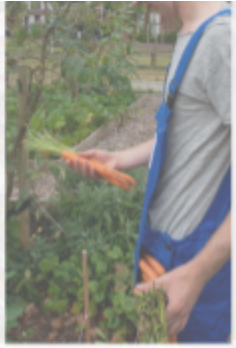
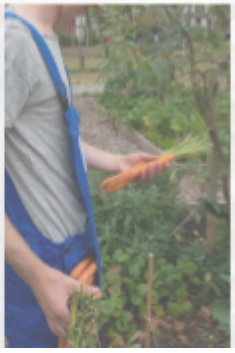


Acquiring insights into the sustainability of future diets:

An exploration of the future urban food acquisition practices of Amsterdam residents in 2050 by means of scenario building.



AMS
AMSTERDAM INSTITUTE FOR ADVANCED METROPOLITAN SOLUTIONS

MSc MADE

WAGENINGEN UNIVERSITY & RESEARCH

TU Delft

Master thesis by:

Ruben Smolders BSc.

Master student - 1050708
MSc. Metropolitan, Analysis, Design and Engineering

August 2022
Amsterdam

Supervised by:

dr. Anke Brons

Wageningen University & Research
Environmental Policy Group

prof.dr.ir. Eveline van Leeuwen

Wageningen University & Research
Urban Economics

dr. Noël van Dooren (external)

Aeres University of Applied Sciences Healthy living in green cities

Third Examiner:

prof. dr. ir. Hans Wamelink

Delft University of Technology
Management in the Built Environment

Acknowledgements

Writing this thesis has been a great experience for me. I have been exposed to many new insights, it brought me in contact with fascinating people who shared their looks on the world with me, but above all, I have learned what I had set out to do, which was to get a glimpse of what the future of our food system might develop into.

A great thanks to my supervisors, Anke Brons, Eveline van Leeuwen and Noël van Dooren for their support throughout this process. Anke provided me with excellent day-to-day supervision, was very accessible, and proved to be a great sparrings partner throughout my entire thesis. Eveline, with her years of experience, provided indispensable advice in regards to the scientificity of this work. Lastly, Noël, while not being a formal supervisor, the feedback regarding the formulation of certain parts and the contribution towards the incorporation of the spatial dimension was greatly appreciated.

As stated, I set out to learn a lot about the (urban) food system, and I can gladly say I did. I have become even more intrigued by urban food systems than I already was and have probably even more questions now than before I started writing this thesis. For that, I need to thank the interviewees, which were so kind to share their thoughts and views about ongoing developments and future perspectives.

And finally, I would like to thank the AMS Institute for facilitating a very pleasant working environment and atmosphere. It was such a luxury to be able to work on the Marineterrein and enjoy the many things the AMS Institute and its network had to offer.

Thank you.

Abstract

Our current food practices cause numerous environmental, social, cultural, and economic externalities. Yet while the challenges arise in these seemingly different dimensions, the solutions to finding a sustainable diet, might be found in the interplay between them. Striking a balance between components of the food system to ensure a future sustainable diet requires a tangible framework as a starting point. This research developed scenarios using expert interviews to draft future food acquisition practices for the city of Amsterdam in 2050. By employing and expanding upon the DESTEP methodology, a glimpse of the future lifestyle practices, system of provision, and food acquisition arose. Seven trends were drafted, which are expected to affect future food acquisition practices significantly. 1) A dichotomy in society between those well-off and those badly-off, 2) a potential increase in plant-based food consumption, 3) a dichotomy in society regarding food orientation, with on the one hand those seeking convenience while a growing number of people look the context behind the food they eat, 4) robotization, 5) water and nutrient scarcity, 6) an increased awareness by governments as to what people eat, and lastly, 7) the ongoing battle for space within the city. The different scenarios point out that the government's role can significantly affect how the future pans out.

Keywords

Practice Theory, Urban Food Acquisition Practices, Lifestyle Practices, Systems of Provision, Food Environment , Sustainable Diets, City Deal, Amsterdam in 2050, Administrative Innovation, Scenario Building, DESTEP + S

Table of Contents

List of figures

Figures

Tables

Chapter 1 - Introduction

Current food system issues

Between 19% and 29% of total anthropogenic greenhouse gas emissions can be attributed to the global food system (van Berkum, Dengerink, & Ruben, 2018). Cities are responsible for consuming 75% of the world's resources and energy whilst generating 80% of the world's greenhouse gasses by doing so (Mohanty, Choppali & Kougianos, 2016). At the same time, it is modern cities that consume resources in quantities far greater than their capability of supplying these resources for themselves (Hodson et al. 2012). Nevertheless, much focus has been on the impact of food production on the climate (Rose et al., 2019; Poore & Nemecek, 2018; Song et al., 2017; Wollenberg et al., 2016). However, cities and their corresponding externalities in the form of environmental pressure and resource management due to consumption patterns deserve extensive academic focus. This is especially true for cities and their attributable food demand externalities, the so-called “foodprint” (Billen et al., 2008; Chatzimpiros & Barles, 2013). The effects of our food system reach beyond just climatic impact. Current food consumption practices are considered a significant concern within the political world due to their impact on the “environment,” the “individual and public health,” “social cohesion,” and the “economy” (Reisch et al., 2013). Cities now accommodate most of humanity, up to 55% in 2018. The share of the global urban population is expected to grow to 68% in 2050, with countries such as the Netherlands and Japan increasing to 92% (Ritchie & Roser, 2018, UN 2018a; UN 2018b).

Scenario-building can help

All of these elements show that the current and future food system is facing a diverse range of potentially conflicting challenges. According to Wilkinson and Eidinow (2008, p. 2), the ability for people to take action concerning these profound challenges "can benefit from the anticipation of future possibilities." Scenario building is a method that can enable people to create imaginative projections of the future. Scenario building is one of the dominant methods used to grasp long-term challenges (Kowalski et al., 2009). Long-term challenges are characterized by complexity and uncertainty. Scenarios do not so much provide certainty in that matter, but enable those involved to think of the possible and plausible (Aligica, 2005). Thus, scenarios provide a set of alternative futures that can allow for a better understanding of what is to be avoided or facilitated. In short, scenario building helps with decision-making.

Food (acquisition) practices

This thesis aims to develop a set of scenarios concerned with urban food acquisition practices of Amsterdam residents in 2050. The acquisition of food is the third element of food consumption besides eating and food planning. It is particularly of interest due to its broad interconnectedness with the urban environment and the corresponding untapped potential in shaping future food acquisition practices to prevent further adverse effects of urban food consumption. The source of changes in behavior lies within the development of practices (Warde, 2005). Thus, studying and understanding practices is the first step to take in order to alter future behaviors. Practices can be described as interactions between human agents (actors) and structures (Giddens, 1991).

These interactions take shape in the form of behavioral practices (Spaargaren, 2003). Practices can also be described as routinized behaviors, shared norms, knowledge, and competencies performed within a material context (Nicolini, 2003). Many of the choices made by individual citizens are made within a larger context. Food acquisition as a practice does not occur in isolation; it affects and is affected by its actors' systems of provision and lifestyle practices (Spaargaren, 2003; Spaargaren & van Vliet, 2003). With systems of provision being the structures concerned with food provisioning and food waste management, the interplay between people, their work, dwelling, and mobility capabilities form the lifestyle practices.

This research aims to dive deeper into food acquisition as a practice and investigate whether and how alternative future scenarios can contribute toward a sustainable diet in 2050. This thesis will investigate the food acquisition practices of Amsterdam residents in both the past and present, after which it is leaping into the future by employing scenario building. In this thesis, it is argued that food acquisition and its interplay with the systems of provision and lifestyle practices can contribute to a sustainable consumption pattern with a sustainable diet as a result. In short, understanding food acquisition practices and knowing how they can develop can help with understanding how sustainable the future urban diet might be.

Acquiring insights into a sustainable diet?

Through expert interviews, trends and drivers are identified. Which trends and drivers are expected to mature and how will they take shape? Do citizens go shopping at the supermarket, have groceries delivered to their homes, or perhaps grow various vegetables themselves?

Once the scenarios have been developed, they are reflected upon and 'scored' using the components of the FAOs sustainable diet as drafted by Lairon (2012) and Johnston and colleagues (2014). Each key component consists of various factors and processes that could help predict the future diet's sustainability. The scenario narratives drafted are characterized by specific trends, which can either positively or negatively affect the conceptual sustainability of the future diet. How, to what extent, and why these effects take place is also elaborated. The goal is to provide policymakers with insights into the interdependencies and influences across the urban food system. This thesis aims to function as an experiment in applying the conceptual framework of a sustainable diet by Johnston and colleagues (2014) to the drafted future scenarios. As the title states, this thesis is an initial attempt to acquire insights into the sustainability of future diets.

Amsterdam in 2050

As the examples in this introduction show, this work will focus on modern urban cities in the developed world, more specifically, the city of Amsterdam. Amsterdam is picked as a case study due to it partaking (as the largest municipality) in the City Deal - ‘Food on the urban agenda’, which is an instigated partnership between the Dutch government and various municipalities to improve the Dutch food system. The usage of the conceptual framework fits with the focus points of the City Deal, and its application in this thesis is considered a contribution toward the goals of the City Deal. Amsterdam is furthermore one of the focus points of an

extensive research program set up by the NWA (The Dutch Research Agenda) in which the 'Transition to a sustainable food system' is investigated for both rural and urban areas, with a particular focus on the year 2050. This thesis is therefore drafted in an attempt to contribute to both.

The main research question this thesis aims to answer is:

How can future urban food acquisition practices contribute toward a 'sustainable diet' in 2050?

