scientific method for assessing products and activities on environmental criteria. This standardization might speed up decision making. However, research into how best to communicate health and environmental recommendations in a meaningful and effective manner is however desirable, according to the respondents.

Willingness and breadth change

Researchers are constrained by funding as well, their willingness to research sustainable food consumption is not always backed up by funding. For instance, one respondent says, the Netherlands was leading in the field of sustainable food consumption research, but funding from the government has stopped, and as a result research diminished drastically.

Not many practices need to change, but it can be argued that government practices and industry practices have to do so. If they start funding research into sustainable protein consumption options, research will benefit.

5.6 Media & celebrities

Capacity and freedom to alter practice

The media have a far-going reach on consumers. Its capacity to influence the practice of eating is disputed, but the consensus is that there is a significant influence.

Willingness and breadth change

Willingness to change is not always there, because media likes to cater to what people want to hear.

In order for media actors to influence the practice of eating, these actors need to be knowledgeable in understanding the protein problem. As one respondent puts it, 'the media and 'celebrity' chefs need to be able to tell a coherent, meaningful story about the impact of our protein consumption, one that does justice to its complexity, with actionable advice.'

5.7 Government

Capacity and freedom to alter practice (skills, knowledge, relationships, time money)

Most respondents said that the government is not willing to change much. This lack of capability is because of the increasing internationalization of food and tax

policies. At the same time respondents argue that it is not a good excuse to say that everything has to be done at the level of the EU. They argue that in order to achieve something at the EU you first need to show initiative and vision on a national or local level. Also the power or branch organizations, is seen as a strong barrier for policy makers to take action. Export interests still rain supreme. According to the respondents there also is a fear among policy makers that voters will not back them up if they aim to influence consumption more drastically.

Willingness and breadth change

Currently, government policy still emphasizes too much the productivity and export interests of agriculture. Producing or consuming less is not something policymakers consider currently. When the focus is on sustainable (protein) consumption, it is one stimulating more production and consumption of more sustainable alternatives, not on reducing anything. Stimulating novel protein foods (algae, seaweeds, insects, legumes and cultivated meat) is therefore a central part of government policy for sustainable protein consumption. Some respondents even said that the government is not willing to change much. Despite ambitious government goals, there still is not a very clear plan how to achieve it. Many respondents say ambition is lacking.

This lack of capacity to act is according to respondents reason to collaborate with retail and ngo's, parties much closer to the consumer and with more influence on their behavior.

5.8 Sustainable protein consumption

To formulate an effective intervention we need a vision of a more sustainable future. Therefore expert interviews have been undertaken. These interviews gave insight in the makeup of our meals that can be part of a more sustainable future. These findings will be discussed next.

The respondents mainly agreed with each other about *what* we should eat. They agreed that we should eat the more sustainable variants of animal protein (as

well within as between species), and that we should consume less animal products and replace some with protein-rich plant-foods. But they differed in the quantities of consumption they deem sustainable.

The respondents argue that reducing meat consumption would be the largest benefit, but that the focus should be on reducing animal product consumption in general. One respondent states that our consumption of animal protein should be reduced by a factor two on the short term (the global average) and should be reduced even further afterwards depending of the type of meat we eat. Another respondent states that we should consume 50% animal protein and 50% plant protein (equal to what we ate in the 1950s), which is deemed a realistic target to reach in 50 years. Another target that was mentioned is to reduce our protein consumption by one third and replace another third with plant protein.

To achieve this our meat consumption should primarily change according to the respondents. One respondent argued that the 500 grams of meat a week as recommended by Het Voedingscentum is not a sustainable level, but a first step in the right direction. The respondent argues that it would be sustainable to consume about 50 grams of meat a day. This would ensure that we make efficient use of grounds not suitable for anything else than grazing and that we make use of residuals from the food industry, which can be fed to pigs. In addition the meat of dairy cows can be used to achieve the sustainable consumption of this 50 grams of meat a day. Another respondent argues that a reduction in meat consumption could also be brought about by emphasizing plant-based proteins or vegetable consumption. For dairy it is more difficult to reduce, because we need the nutrients in it, which are more difficult to replace, according to one respondent.