Furthermore, one sub-question will need to be answered to formulate the argumentation required to answer the main research question. The sub-question is concerned with developing the potential future urban food acquisition scenarios. These scenarios come in the form of narratives that come to life through a combination of trends and drivers resulting from the expert interviews. The sub-research question is:

What are potential future urban food acquisition practices for Amsterdam residents in 2050?

Thesis structure

This thesis covers six chapters (see figure 1). This final paragraph concludes Chapter 1, the introduction. In Chapter 2 - the theoretical framework is further elaborated and its use throughout this thesis is explained. In Chapter 3, the conceptual framework of the sustainable diet and its key components, factors, and processes are described. Chapter 4, elaborates on the methods used throughout this thesis. Methods used for interviewing experts, developing scenarios, and executing the scenario analysis are described here. Chapter 5, describes the interview results with experts and presents the identified trends. After that, the developed scenarios are presented and reflected upon. The goal is to explore how each narrative might approach a sustainable diet. This chapter helps answer both the sub-question and the main research question. Chapter 6 follows from that and provides brief conclusions on the results. Finally, Chapter 7, concludes this work by discussing the employed research methodologies and results, furthermore it elaborates on the implications of this work for society at large.

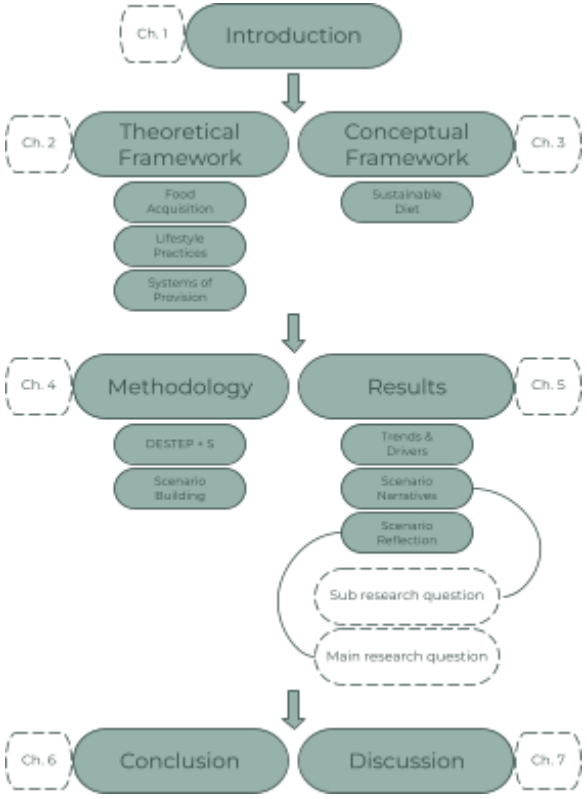


Figure 1 - Overview of chapters and coverage of main- and sub-research questions.

Chapter 2 - Theoretical Framework

Chapter description

This chapter describes the theoretical context through which this thesis investigates the case study. A brief overview of four fundamental consumer behavior models is drafted to help understand how the point of departure for practice theory differs from these well-known scientific positions. After that, practice theory is explained in general, followed by the different elements: lifestyle practices, systems of provision, and food acquisition practices. This chapter ends with a summary and the main takeaways while also describing how the theoretical framework will be used throughout this thesis.

2.1 - Studying consumer behavior

Essentially, practice theory is used in this thesis as a lens to look at consumer behavior and the context in which it takes place. Consumer behavior, however, has not always been observed through the practice theory lens. In the 19th century, it was mainly researched from an economist's perspective (Kotler, 1965). Later, however, the interest in consumer behavior also started to rise in other scientific disciplines such as sociology, psychology, and anthropology (Daniela, 2011). Scientists approached consumer behavior from their scientific disciplines, causing four fundamental theories in the field of consumer behavior to arise: 1) the Marshallian economic model, 2) the Pavlovian learning model, 3) the Veblenian social-psychological model, and 4) the Freudian psychoanalytical model. Ways through which to study consumer behavior are argued to stem from either one of these four fundamental theories (Daniela, 2011). "Later developments in the study of consumer behavior enriched the field by bringing an integrated approach, thus adding value to the discipline and the fundamental theories these subsequent theories and models were built upon" (Daniela, 2011, p. 837). The following section covers these fundamental models briefly in an attempt to broaden the understanding of how researchers look at consumer behavior.

Marshallian economic model

As mentioned, the economists were the first to try and better understand consumer behavior (Kotler, 1965). Economists see consumers as rational beings who aim to satisfy their needs through the lowest possible expenses (Jisana, 2014). Consumers are expected to chase a life “full of pleasure” however do so rather sparingly and in a “predictable way” (Daniela, 2011, p. 838). In this model, consumers are expected to optimize their resources and allocate them to obtain their “greatest total usefulness'' (Daniela, 2011, p. 838). This means that consumers will ensure maximal utilization of their resources, which determines their consumer behavior. In this line of thinking, Alfred Marshall coined the concept of marginal utility. Marginal utility describes that the benefit (utility) that a consumer obtains from buying a particular product is inversely related to how much of that the consumer already owns (Marshal, 1920). So, the additional benefit derived from consuming a certain product decreases with every increase in the number of times the consumer owns that product until the consumer has no need to purchase any additional unit, which results in zero marginal utility.

Simply put, a slice of bread is worth more to someone owning two slices of bread than to someone owning twelve slices of bread. In this model, the market consists of rational and homogenous buyers. The consumer in this model is often referred to as the 'economic man' (Homo economicus) (Persky, 1995).

For this model to stand, the consumer must be knowledgeable of all the obtainable consumption options out there to be able to weigh their decisions and make rational choices (Schiffman, 2007). This is considered unrealistic since consumers rarely have all of the information, time, and motivation to make such 'perfect' decisions (Simon, 1997; Bray, 2008). Furthermore, other factors that can potentially influence consumer behavior are left out. Things such as attitudes, personality, culture, and motivation are not considered.

Pavlovian learning model

Unlike economic theories, psychological theories see consumers as responsive to emotional aspects. The Pavlovian learning model is one of the two theories in which this dissenting voice took shape; the other is the Freudian psychoanalytical model. Pavlovian learning corresponds with the “nurture” side of the debate, and the Freudian psychoanalytical model falls under the “nature” school of thought. This view of consumers being conditioned by external influences is "an obvious reaction" to how the economic model views consumers as homo economicus (Daniela, 2011, p. 839). Ivan Pavlov conducted the famous research where he experimented with a dog and a bell. Pavlov would ring a bell every time before feeding the dog. Soon the dog had learned to associate the bell with the food, and it would start to salivate by just hearing the bell being ringed, whether there was actual food or not (Kotler, 1965). Pavlov's research introduced the theory of learning, which states that human behavior is caused by a learning process. Basic and learned needs govern a consumer's behavior. Basic necessities are foodstuffs, apparel, and refuge, while learned needs include anxiety and guilt. A hungry customer will prioritize buying food (basic need); however, once no longer hungry, he or she will return to purchase the jewelry (learned need) (Jisana, 2014). Pavlov figured that learning is an outcome of a process of association. The consumer's response is based on their learning and experience, also coined as the conditional reflex (Daniela, 2011). This model eventually advanced into the development of the stimulus-response model, which is based on four key concepts: drivers, cues, response, and reinforcement (Dollard, 1950).

Freudian psychoanalytical model

Sigmund Freud questioned men's capability to control their psyche, and the psychodynamic tradition is often attributed to him (Stewart, 1994). The psychoanalytical model sees behavior as being affected by unconscious effects (Daniela, 2011). "Copernicus destroyed the idea that man stood at the center of the universe; Darwin tried to refute the idea that man was a special creation; and Freud attacked the idea that man even reigned over his own psyche" (Kotler, 1965, p. 41). Freud posits that biological influences taking shape as drivers affect behavior, drivers that are thus outside of the conscious thought (Arnold et al. 1991). The three facets of the psyche, the behavioral manifestations (Daniela, 2011), that are part of this theoretical lens are the id, ego, and superego (Freud, 1923). Urges and drives find their origin in the id. The ego is

concerned with finding ways to express these urges, while the superego helps with channeling the instinctual manifestations into socially approved outlets (Kotler, 1965). This latter part is important as men are deemed incapable of doing this in a perfect manner, which translates to them emerging in dreams, obsessive behavior, or solecism (Kotler, 1965). The key takeaway from this theoretical perspective is that the psychodynamic approach sees behavior as a product of biological drivers alternatively to individual cognition or environmental queues (Bray, 2008). Inherent to this approach is the necessity to understand a research subject, its motives, and ideas, requiring in-depth analysis. Therefore, the in-depth interviewing technique is also attributed as heritage resulting from the Freudian psychoanalytical model.

However, this model received wide criticism due to its subjective nature (Karden, Cronley, & Cline, 2010). Moreover, it is considered to raise more voices of critique than acclaim (Kassarjian, 1971).

Veblenian social-psychological model

In Thorstein Veblen's social-psychological model, the social and cultural factors depict consumer behavior. Veblen considered humans as social beings who sought confirmation from peers by adhering to social norms part of the cultures they belonged to (Kotler, 1965). Veblen is famous for his work 'The Theory of the Leisure Class,' which he wrote in 1899 and in which he studied and described the behavior of the upper class. He observes 'signaling-by-consuming,' now known as conspicuous consumer behavior, a tendency to be outward-focused (showing-off) while engaged with consumption and aiming to gain prestige amongst peers in the cultural group (Veblen, 1899; Bronner & de Hoog, 2018). The behavior of individual consumers is thus considered to be an outcome of the social pressures “exerted in the individual's quest to fit within the desired social group” (Daniela, 2011, p. 838). Behavior is therefore often aimed to be in tune with various subcultures, reference groups, and families that the consumers feel like they belong to, as conforming to the standards can yield them social status: "since the consumption of these more excellent goods is an evidence of wealth, it becomes honorific; and conversely, the failure to consume in due quantity and quality becomes a mark of inferiority and demerit" (Veblen, 1899, p. 53).