One respondent was critical about society's capacity to change our diet sufficiently. The respondent argued for consuming more plant protein by mixing plant protein with pre-fab animal foods. The respondent believes this would

fasten the transition, even though on its own it would be insufficient. In this way we could reduce our meat consumption by around 10%. Meatless one example of such a plant-product that can be mixed. Its environmental impact is on average 15-20x less than eggs or chicken.

Pre-fab food that is aimed to replace meat (and often looks like meat) has received quite some skepticism from the respondents. Most of them do not think that they will contribute a lot, because they either look too much like meat (does not create a new normality) or are not suitable for hospitality (not culinary enough). They are envisioned to play a minor contribution to the transition on the short term.

Some novel protein foods were briefly discussed. It became clear that for the vast majority of the respondents insects are also not seen as a highly valuable alternative. The psychological barriers for consumers to eat them in the Netherlands is seen as unreachable (especially in the coming decades). Insects could however play a role, when mixed with pre-fab animal food, according to the respondents. Artificial meat cultivation is not really seen as an option by most respondents, partly because the environmental impact is still unclear. However, legumes are seen to have much potential. It is expected that a combination of retail and government collaboration can help grow the availability and information infrastructure of legumes and derived products. They are already readily available, could be mixed with animal products as well and are significantly more sustainable.

5.9 Summary

This chapter provided an understanding of the capacity and willingness of relevant actors to promote sustainable protein consumption and a definition of what sustainable protein consumption should/could be (according to the interviewed experts). I acknowledge that the interviewed experts were not randomly chosen, so there is a degree of selection bias present. As well the number

of experts interviewed per category was not done to be representative of the dominance of these actors in the Dutch protein system (for instance, relatively many researchers have been interviewed). However, I would argue that many of the interviewed experts have extensive experience with the actors (capable of) influencing our protein consumption and thus provide insightful information. This chapter thus provided a general understanding that will make sure that the recommendations given in the next chapter will be based on reality, when the actors capacity and willingness to change is concerned.

6. Interventions for sustainable protein consumption

The goal of this chapter is to come to concrete policy interventions through the use of a practice frame, thereby providing the insight in answering the main research question: *what are potential options for sustainable protein consumption and how can they be informed by sustainability governance?*

As Spurling et al. (2013) have illustrated, a practice approach does not necessarily mean different types of interventions, but a different framework through which to decide what interventions are most useful and how they should be implemented. There are three practice frames for changing our eating habits. The first is changing the resource intensity of the practice of eating by recrafting its constituent elements. Secondly, one can look at what the more sustainable variants of eating are and aim to stimulate those. Lastly, the emphasis can be on changing how eating interlock with other practices (Spurling et al., 2013). I will give my recommendations for each of these practice frames, based on my findings of chapter four and five. Chapter four has given us information about the main barriers for protein consumption as found within the practice of eating, while chapter five has given us an idea of the capacity and willingness of key actors to promote sustainable protein consumption. The table hereunder (table 8) provides a summary of the recommendations made in this chapter and contradicts them with the interventions that would be derived from the dominant policy framings.

Table 8 Different policy frames for the sustainability challenge (Spurling et al., 2013)

Policy framings of the sustainability challenge	
Dominant framings	
1. Innovating technology	Improvements in the production process of meat and dairy and stimulating Novel Protein Foods (NPF's).
2. Shifting consumer choices	Provide information on sustainability impact of protein-rich foods (labelling, campaigns, marketing). Food education at schools.