However, this model does not allow for an analysis of the ongoing exchange between the action and the structure in which the action and interaction with cultural peers occur. It is solely focused on the interplay between the individual and various reference groups but falls short when it comes to including the physical structures.

2.2 - Practice Theory

Practice theory differs from the models introduced above. Considering the economic and socio-psychological models, both fail to embrace the organization of reality through symbolic knowledge. This knowledge enables "the basic distinctions and schemes (which) lay down which desires are regarded as desirable and which norms are considered to be legitimate" (Reckwitz, 2002, p. 246).

The most critical distinction between practice theory and the four models introduced is that these introduced models can be

described as theories of behavior. Within theories of behavior, the individual is at the center point of the study, be it their rational, learning, behavioral manifestations, or urge to conform to social pressure. Behavioral theorists aim to interpret a cause and effect situation when analyzing change "as the influence of an independent variable over a dependent variable" (Kumbargeri and Sinha, 2017). With practice theory, however, the focus is shifted from the individual consumer to the consumer practice. Practice theory is promising in this regard as it enables a "contextual approach to consumer behavior and lifestyles" and provides fresh insights into the basis of human behavior and its transformation over time (Gossen & Kropfeld, 2022, p. 723). Furthermore, the characteristic of practice theory is that it enables the analysis of the dynamics and links between (related) practices and their surrounding elements, which makes it appropriate to use in an attempt to study the changes towards a more sustainable behavior (Spotswood et al., 2015).

Practice theory concerns the conditions surrounding the “practical carrying out of social life” (Halkier, Katz-Gerro & Martens, 2011, p. 3). Practice theory stems from the philosophical work of Heidegger and Wittgenstein and has roots in social sciences through the work of Giddens and Bourdieu (Halkier et al., 2011). Since the mid-1980s, there has been increased attention to studying consumption behavior from a social science perspective (Campbell, 1991; Miller, 1995). Practice theory arose from sociological consumption studies (Røpke, 2009). It mainly originated from the ongoing debate regarding the structure-agency interaction (Halkier et al., 2011). The often cited definition of a practice comes from the work by Rekcwitz, who states that a "practice (Praktik) is a routinized type of behavior which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge" (Reckwitz, 2002, p. 249). What is furthermore important to note is that a practice, say consuming or cooking, should be envisioned as a “block” that cannot be reduced to its single element but rather depends on the “interconnectedness” of the various elements in order for it to exist (Reckwitz, 2002, p. 250).

The usage of practice theory in this thesis is concerned chiefly with its capability to analyze consumption. Warde was one of the first to argue for a broader range of focus points when investigating consumption and move beyond concepts such as purchasing alone (Warde, 2005)—introducing more attention towards, for example, the symbolic significance or usage of items. Enjoyment was relatively novel here, especially concerning routine aspects such as food consumption (Warde & Martens, 2000). Harvey et al. (2001) argue that consumption should not be reduced to merely demand but instead that it can be an integral part of daily life. Warde provides a definition for consumption: "a process whereby agents engage in appropriation and appreciation, whether for utilitarian, expressive or contemplative purposes, of goods, services, performances, information or ambiance, whether purchased or not, over which the agent has some degree of discretion" (Warde, 2005, p. 137). Consumption is therefore not a practice itself; instead it is considered "a moment in almost every practice" (Warde, 2005, p .137). This is consistent with the idea that the activity renders the want, rather than the other way around (Swann, 2002). Practices create wants, not individual desires (Warde, 2005).

The role of consumers in "shaping and reproducing some of the core institutions of production and consumption" is becoming of greater importance (Spaargaren, 2003, p.687). This thesis builds upon that and agrees with the arguments posed by Spaargaren that a contextual approach is necessary to study sustainable consumption. This context considers the broader social structures in which human agents act (Spaargaren, 2003). These 'actor-structure' interactions by human agents concerning the social structures are considered 'social practices' (Giddens, 1991). What is vital here is that human agency is not seen as solitary, but rather that it takes shape as an actual 'behavioral practice,' with its ongoing interrelation with lifestyle practices and systems of provision (Spaargaren, 2003). Social practices can be described as actors who pursue their daily routines (Spaargaren & van Vliet, 2003). Nicolini expresses practices as routinized behaviors, shared norms, understanding, and competencies performed within a material context (2013). Practice theory allows for analyzing the interaction between actions and structures (Spaargaren & van Vliet, 2003). Lastly, reproduction and the transformation of social practices have relevant implications for institutions and infrastructures associated with consumption patterns (Shove et al., 2012).

2.3 - Urban Food Acquisition Practices

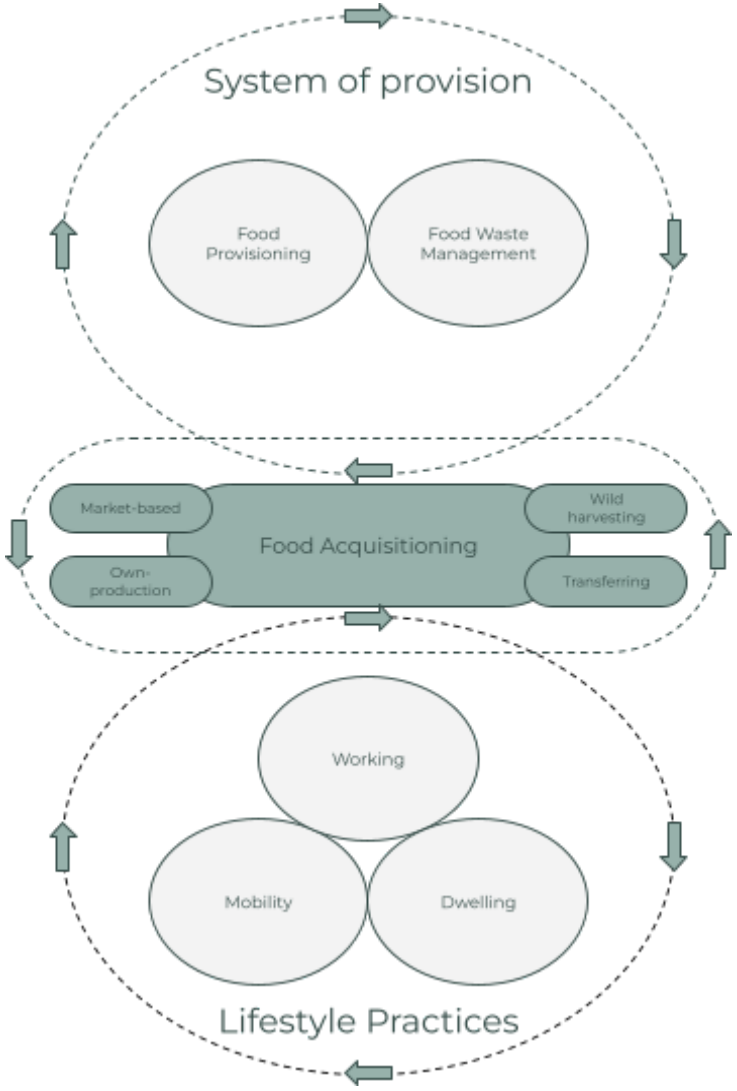
The acquisition of food is the third element of food consumption besides eating and food planning. Urban citizens have many different ways in which they can acquire their food: a visit to the local grocery store, more prominent retailer, or local (urban) farm, perhaps ordering it online through an app or even through growing it themselves. The act of acquiring the food, however, is not a standalone act. Seeing these acts as part of a larger framework, practice theory allows for a better understanding of the act. A simplified explanation of practices is that they are a bundle of: "material artifacts, conventions, and competencies" (Shove et al. 2008, p.9). The result of this is a framework consisting of three elements within the conceptual model: lifestyle practices, the practice itself (in this case, food acquisition), and the systems of provision. Figure 2 shows the model, which is inspired by the work of Spaargaren & van Vliet (2003) and Brons (n.d.). This work will make use of this theoretical framework throughout the expert interviews.

The following three subsections describe each of the three different elements within the model of consumption practices. They provide the theoretical background to which, in the results section, the findings are ascribed and take shape.

Lifestyle Practices

The transition toward a more sustainable society demands a shift in consumer lifestyles (Georg, 1999; Sanne, 2002). The bottom of the conceptual model of consumption is concerned with these lifestyles. Lifestyle practices, to be more precise, which is concerned with the settings of interaction as well as the context of practices (Spaargaren & Van Vliet, 2000). Lifestyle practices encompass the various ways actors can use the structures and how actors use knowledge and resources to monitor and perform their actions (Spaargaren & Van Vliet, 2000).

Figure 2 - Theoretical Framework of Consumption Practices as inspired by Spaargaren & van Vliet (2000) & Brons (n.d.), including Taylor et al., (2018) their food acquisition sources.



A lifestyle can also be described as a pattern of behaviors (Monmaas, 1993). Also, forming unity amongst different sets of social practices or "integration of social practices" is an element of lifestyles (Spaargaren & Van Vliet, 2000, p. 50). These bundled practices form so-called sets of interconnected practices by means of space and time (Shove et al., 2012).

However, there is more to it. Lifestyles are also very much concerned with the "story" that helps the actor express, through creating this specific "unity of practices," the actors' "narrative of the self" (Spaargaren & Van Vliet, 2000, p. 50). This narrative of the self is a form of "self-definition" and "self-expression" (Axsen et al., 2012, p. 65). Studying this concept of identity has become more prevalent when studying consumption practices. This is because it provides a more theoretically detailed basis for understanding (sustainable) consumption practices than attitudes, social norms, or values (Axsen et al., 2012; Stets & Biga, 2003). Research has shown that attitudes and individual beliefs are weak predictors of pro-environmental behavior (Scott & Willits, 1994). Furthermore, by "neglecting social and institutional contexts," these various prediction models "have been plagued by the attitude-behavior gap" (Axsen et al., 2012, p.65; Peattie, 2010).

Although establishing identity through practice is something we as consumers engage in, not all practices are deliberately associated with establishing an identity. Research has shown that more routinized practices such as taking a shower or washing our hands are less prone to being part of someone's self-definition, story, or lifestyle (Shove, 2010). The degree to which a particular practice is routine can thus determine to what extent the practice is part of someone's identity building.

Lifestyle practices are thus bundles of integrated social practices that can contribute to someone's story. Lifestyle Practices, however, are very much part of social structures as well. The story we try to create is not something we tend to keep to ourselves. These lifestyle constructions take place in specific contexts, often social contexts. How we construct our lifestyles is often a matter of negotiation within that specific context. The context on the one side determines a lot about the possible identity that we can create. The social context both enables and constrains the practice in a certain way, determining how and if practices are part of specific social structures. Furthermore, cultural meaning plays a significant role in how these social structures came to be and how they are maintained (Swidler, 1986). Practices are thus to be appreciated within their cultural context.

To make lifestyle practices more tangible, the three main focal points taken into consideration in the context of food acquisition are the interaction between the future urban dwelling, work characteristics, and mobility capabilities. These three aspects of lifestyle practices are put forward since these three form the settings of interaction and the context of practices. The lifestyle practices people partake in occur through an interaction between the three.

Systems of Provision

The upper side of the Conceptual Model of Consumption provides an opportunity to investigate social practices and how they are ingrained in the broader social-technical context (Spaargaren & Van Vliet, 2000). Consumption is very much interlinked with production. How people go about their daily lives while doing groceries and acquiring food is very much rooted in how these contexts are organized. The so-called “history” of certain products and their uses has made it so that people get access to them in a certain way (Spaargaren & van Vliet, 2000, p. 59). Systems of provision are just that: they allow people to have access and make use of production-consumption cycles (Spaargaren & Van Vliet, 2000). The concept of systems of provision describes the structures that link together distinctive patterns of production and patterns of consumption (Spaargaren & Van Vliet, 2000). In essence, by including systems of provision, the acts of supplying, maintaining, and disposing of products are not excluded from the equation but are included and put forth as part of the same system. Since these systems of provision, help organize our interaction with the environment.

The interconnection described here has its consequences for how people act. This interconnectedness also has a potentially limiting effect, especially when things have to change. There is an increasing urge to work towards more sustainable lifestyles. This urge can come from governmental organizations or consumers' intrinsic motivation itself. Regardless, however, the interconnectedness of our behaviors and the systems of provision makes it so that the possibilities (not) offered are of great importance (Spaargaren & Van Vliet, 2000). The main reason is if the intrinsic consumer motivation is to engage with more green lifestyle practices. However, the systems of provision do not meet those demands; little actual green consumer behavior will occur. The same goes for the other way around; if green alternatives offered through the systems of provision do not fit with the consumers' lifestyle or own system in place, very few of these green alternatives will be used. For example, a more sustainable

alternative to waste disposal will most likely not be adopted if it does not fit within the current infrastructure of waste handling within the neighborhood or municipality. Individual consumers will either not be able to engage with the green option, or it can simply be too big of a hurdle to overcome. Applied to food, the concept of systems of provision can also be described as the food environment as it functions as the "interface" between food acquisition and the wider food system (Turner et al. 2018, p. 95).

This interface is what allows for the supplying and disposing of products. This takes shape in the form of supermarkets in residential areas, where people can go and perform their practice. Furthermore, the various markets throughout Amsterdam also function as the food environment. Besides market-based access, however, people can also supply food for themselves by growing it on their balconies or having a community garden or urban garden membership. Any place in which people acquire their food is considered the food environment, of which the food provisioning function is a crucial element. In addition to acquiring the food, the infrastructure concerned with food waste management is also deemed necessary. The interaction with this infrastructure is inherently linked to what residents in the city acquire. In that sense, there is a constant interplay between the practice and food provisioning and food waste management.

Food Acquisition Practices

We have seen that practices fall between the lifestyle practices on the one end and systems of provision on the other. Acquiring food is based on a person's lifestyle practices while also being dependable on the socio-material context in which the practice takes place. According to Veen et al. (2014), the acquisition of food is both the shopping and growing of food. However, food acquisition as a practice can be described through different sets of lenses. According to Turner et al. (2018), food acquisition occurs within the food environment. The authors go on to state that there are four types of food sources in the food environment for people to acquire food (Turner et al., 2018):

1. Market-based sources (formal and informal)
2. Own production (urban, peri-urban, and rural)
3. Wild harvested foods (urban, peri-urban, and rural)
4. Food transfers – including gifts

Also, see figure 2 for the integration of the food sources within the theoretical framework. Even though the last two fall outside the shopping and growing introduced by Veen and colleagues, these two sources can play a significant role in the total amount of food acquired, especially in specific cultures and parts of the world.

In the Netherlands, most people acquire their foods through the supermarket. The acts involved start once leaving the house and end when entering the front door again or potentially when the food is consumed on the go. This depends on the type of food being acquired, where a bottle of apple juice can be consumed right after purchase, a bag full of vegetables and pasta for later that evening first needs to be stored, prepared, plated, and then consumed.

The food acquisition practice is part of a larger chain of practices. Food acquisition practices fall within food resource management or food handling practices and are deemed an important aspect of that (Hersey et al., 2001). Food resource management can best

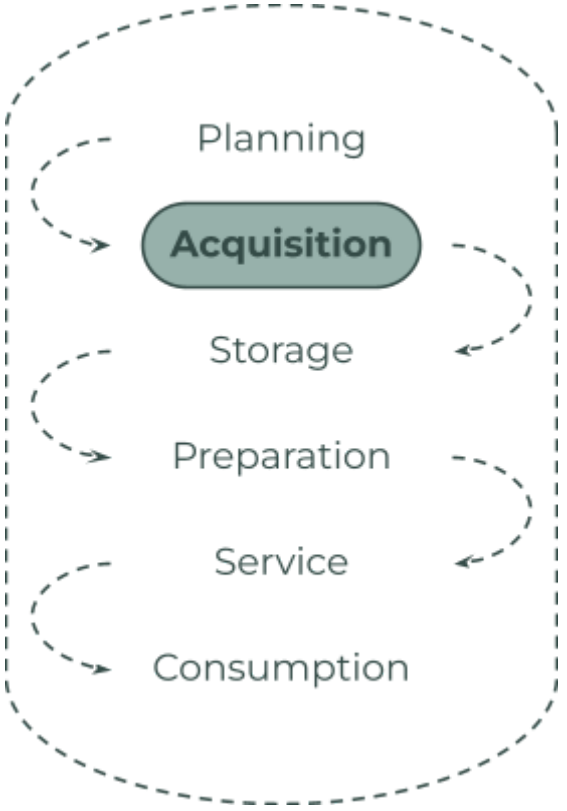
be described as the "handling of all foods and resources that may be used to acquire foods by an individual or family" (Hersey et al., 2001, p.16). See figure 3 for an overview of food acquisition in food resource management.

Concluding Remarks

The argument posed in the work by Shove and colleagues is that over time, practices can become increasingly embedded within the material artifacts (Shove et al. 2008). Activities are not only enabled but also shaped by structures of rules and meanings; in turn, these structures are reproduced through these activities (Shove et al., 2012). What this means is that many of the acts, doing groceries, for example, can become so ingrained within our daily lives and surroundings that it becomes difficult to think of a world without it. While this often does advance convenience, it can also lead to practices becoming fixed, even if they are not desirable. Unhealthy or unsustainable practices such as buying unhealthy snacks or eating large quantities of meat are examples of this. These practices and the environments they take place in become second nature, and with that, they reinforce each other. This is why this work argues that a broader perspective is required when analyzing individual agents, products, routines, infrastructures, and skills that make up everyday practices. Especially when trying to investigate what potential future urban food acquisition practices might look like.

This theoretical framework functions as a scope of analysis through which components of future food acquisition practices are analyzed. These components of the future will result in a set of scenarios. Even though the act of building scenarios leads to multiple futures, scenario building can help simplify things (Aligica, 2005). This is especially the case when both uncertainty and complexity are high. The main reason is that scenarios allow for a comprehensive future story and a potentially realistic description of what to expect. The elements of this theoretical framework form a starting point around which the different scenarios will be described.

Figure 3 - Activities in Food Resource Management (source: authors own creation).



Chapter 3 - Conceptual Framework

Chapter description

In Chapter 3, the conceptual framework of a sustainable diet is drafted by explaining its origin as well as describing the key components that it consists of. Arguments are put forward as to why this conceptual model is used. Its relevance for and fit with the City Deal initiative the city of Amsterdam is partaking in is also described. This framework will be used to 'score' the sustainability of the diets corresponding with each of the different scenarios developed in Chapter 5. By doing so, this thesis aims to make a first attempt to provide ways for administrative innovation as requested in the City Deal initiative. The framework allows for a comprehensive approach to scoring the different scenarios. Furthermore, it provides a visual representation that aims to foster understanding for participating municipalities in the City Deal initiative. It aims to provide, at a glance, an overview of the sustainability of a potential future.

3.1 - Why a sustainable diet?