	Subsidies and taxation to encourage more plant protein and less animal protein.
3. Changing behavior	Encourage individuals to eat more sustainable protein foods, by providing cooking classes that emphasize smaller portions of animal protein or vegan meals.
Practice frames	
4. Re-crafting practices	Re-craft the elements of existing eating practice. Promote tastes for meals that contain less meat and dairy. Promote meat-free breakfast, lunch and dinner.
5. Substituting practices	Encourage the replacement of unsustainable trends in eating with the most sustainable variants. For the protein problem this is not applicable, because despite of where and how we eat, the consumption of animal protein is almost equally high.
6. Changing how practices interlock	Intervene in how eating interlocks with other practices to create more sustainable eating patterns. Work with workplace hospitality and catering, restaurants, festivals and hospitals to provide more plant-based meals and less meals containing animal proteins. At the same time work with supermarkets to improve the marketing of plant-based high-protein foods and improve the amount of ready-made plant protein meals (or smaller animal protein meals) available. Also aim to change the food recommendations of health professionals.

6.1 Recrafting practices

Recrafting practices is about reducing the resource-intensity of existing practices by changing the elements of those practices (Spurling et al., 2013). Policy intervention according to this framing should aim to promote tastes for meals that contain less meat and dairy and should be targeting the make-up of breakfast, lunch and dinner. A practice based frame thus moves beyond a singular focus on individual choices and technological innovation by stressing the socio-material context of behavior.

Interventions should address the barriers for sustainable protein consumption as identified in chapter five. Below, each of the elements will be discussed for how their barriers can be addressed through interventions.

Changing the material context of protein consumption

The barriers for sustainable protein consumption posed by the material context, have been identified in chapter four as:

- The price of animal foods
- Retail emphasis on animal foods
- Confusing information infrastructure

Firstly, the lack of attractive alternatives warrants new product development and wider availability of existing ones. Some alternatives are already widely available and not in need of development, such as legumes. However, there is room for the development of innovative ready-made meals that use more sustainable protein sources (more plant protein and less animal protein, or more sustainable sources of animal protein). Also processed foods could replace much of their animal protein with plant protein, without consumers noticing a taste difference (think about mixing in plant protein in minced meat, dairy or hyper processed foods). If such alternatives food products are made convenient and tasty, they will be more likely to be embraced by consumers. Product innovation will address the current lack of availability of attractive alternatives and can possibly make the price of alternatives more competitive with animal foods.

Government can subsidize the development of attractive sustainable alternative protein-rich foods, but should also increase the price of (the most unsustainable) animal foods. Additionally, less subsidies/financial support for the most unsustainable animal protein production would be desirable. More true pricing through tax changes is however not likely to occur soon, because this tax system is largely regulated by European institutions. Attempts should however be made

to change the tax system, because taxation on the basis of environmental impact is expected to be much more effective in an age of global environmental issues than taxation on labor is.

In addition regulations in favor of an industry-wide minimum requirement for a percentage of sustainable protein foods would be advisable, because price changes might take a while to be implemented. More strict regulation of the formal information infrastructure of packaging is desired, because, as we saw in chapter four, currently labeling and information on packages is not regulated enough, confusing and often misleading.

The proposed financial and regulatory interventions are a primary task of the government. It is however advisable to include retail, producers, ngo's and scientist during the formulation of goals. These parties can potentially improve the interventions by providing feedback on how these interventions could be most effective while facing the least amount of resistance.

Altering the meaning of protein consumption

The barriers for sustainable protein consumption posed by the meaning of the practices, have been identified in chapter four as:

- Animal products and especially meat are seen as an essential part of a proper meal
- Plant-based alternatives are perceived as relatively unattractive
- Sustainability issues are not a high priority for most people

We have seen in chapter four that eating animal foods is also a matter of convenience and habit and that strong meanings are often not attached to the practice. Changing the meaning of animal protein consumption is difficult, because attempts to reach the masses are likely not to relate too most people (there is a large heterogeneity of eating practices). Vihalemm et al. (2016) argue that hands-on consumption experience is the most powerful meaning creator.

Initiatives to change the meaning of the practices of protein consumption should therefore be aimed at creating as much positive exposure to alternatives as possible.

People need to be made aware that it is normal and why it is desirable to reduce our animal food consumption and eat alternatives. Therefore information provision is required. Mass communication is not likely to change the practice, but is likely to raise public debate (and is therefore useful). Retail marketing could be used by suggesting sustainable alternatives according to people's preferences.

In addition to labels it would be helpful if a variety of other information (appealing to different subgroups) is readily available at the point of purchase. This could take the form of suggestions for sustainable recipes and more background information about the labels. Also communicating a set of heuristics to decide whether something is more or less sustainable can be useful (people make easier decisions when it is part of their philosophy, and they will feel less dependent on formal information infrastructure). Also in restaurants information should be available, where ideally its employees, labels, or additional information, can guide you too more sustainable alternatives.

As a specific recommendation for labeling, pertains to a standardized system with starts for three separate sustainability categories (environmental impact, animal welfare and health). I would recommended a specific coalition to achieve this labeling infrastructure. In the first place it is necessary that the label has the trust of the consumer. Therefore independent ngo's need to be made part of the coalition. Secondly, retailers need to be brought on board, because they have the power to demand labeling from their suppliers. It is not expected that these changes will be easily accepted by retailers and producers, therefore legislation or subsidies are likely to be necessary to achieve this.

Next to information provision people need to taste/experience the alternatives. Therefore I would suggest that supermarkets and restaurants give away free samples of sustainable alternatives and give a priority to those products in their marketing strategies. To achieve this regulations and price incentives might be necessary.

In summary, to change the status quo, the lack of attention and awareness about sustainability issues and the bad reputation of alternatives, information provision and exposure to alternatives are necessary. Policy makers can stimulate this by subsidizing initiatives and providing information, as well as incentivizing retail to market sustainable alternatives more in comparison to animal foods.

Improving the knowledge and skills necessary to eat sustainable protein foods

The following barriers for sustainable protein consumption with regards to skills of the practices were found in chapter four:

- Insufficient knowledge about the sustainability impact of our meals
- Insufficient skills of preparation of a tasty and more sustainable meal

Currently people cannot do what is required of them: selecting and preparing sustainable alternatives. As a practice perspective teaches us, meaningful activity, learning by doing, is the greatest teacher.

I would propose using various 'forms' of education to ensure different opportunities to learn, that speak to different (groups of) people. First formal food education (provided by educational institutions) should be provided for throughout elementary and high school. Also formal education afterwards (university etc.) should include food education whenever the study is related to this. In this way health and medical studies will be capable of giving advice on sustainable food choices in their recommendations as well.

In elementary and high school, food education can easily be made more practical, by use of a school garden and cooking classes etc. When following a health science curriculum it is however not dominant practice or necessarily recommendable to use these methods. Therefore I suggest learning about the sustainability impact of food in a theoretical matter combined with case studies (theoretical examples or practice sessions with other students) to practice including sustainability advice in their field.

Relying on school teachers alone may pose too much burden on them. Therefore ngo's can be used in the coalition for education as well. They can give sustainable cooking lessons or local lessons about the sustainability of food.

It is especially recommended that education institutions and other public institutions (especially related to health, such as hospitals) give the right example, because people are strongly influenced by what people around them do. So more sustainable meals in canteens, hospital food etc. is very necessary.

For non-formal education, it is easier to make activities more practical, such as cooking classes.

In addition to education, it is necessary that the retail environment facilitates skills and knowledge acquisition as well. Therefore the previously discussed labeling infrastructure is necessary, as well as an app or in-store suggestions about alternatives. This can be for example recipes with sustainable alternatives at the animal food section. Or a poster suggesting sustainable protein alternatives at the dairy/meat and egg sections of the supermarket. Also it would be recommendable that restaurants make the sustainability of their meals more obvious. In addition, further information should be readily accessible when someone wants/needs it. Apps and labels should provide this background information whenever desired. This can be in the form of a QR-code in store where people can get more information about the impact and sustainable alternative meals (and their preparation) of the product category.