Recent years have seen a rise in attention paid to policy development for sustainable diets. While this research line has long focused on the developing world, an increasing body of literature has investigated developed countries (Reynolds et al., 2014; Keats & Wiggins, 2014; Wiggins et al., 2015; Gonzales Fischer & Garnett, 2016; UNSCN, 2017). Furthermore, eight of the sustainable development goals have subgoals that are considered to be significantly aimed at a sustainable diet, see table 1 (Lang & Mason, 2018)

The food we eat and our diets are considered crucial determinants of our well-being and health. Nevertheless, the current food system is "unfair" and brings about "social injustices" (Lairon, 2012, p. 35). Research has shown that "poor dietary patterns make the greatest contribution to the burden of non-communicable diseases" (Tansey, G., & Worsley, A. 2014, p.90). Also, several leading causes of mortality and morbidity, including cancer and type 2 diabetes, are attributable to overconsumption (CDC, 2013). Furthermore, research has shown that in the Netherlands, adherence to food-based dietary guidelines is low (van Rossum et al. 2011).

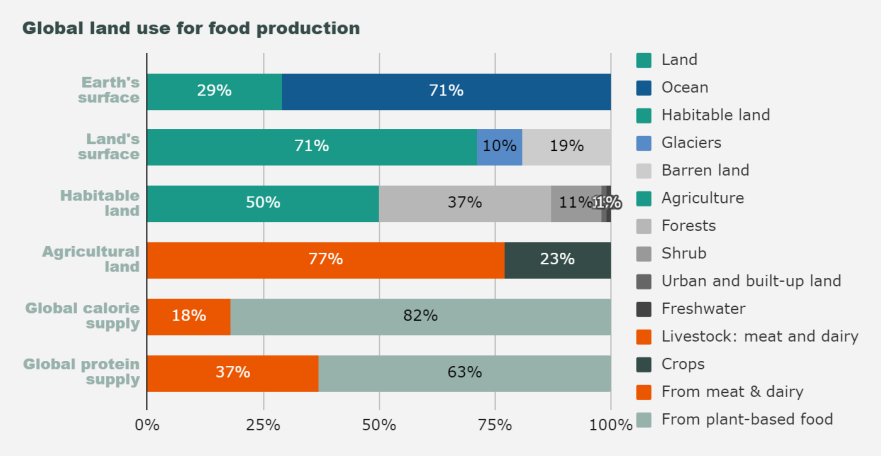
Table 1 - The United Nations Sustainable Development Goals (SDG) pointing to sustainable diets (source: Lang & Mason, 2018)

SDG	Goal	Significance for diet and food
SDG 1	End poverty	Inequalities determine access to diet; c. 80% of the world's poor are rural, many working on food
SDG 2	End hunger	c. 800 million are hungry; c. two billion overweight or obese
SDG 3	Health and well-being	Ensure healthy lives and promote well-being for all at all ages
SDG 6	Clean water	Crops and livestock account for 70 % of all water withdrawals
SDG 7	Energy	Food systems use 30 % of global energy resources
SDG 12	Sustainable consumption and production	An estimated 30 % of food is wasted; changing dietary patterns increase food's footprint
SDG 13	Combat climate change	Diet is a major contributor to climate change, accelerating with the nutrition transition
SDG 14	Oceans, seas and marine resources	c. 29 % of commercially important assessed marine fish stock are overfished; c. 61 % are fully fished
SDG 15	Life on land; biodiversity	A third of land is degraded; up to 75 % of crop genetic diversity is lost

Apart from a health standpoint, “diets have a pivotal role in supporting the transitions towards a more sustainable agriculture and food system” (FAO & WHO, 2019, p. 29). However, as the introduction has aimed to portray, our current food system and practices are not sustainable. Taking land use as an example: about 50% of habitable land is used for agriculture, 77% of that is used for livestock (meat & dairy), while this only is responsible for 18% of our global calorie supply and 37% of our global protein supply (Ritche & Roser, 2020). Figure 4 shows the land use accommodated with our current food production, showing evident inefficiencies in agricultural land use and calorie and protein distribution.

Another example that portrays the unsustainability of our current food system is dairy milk consumption. In Europe, dairy can contribute up to one-third of its total carbon footprint (Sandström et al., 2018).

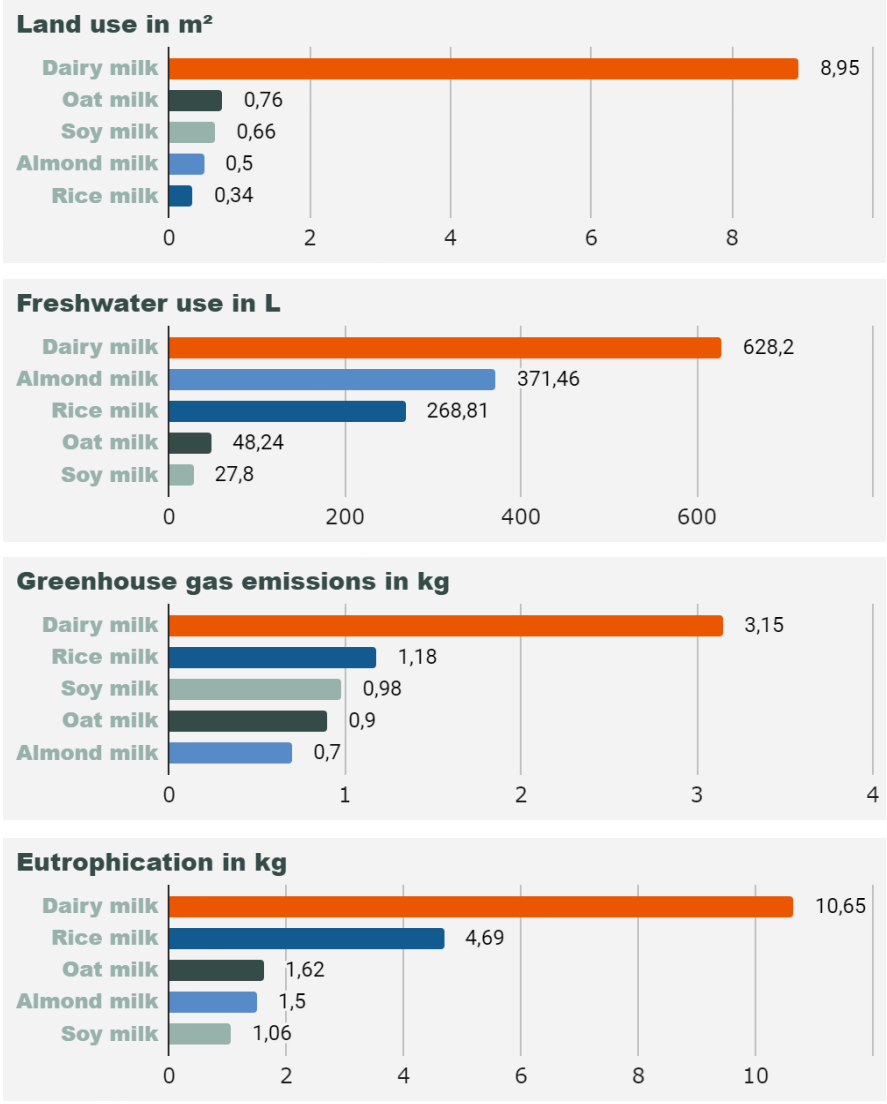
Figure 4 - Land use distribution of food production (source: free from Ritchie & Roser 2020)



For milk, various plant-based alternatives are available on the market, showing considerable improvements in land use, water usage, greenhouse gas emissions, and eutrophication (Poore & Nemeck, 2018). Nevertheless, Europe's plant milk market share amounts to 4% (Mäkinen et al., 2016). See figure 5 for an overview of the comparison between dairy milk and three widely available alternatives.

Apart from the health constraints and environmental impact of our food system, there are also other aspects of our food system causing problems. Having to deal with obesity, for example, affects not only the health of the affected but also their social life and economic situation (DEFRA, 2008). Even though Europe is considered a wealthy continent, food poverty is an increasing problem. While throughout Europe, there are considerable differences, in 2015, the average risk of poverty was 21%, with 8% of the population being considered "unable to afford" a protein-rich meal every second day (EU SILC data, 2015; Galli et al., 2018, p. 3). For the Netherlands, these numbers are 16.5% and 2.2%, respectively (EU SILC data, 2015). Tackling this wide range of challenges can be difficult. Even more so since food also very much holds cultural values in and of its own (Nicolaou et al. 2009). Modern Western cities (including Amsterdam) are becoming what are known as majority-minority cities (Crul, 2016; Brons, Oosterveer, & Wertheim-Heck, 2020). This means that most of its population identifies as part of a minority. The sustainable diet of the future is one that is culturally acceptable (Mason, P., & Lang, T. 2017). However, adequate, sustainable food provisioning for the future city can prove challenging with a wide variety of cultural preferences to adhere to.

Figure 5 - Environmental footprints of dairy and plant-based milk, impacts measured per liter of milk (Source: free from Poore & Nemecek (2018)



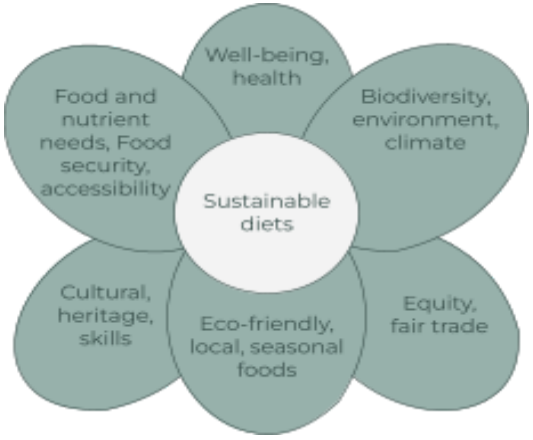
3.2 - The sustainable diet concept

Working towards a healthier and more sustainable diet is vital in light of global climate change and the increasing world population. Nevertheless, determining what a healthy and sustainable diet entails is debatable (Brons et al., 2020). Over the years, many arguments have been raised to develop more evidence of what a sustainable and healthy diet entails (Tilman & Clark, 2014; Nelson et al., 2016; Springman et al., 2018). Even though both aspects are different, throughout literature, the concepts of healthy and sustainable are put together when discussing the sustainable diet (Hallström et al., 2018). In addition, there is more to food than its nutritional value and environmental impact. According to Dernini and FAO colleagues, "sustainable diets" are "diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources" (International scientific symposium biodiversity and sustainable diets united against hunger & Dernini, 2012, p. 7).

Authorities should direct people towards sustainable food production and consumption (Dernini, 2012). The concept of sustainable diets can help "to successfully advance commitments to sustainable development and the elimination of poverty, food and nutrition insecurity, and poor health outcomes" (Johnston et al. 2014, p. 420). For city authorities, it is not always clear how to assess the sustainability of the food being eaten within the city borders. Furthermore, the food system is characterized by many

interrelations of processes and factors influencing one another, causing policymakers difficulty in making appropriate choices (Lang & Barlin, 2013). This thesis, therefore, follows the work by Lairon (2012) (published in (International scientific symposium biodiversity and sustainable diets united against hunger & Dernini, 2012) and Johnston et al. (2014) and tries to help policymakers gain insights into the sustainability of the cities' diets. Figure 6 shows a schematic representation of the key components of a sustainable diet as introduced by Lairon (2012).

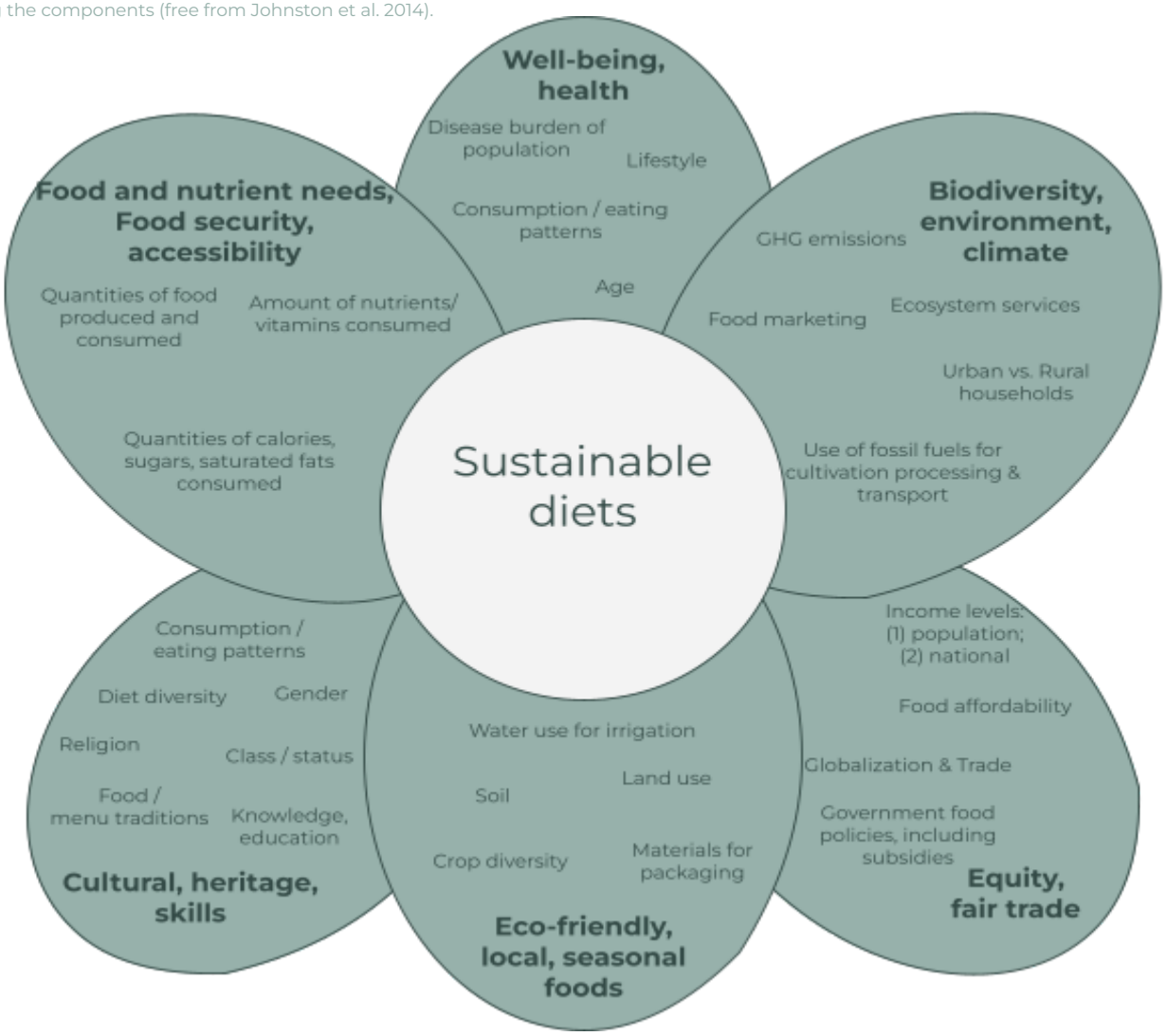
Figure 6 - Schematic representation of the key components of a sustainable diet (free from Lairon, 2012).



The President of the Federation of European Nutrition Societies (FENS), Denis Lairon, drafted the schematic overview during the International scientific symposium biodiversity and sustainable diets united against hunger, organized by the FAO. The six key components are based on five determinants: 1) agriculture, 2) health, 3) sociocultural, 4) environmental, and 5) socioeconomic. See Lairon (2012) for an extensive version of this. Elements 2 to 5 are widely regarded as the domain of what a sustainable diet entails (Drewnowski, 2018). However, as argued by Mason and Lang (2017) in response to the conventional notion of what sustainability entails: "food requires a more subtle and complex combination of factors, arguing that sustainable food and diets can usefully be viewed under six broad headings: quality, health, environment, social values, economy and governance" (p. 7). The conventional here being the environment, society, and economy.

Johnston and colleagues took inspiration from the work of Lairon. They drafted a schematic that includes not only the key components of a sustainable diet but, in addition, introduces various processes and factors “that make up the influence of a particular component on what comprises a sustainable diet” (Johnston et al. 2014, p. 421). The key components contain four to seven factors or processes displaying their interdependence and influence on the diet's sustainability. See figure 7 for the schematic overview of the sustainable diet, including its corresponding factors and processes. The argument for working with the model introduced by Lairon and later extended by Johnston is its extensive coverage of topics concerned with the sustainable diet introduced by the FAO. The range of topics that the conceptual framework by Johnston is thus argued to be a full-fledged lens through which one can analyze the sustainability of a diet. What is crucial to understand here however is that not all individual factors and processes are worked out in-depth within this thesis. Their sole purpose here is to allow for a visual representation. In Chapter 4 the usage of this conceptual framework is explained more in depth.

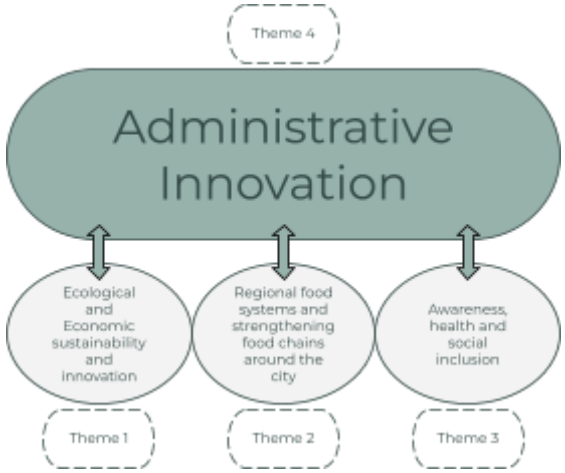
Figure 7 - Schematic representation of the key components of a sustainable diet, including factors and processes influencing the components (free from Johnston et al. 2014).



3.3 - The City Deal

As briefly indicated in the introduction, Amsterdam takes part in the City Deal - Food on the urban agenda, in which twelve municipalities, alongside three ministries, work together within four thematic clusters: 1) Ecological and Economic sustainability and innovation; 2) Regional food systems and strengthening food chains around the city; 3) Awareness, health, and social inclusion; and the overhaulin theme: 4) Administrative innovation (see figure 8). This work argues that the framework's components by Johnston and colleagues cover the three substantive themes while the entire conceptual framework itself and its application in this thesis helps with the overhauling fourth theme. The four themes are briefly described here to strengthen the argument as to why the conceptual framework by Johnston and colleagues is relevant to use.

Figure 8 - Overview of the structure of the city deal method (Source: Staatscourant, 2017)



Thematic Cluster 1) Ecological and Economic sustainability and innovation.

The City Deal initiative is concerned with local food policy and hopes to offer opportunities to make food systems ecologically sustainable and, at the same time, generate economic activity in and around the city. Its goal is to take advantage of these opportunities, for which a joint approach is required. It is argued that contribution from all partners in the chain is needed: from farmer to consumer, but also intermediate links such as retail and processing industry. In addition, the city government can play an important role as a catalyst by bringing parties from different policy areas together to stimulate crossovers and generate a stimulating environment for system innovation (Staatscourant, 2017).