In summary, the lack of knowledge of what a sustainable (protein) meal is and how to prepare tasty variants of it can be addressed through education and improved information infrastructure. These measures are likely to require subsidy and coalitions, because it is not likely that retail will take sufficient first initiative, or that schools take on the extra required workload.

6.2 Substituting practices

This framing could possibly identify more sustainable trends in eating, that go beyond the types of food consumed. To my knowledge there are however no completely different ways of eating (and selecting and preparing food for that matter), that mean a more sustainable consumption of protein-rich foods. The current trend in eating out, for instance does not per se lead to more sustainable protein consumption.

6.3 Changing how practices interlock

The third, and last, practice frame for more sustainable protein consumption considers how eating interlocks with other practices. As we have seen in chapter four, animal foods are on average consumed at all meals (breakfast, lunch and dinner). Breakfast mostly occurs at home, and therefore is not relevant for this framing. Lunch is by the vast majority of the Dutch consumed outside of their own house (at work, at school or at a restaurant). Policy makers can again stimulate workplace/school hospitality and restaurants to provide more sustainable meals. This can be done in the form of subsidies and regulations (sustainability labelling). Also continuing education programs for these retail professionals could be funded by government in order to enhance the skills and knowledge of preparing sustainable alternatives.

The Dutch also eat out more often each year (Schutijser 2017). This makes it even more important to incentivize workplace hospitality and restaurants to improve the sustainability performance of their meals. This can, again, be done by setting minimum requirements for sustainable foodstuffs, subsidies for sustainable

foodstuffs. Also government could make people aware of how sustainable a restaurant is by introducing a label. Previously, such attempts were not accepted by retail, but increasing environmental pressure should make government more persistent in their attempts. Making a label part of official regulations/legislation would be a way to do this.

It is important that these interventions are not only imposed top-down. Policy makers should aim to actively collaborate with retailers (party with most experience in the field and buying power), ngo's (the party most trusted by consumers) and consumers (to listen to consumer preferences and feedback).

Also health professionals often lack a knowledge of the sustainability impact of the foods they recommend. Or they lack an incentive to do so. Policy makers can work together with these professionals giving nutritional advice (nutritionist, personal trainers, medical doctors, general practitioners) by providing continuing education. For the future it would be desired if the government could demand that study curriculums for these professions include the sustainability aspects of food (and in specific how to recommended a healthy and sustainable diet) as well. Hospital retail is another point of interest. Hospitals often work with outsourced suppliers for their food. As far as I am aware of, hospital meals are not representative of a healthy and sustainable meal, despite all the benefits of good nutrition for speeding up the recovery process. Policy makers could impose stronger regulations/demands on food provisioning in hospital retail.

7. Conclusions, discussion and reflection

The first aim of this chapter is to conclude how well the practice-approach of this thesis has resulted in more reflexive policy options for sustainable protein consumption. The second goal of this chapter is a personal reflection on the research process.

7.1 Conclusions

To answer the main research question I chose the following sub questions:

- *What are the principles of sustainability governance?*
- *What is the context of protein consumption in the Netherlands?*
- *what are the constraints and possibilities of relevant actors to contribute towards more sustainable protein consumption?*

Through the literature review it became that the concept of reflexive governance provided principles for sustainability governance: 1) trans-disciplinary knowledge production, 2) experimentation and adaptivity of strategies and institutions, 3) anticipation of long-term systemic effects, 4) iterative participatory goal formulation and 5) interactive strategy development. In particular SPT was seen as a way to adhere to the first three principles through its concepts useful for systemic analysis. The context of sustainable protein consumption, the second sub question, was investigated by making use of those social practice principles. The large influences of industry and politics in our consumption patterns have become clear through this analysis. Also it revealed that animal food consumption is not linked with a strong cultural meaning, but mostly something that became normal through market forces and political stimulation.