Urban food systems are viewed as being linked through the use and management of natural resources. The city is also connected to the surrounding region via waste, nutrients, and water flows. Examples that can help with economically strengthening the regional food system are: better closing cycles and balancing agricultural production with the management of natural resources based on principles such as circular economy, cradle-to-cradle, and nature-inclusive agriculture. Potential effects are moderating meat consumption in combination with regional cultivation and marketing of protein crops or preventing food losses and waste. A new, value-driven business model (people, planet, profit) is necessary to exploit these opportunities for economic and ecological sustainability. Knowledge and innovation in this area must, however, be developed. (Staatscourant, 2017).

Thematic cluster 1 overlaps with the components: **'Biodiversity, environment, climate'** and **'Equity, fair trade.'**

Thematic Cluster 2) Regional food systems and strengthening food chains around the city.

The City Deal initiative states a growing social need to make local and regional food more available in the city. Local and regional food meets the demand for healthy and fresh food and transparent food chains while simultaneously providing opportunities to strengthen farmers' incomes. However, it is mentioned that the development of local and regional food markets is still insufficient. Local and regional products are only sparsely available in supermarkets. There is much dynamism in small-scale initiatives that connect farmers and consumers directly via short chains, but these still lack scale and clout to reach wider groups of consumers. Local policy could offer opportunities to make improvements to increase the availability of local and regional products in the city. This is through rural development policy and urban policy instruments (e.g., public procurement) being used in an integrated manner. The development of innovative retail concepts and the bundling of supply in regional food hubs are also important (Staatscourant, 2017).

Furthermore, Food education can also strengthen fair, regional food systems. The City Deal initiative argues that in recent decades, citizens have become increasingly alienated from their food's origin and production method. Awareness activities (for example, visits to farms in the area and education about food for specific target groups) can contribute to greater awareness about the origin of food and the importance of solid relations between urban and rural areas. Justice and a fair price for food products are essential drivers for strengthening regional food systems. These are also reflected in urban Global Goals campaigns to achieve the UN Sustainable Development Goals at the local level." (Staatscourant, 2017).

Thematic cluster 2 overlaps with the key component: **'Eco-friendly, local, seasonal foods.'**

Thematic Cluster 3) Awareness, health, and social inclusion.

The third cluster is concerned with health, food, and social inclusiveness, which are strongly linked within the city. Health is a core value that many urban residents associate with food and, therefore, a valuable input to increase awareness of food choices. This theme can also be linked well with the municipal health policy memorandum. Dietary patterns partly determine how people feel and are essential to public health. Diseases of affluence (type II diabetes, cardiovascular disease) have been increasing and are partly related to eating behavior and being overweight. Health problems are also closely related to poverty and social disadvantage. Factors such as (low) food skills and insufficient access to varied and fresh food play an important role (Staatscourant, 2017).

The improvement of health – focusing on people in a lower socioeconomic position – is therefore seen as a critical point in urban food policy for many cities in the Netherlands. Activities such as information about healthy nutrition, making healthy food choices more accessible and more attractive, and attention to

nutrition in healthcare are examples. In addition to stimulating healthy (nutritional) behavior, strengthening a healthy living environment (including a healthy food supply), which invites a conscious and healthy lifestyle, is an important point of attention for promoting health and social inclusiveness. This includes access to sufficient healthy food, vibrant greenery in the neighborhood, urban agriculture, and other community initiatives related to food." (Staatscourant, 2017).

The third thematic cluster is represented by the following components: **'Well-being, health,' 'Food and nutrient needs, Food security, accessibility'** and **'Cultural, heritage, skills.'**

Thematic Cluster 4) Administrative innovation.

The overarching theme 'Administrative innovation' focuses on administrative innovation and what is needed for this. It also connects the three substantive theme clusters in its attempt to offer solutions to the three substantive theme clusters. Learning about and working together on administrative innovation is the overarching method in this City Deal. The aim is to move from government to governance and from an approach in fragmented subdomains to an approach to the food issue as a chain and system. (Staatscourant, 2017).

This final cluster is the overhauling one and is concerned with envisioning the fragmented subdomains as a food system. The sustainable diet concept and corresponding conceptual framework play a role here. It allows researchers and policymakers to step away from fragmented approaches and aims to encompass the entirety of the food system within the urban sphere and its interrelated factors and processes. See figure 9 for an overview of the conceptual framework and its linkages to the four thematics clusters of the City Deal program.

Concluding Remarks

The goal of this conceptual representation of the sustainable diet within this thesis is to enhance the insights that policymakers can gain from investigating the potential future of food acquisition practices. Seeing at a glance the effects certain realities can have on the sustainability of the diet should help create a better and holistic understanding of the food system's complexity. A suitable methodology for assessing the sustainability of diets is complex. Therefore an "element of pragmatism is inevitable. There is pressure for good methods and indicators because there are already strong reasons for dietary change" (Mason & Lang, 2017, p. 37). This conceptual framework, therefore, does not zoom in on a particular detailed diet composition such as the EAT-Lancet (Willet et al., 2019). Instead, this thesis is more concerned with the relation between food acquisition practices, lifestyle practices, and systems of provision that, together, as part of the food practices of Amsterdam residents, can contribute to a sustainable urban food system that can translate to a sustainable diet. Determining specific dietary compositions would be a potential next step. For this, however, each individual process part of the key component needs to be worked out in detail, after which it can be linked to the composition of the diet. However, such a step would require a deep understanding of every component and its (local) context for it to succeed, which is not within the scope of the current thesis. See discussion for further elaboration on potential future uses for this conceptual framework.

This thesis uses the schematic representation of the sustainable diet introduced by Lairon (2012) and Johnston et al. (2014). Where the next chapter explains how from interviews, various trends and drivers were drafted, Chapter 5 introduces four future narratives of food acquisition practices. These future narratives, in turn, are reflected upon employing the sustainable diet components part of this chapter's conceptual framework. Displaying the schematic overview in figure 7 and showing which factors and processes, and thus which key components, could potentially strengthen or jeopardize the scenarios' diets sustainability. The following chapter describes this process of reflection and visual presentation more in-depth.

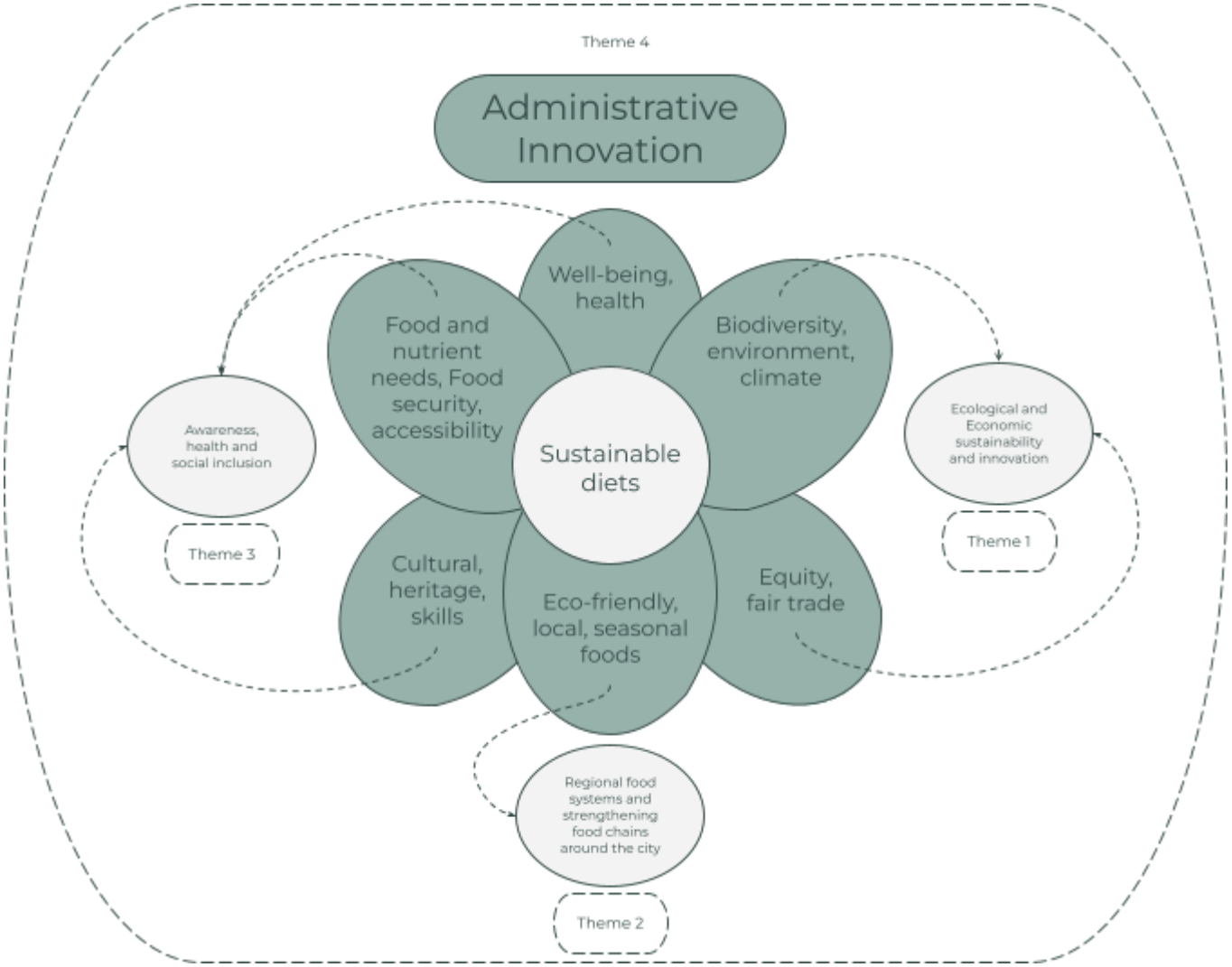


Figure 9 - Overview how of the city themes are covered by the conceptual framework

Chapter 4 - Research Methodology

Chapter description

This chapter starts by briefly describing the history of food acquisition practices within Amsterdam from 1400 to the present, see section 4.1. The sections that follow shed light on the executed and developed research methodologies (see table 2).