The third sub question investigated the latter two principles of reflexive governance (and thus sustainability governance) in order to give an overview of the constraints and possibilities of relevant actors to contribute to more sustainable protein consumption. It revealed that policy-makers are very much

dependent of other actors for interventions that are most likely to be effective. The increased buying power of large retail players is one of those reasons. At the same time, the government is not the most trusted actor among consumers. Ngo's, scientists and media celebrities have most of the trust of consumers and should be employed for effective policy making. Another constraints for policy makers is the increasing internationalization of political institutions and authority. Tax changes are for instance to a large extent not under control of the national government, but rather regulated on a European level and influenced by international trade agreements.

The last sub question is answered in this section for the first time: *how can reflexive governance be applied for more sustainable protein food practices?* I will address each of the principles/strategies separately below.

Complexity: integrated knowledge production

I would like to start with the reflexive governance strategy *integrated knowledge production*. Chapter three and four have illustrated the complexity of the Dutch protein problem. In chapter five, with the specific recommendations, it became clear that any intervention that arises (from a practice perspective) is interdependent on other interventions and multiple actors. This multi-actor dependency requires knowledge about how behavior is best changed by this variety of actors, therefore necessitating integrated knowledge production. The practice frame showed that in order to address all the barriers of the problematic practice, there is a variety of possible interventions required. For each type of intervention, different knowledge sources are required, requiring both explicit and tacit knowledge. To change the skills of protein consumption we need for instance education, labelling and information infrastructures. To determine the content and medium of the message we need both explicit knowledge (from science) about what a sustainable diet looks like and how best to communicate it, as well as tacit (experiential) knowledge about how best to communicate the

message. Framing sustainable protein consumption from a practice perspective makes it impossible to focus on single/isolated interventions, therefore promoting knowledge exchange.

Uncertainty: experimentation and adaptation

Some lessons about the second reflexive governance strategy, *experimentation and adaptation*, were learned as well. The practice framing of chapter five illuminated that it is never certain that an intervention will work, because of the large amounts of variables at play. Therefore experimentation (for example at festivals, at a few (local) supermarkets, restaurants or canteens), preferably on a small-scale and without much too loose, are recommended in chapter five. However, this did not prove to be easy for all of the interventions that could be identified through the practice frame. Tax measures, such as true pricing for instance, do not (easily or at all) allow experimentation. They have to be implemented on a (inter)national basis. My analysis therefore raises the question whether changing the material context of protein consumption (the availability of products and the low prices) can go without large-scale, structural changes that are slow to reverse, thus less adaptable. It might be argued that a large structural change is exactly what is necessary, because it might be precisely too much economic liberalization that is a large contributor to the protein problem in the first place.

Path-dependency: anticipation of long-term systemic effects of measures

In the previous chapter I recommended using a variety of interventions at the same time. This means that the effects of interventions are even harder to anticipate, because of the interdependencies and influences of these multiple interventions. My recommendations in chapter five are very much about experimentation. I proposed learning through small-scale interventions whenever possible. The outcomes of these interventions (as well as similar case studies in other countries) can provide an indication of results that are to be expected. However, in my opinion, a practice-based approach did not allow for

recommendations that aim to predict or anticipate long-term effects. I would argue that interventions for sustainable (protein) consumption are best to be evaluated for their potential downsides and upsides (where more upsides than downsides is indicative of a reasonable intervention).

Value trade-offs of sustainability goals: participatory goal setting

The proposed interventions from the previous chapter, acknowledged the need for collaboration between different actors. The normative aspects of the protein problem require agreement among a wide variety of actors (ideally representative of the dominant perspective in society). The expert interviews revealed that the amount of animal protein we can sustainably consume, is for a large part the result of normative stances towards unequal food access in the world (food poverty), the valuation of biodiversity and animal treatment. To set any target for an intervention I have thus proposed communication between different actors to come to an agreement, so that it is not just one party (in this case the government) who decides upon the ethical valuation of the protein problem. Especially, the inclusion of ngo's and consumer values, provide a counterbalance with the often short-term foci of industry and economic emphasis of government.

Distributed control: participatory strategy development

In the previous chapter I argued for collaboration between ngo's, medical professionals, retail, educators, producers, scientists and the Dutch government (and related institutions). Chapter three and four strongly indicated the distributed control between actors (capable of) influencing the protein system in the Netherlands. I do however see a strong role for the national government to coordinate these players in order to bring them into contact and align their activities. In a world of an overwhelming amount of contradictory information, it is critical that consumers have a filter for their food decisions. Educating people on the principles of sustainable protein consumption (or food consumption for that matter) empowers people to make better decisions and recognize misleading

claims. Educators and information from experts in the field can provide such a fundamental understanding among consumers. Simultaneously, the research in chapter three and four has shown that the protein problem is complex and that people can and will not contemplate on each food decision. Therefore a standardized information and labelling system needs to exist, co-created by parties that have the trust of consumers (ngo's). At the same time it is critical that retailers are employed in the strategy towards more sustainable consumption, because they are arguably the most powerful player.

With the insights of the answers to the sub questions in the previous chapters, the main research question can be addressed: *what are potential options for sustainable protein consumption and how can they be informed by sustainability governance?*

The analyses in the previous chapters have illustrated that it is necessary that education, information, a labelling infrastructure, regulations and price incentives are all required. They are not expected to work sufficiently when used in isolation, because not all elements are addressed (equally) by the different types of interventions. The policy options that agree most with the reflexive governance principles are the ones that address all elements of the problematic practice. Also these interventions are the ones that aim for small-scale experiments whenever possible, collaborating with relevant retailers, producers, ngo's, scientists and consumers. Additionally, anticipating path-dependency for sustainable (protein) consumption is very unlikely to be accurate, and therefore should not be relied upon as much. The focus should instead be on consistently performing best practices that allow integrative knowledge production, experimentation, participatory goal formulation and collaborative strategies. Regulations, legislations and financial interventions are largely top-down interventions, which are very slow to adapt in many cases. However, my analysis raises the idea that these interventions are necessary, because they are the only ones that address

the material context of protein consumption. This is in agreement with the literature review, that showed that focusing too much on consumers or too much on the supply side is not effective.

To answer the main research question: information provision and education are the interventions that allow adherence to the principles of reflexive governance most easily, while regulations/legislations, and taxes and subsidies are more difficult to implement while complying with these principles. However, a practice operationalization illustrates the very necessity of all these interventions (simultaneously) for attempts towards sustainable protein consumption. The main role of the national government, in my opinion, is to monitor and analyze all the small initiatives on a municipal level in order to recognize patterns of combinations of interventions that work in a specific context. At the same time some interventions need to be nation-wide or on an even larger scale. I would like to finish that my analysis gave me the impression that the largest barriers and therefore largest benefits for sustainable protein consumption are found in the material context. If we learn from history or current trends, we cannot expect the vast majority of people to change their diet make-up in the foreseeable future, without a large increase in urgency for them. Prices alone, will also be insufficient, because of the affluence in the Netherlands, but it should be part of the intervention package. The only way to create a large enough sense of urgency in society is, in my opinion, to intervene in a large variety of ways, while still spreading a coherent vision about where we should and could go.

7.3 Reflections on the research process & discussion

During the research process it proved difficult to translate theory into practical recommendations. I started out by attempting to combine a social practice approach with the concepts of the multi-level perspective (MLP). In the literature the combination of these two theoretical or conceptual approaches was argued to provide an even better understanding of social change than the two approaches

separately. I did however struggle to apply this combined approach for the protein problem. This MLP sees social change as the interplay between different societal levels (niches, regimes and landscapes), where landscape pressures (large-scale social, political, economic and environmental influences) and niches (read mostly technological innovation) influence the mainstream way of doing. The combined approach sees social changer still as the interaction of these three levels, while only focusing on the practices. Thus, niche practices are innovative, less performed practices and regime practices are the mainstream practices. For the protein problem it proved not to be possible to make this distinction because the practice of eating did not have more sustainable variants (that can be identified as separate practices).

Eventually, I choose to follow a practice approach, because it acknowledges the influence of both individual lifestyles and supply more realistically than the MLP. The most difficult part of a practice approach is setting boundaries. After trial and error I realized it was not possible to see eating of a specific type of protein as a separate practice, but as a part of eating. Thus, food consumption is a consequence of eating. In the practice literature, food consumption was seen as an aggregate of ordering & selecting, delivery, preparation, eating, and waste disposal. A focus on just eating proved to be most clear for the purposes of this thesis, because eating more sustainable sources of protein is the eventual goal. This approach made it possible to still address all the other practices of food consumption, without making very artificial separate descriptions of them. Food consumption practices are very highly dependent on each other and discussing them separately provided too much overlap.

The use of expert interviews was a central part of the thesis and was aimed to get a better understanding of the field than literature could have provided. When I conducted the interviews, I still espoused to use the MLP and SPT combined approach and therefore had asked very broad questions. After deciding on a practice approach, I realized that I inquired heavily into intervention possibilities.

Therefore I have aimed to come up with them by myself instead of evaluating given interventions. After trial and error I realized what types of interview information were most suitable for a practice approach. An understanding of the mainstream practice, eating, is highly documented in the Netherlands, and therefore does not require expert interviews to better understand. However, alternative practices and a vision on how a more sustainable protein diet would look like require up-to-date information, which experts can give you. Also, keeping the interviews anonymous gave the possibility to ask questions about who is responsible for the current situation, and who can and actually do something about it.

At the same time there still was a lot of information from the interviews that did not easily fit into the conceptual framework of SPT. At this time I came across the concept of reflexive governance, which made me capable of putting SPT in the wider context of sustainability governance. The principles of reflexive governance provided an insight into how to structure the thesis. It showed that SPT is currently fitted to address 3 of 5 these principles directly through the concepts they provide (the system analysis principles). It made clear to me that I still needed a way to address the principles for participatory goal formulation and strategy development. The expert interviews (which were chosen in the initial phase of the research to make this thesis more practical) provided a great source of information to investigate how these principles could be met.

From a methodological perspective I recommended that further practice approaches for sustainable consumption policies think about systematic ways of evaluating trends (in relevant practices). A practice approach is especially useful, because it allows more creative thinking about a more desirable future. At the same time, the little constraints that a practice approach has means that one does not know where to look for information and trends that are necessary for out-of-the box thinking. A more systematic way of doing so would be desirable.

I am also curious about the reproducibility of a practice approach, because there are so many selections about system boundaries that one makes during the process. It all starts with the selection of the problematic practice(s) up to a vision of the future and selection of interventions (depends on your creativity and desire to battle the status quo). I would however strongly argue for setting a clear vision for the future, based on the input of a variety of actors.

Another important point is the lack of case studies that use RG or SPT to create new intervention programs and monitor correlations. I believe that in order to verify the practical usefulness of theoretical concepts for policy making, we need many experiments. We cannot extrapolate that an application of reflexive governance principles will always lead to a better practical outcome. We need to compare many experiments and recognize patterns, while also remaining aware of the fact that methods will not always work the same. I therefore see a practice approach more as one method that is strongly in line with the principles of RG, but not as the only effective operationalization of these principles.

As a final remark, I would say that sustainability problems such as the protein problem, could do with more radical visions of the future, and maybe require stronger regulations from the government. Normally I see the benefits of decentralized governance, but I think this thesis showed again that there is a lack of capacity and readiness to change among many actors, and we are in need of a radical overhaul of our culture of consuming more.

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Appendices

Appendix I: Interview questions

The conducted interviews were semi-structured. The predefined questions, to standardize the questions, were:

- What is the impact of our current protein consumption?
- What are the barriers for sustainable protein consumption?
- What alternatives are there for more sustainable protein consumption?
- What are the relevant actors necessary to make our protein consumption more sustainable?
- What can these different actors actually do?
- How willing are these actors to change their practices?
- (As a bonus question I often also inquired into their opinion of sustainable levels and sources of protein consumption)