Table 2 - Overview of different sections and methods

Section	Method(s) used
4.1	Amsterdam Case Study
4.2	Expert Consultation
4.3	DESTEP + S, Scenario Building
4.4	Scenario Reflection

Section 4.2 is concerned with conducting interviews and identifying trends and drivers. In order to understand and structure the findings from the interviews, the DESTEP methodology was used and broadened. The DESTEP methodology is a way to structure trends and drivers and interpret them as either a Demographic, Economic, Social, Technical, Ecological, or Political development. Introducing the S (Spatial) dimension should enrich this methodology and result in a more complete and encompassing methodology for systematically analyzing trends and drivers. This results in the DESTEP + S methodology. This is further explained in the Section 4.3. In addition to answering both research questions and expanding the DESTEP methodology, this paper also aims to contribute to the methodological act of scenario building itself. It is attempted to further the understanding and development of practical application of the scenario-building methodology. This work describes the scenario-building process step-by-step and allows the reader to follow how conclusions resulted from the interviews through various metric tables (table 7 contains an overview of the steps, Appendix B contains all steps filled in). With that, an attempt is made to break away from the often unclear procedure of how scenarios in qualitative research are developed. The developed scenarios help with answering the sub-research question. The scenarios are reflected upon by using the key components of the sustainable diet concept as outlined in Chapter 3 and with that answers the main research question. Section 4.4 describes how this is done.

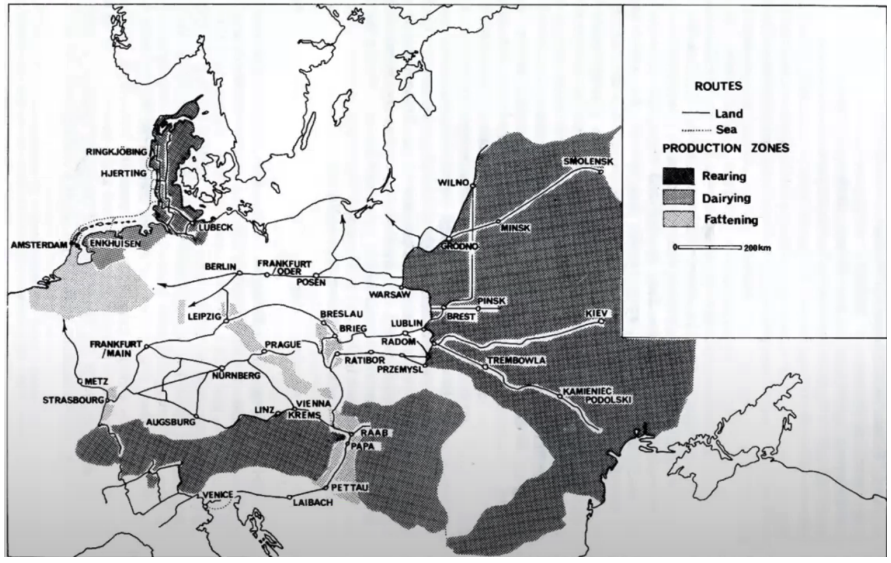
Out of the four thematic focal points of the City Deal, this thesis mainly aims to contribute toward the overhauling thematic cluster of administrative innovation. By showing how the conceptual framework can be used and integrating that with scenario building, this thesis aims to lead by example. With the elaborate steps which are described in this chapter and in more detail in Appendix B this work hopes to be a starting point. One that allows for a one-on-one reiteration of this work. This is argued to be valuable if the municipality of Amsterdam or any of the other eleven municipalities is interested in (expanding their) understanding (of) future possibilities for their (urban) food systems. An important note to make is that combining three methods requires a great deal of time and dedication. Within the scope of this thesis a first attempt is made, yet it does not claim to be perfect by any means and it thus welcomes any form of criqitqual feedback.

4.1 - Amsterdam Case Study

This research is concerned with 'futuring' the food acquisition practices for the city of Amsterdam in 2050. This short section is aimed to provide a brief history of how Amsterdam as a city acquired its food over the years while also briefly touching upon, what becomes evident later on, how the relationship between the city and its hinterland is fundamental to the food acquisition practices of its residents. The actual food acquisition practices of Amsterdam residents throughout history are not dictated as such in detail since a majority of its people were poor, and their diets were not something of interest for many to study. However, the way in which the city was supplied with food is known, which does help paint a picture of how the food practices between 1400 and 2000 developed. The following paragraphs are by no means a complete overview of the Dutch or Amsterdam food (acquisition) practices but are purely intended as informative and cover a few key characteristics of 600 years of Dutch and Amsterdam food history.

How a city back in the days used to be fed can best be explained by von Thünen's model 'Isolated State' (Von Thünen, 2009). This model argues that how the agricultural hinterland of a city takes shapes can be derived as a function of the transport costs, production costs, and market price of agricultural products (Tobler, 1993). This resulted in rings around the city, each providing different crops and food for the city. Immediately surrounding the city are the perishable products, such as milk and strawberries. After that, a ring of wood production exists since wood is bulky and expensive to transport (if over land). Further away are grain farms and comparable crops. The outer ring provides the city with cattle. Cattle are raised in the outer ring since they can walk toward the city's market (Cruijningen, 2020). However, for Amsterdam, this theory is not wholly conclusive since the surrounding hinterland is characterized by peat soil. This land was too wet for arable farming (especially after 1350). So the hinterland was not capable of feeding the Amsterdam residents. Grain could not be grown, so it would not be possible to have basic foods such as bread (Cruijningen, 2020). Amsterdam grew from a small town in 1400 to a big city with a population of about 175.000 in 1650 growing up to 218.000 in 1800 (Blockmans, 1990). So the city had to find ways to feed its residents.

Figure 10 - Overview of cattle raising and cattle trade in early modern Europe (source: copied from Cruijningen, 2020)



For grain, the solution was found by importing it from the baltic region (see figure 10). Amsterdam grew as a port city, and this grain trade became rather lucrative, resulting in the Amsterdam corn exchange in 1650. This corn trade was even seen as the mother of all trade ('moedernegotie') and indeed formed the basis of prosperity for the city (Steel, 2013; Cruijningen, 2020). For cattle, the food supply did follow von Thünen's model. Cattle were mainly found on the periphery of Europe. The Netherlands imported cattle mainly from Denmark, where cattle was transported via land. Following von Thünen's model, milk production was found near the city gates due to its perishable nature. Dairy farmers brought the milk via the canals of Amsterdam and sold it on the market. Figure 11 shows Amsterdam in 1544 and gives a clear overview of how the hinterland supplied the city through the waterways. There were no ways of cooling the milk, so milk had to be transported right away from the land to the markets. By 1700 farms had grown much more prominent, resulting in traders taking up the task of bringing the milk from the farm towards the city, loading up the boats with up to 1500 liters of milk, still via the canals.

Even though the actual food acquisition practices are not described here, it becomes clear that the relationship between the city and its hinterland was evident for an extended part of history. Carolyn Steel writes:

> *No inhabitant of a pre-industrial city could have been unaware. Before the railways, supplying themselves with food was the biggest headache cities faced, and evidence of the struggle was unavoidable. Roads were full of carts and wagons carrying vegetables and grain, rivers and docksides were packed with cargo ships and fishing boats, streets and back yards were full of cows, pigs and chickens. Living in such a city, there could be no doubt as to where your food came from: it was all around you, snorting and steaming and getting in the way. City-dwellers in the past had no choice but to acknowledge the role of food in their lives. It was present in everything they did.* (Steel, 2013, p. 6)

The steady supply of food towards Amsterdam saw no particular disturbances and was considered steady for many years. However, the famous potato disease in 1845/1846 did have its effects on what Dutch citizens ate (Raping and Tassenaar, 2007). Table 3 is an overview of caloric sources between 1807 and 1913; here, we see the potato disease as a dip in the numbers between 1845 and 1855 (Knibbe, 2007). We also see a decrease in the role of dairy products throughout the years. Wheat, on the other hand, became a more important source, as well as meat. The reason for this is mainly ascribed to the increasing population.

Figure 11 - Amsterdam in 1544 (source: copied from Cruijningen, 2020)

Apart from what people ate, it is also interesting to look at how capable people were in acquiring their food. One way of looking at this is the spending on food as a percentage of the GDP. The GDP, however, is not a measure of welfare but wealth, although it is questionable whether an increase in GDP meant that the pockets of those working for a wage were filled. This is since the GDP is concerned with the market value of all final goods within a specific country during a specific period. It, therefore, does not say much about how the wealth, if there was any, was distributed. Table 4 gives an overview of spending on food, alcohol, and tobacco as a percentage of the GDP. Even though the GDP was constantly rising, much money was spent on purchasing food. In addition, it also provides an overview of spending on food, alcohol, and tobacco as a percentage of total spending (including consumption, investments, export, and governmental spending).

We see that until the industrial revolution, the share spent on food was actually increasing, even though the GDP and total spending were increasing. The industrial revolution started in the second half of the 19th century in the Netherlands, where before, most people had to work the land to provide themselves with food; now, due to various technological advancements (canned food is one example), this was no longer necessary (Gelijnse and Dekker, 2011). People started working in factories, and local bakeries became large bread manufacturers. The same goes for cheese makers from which large dairy producers arose.

Table 3 - Source of available calories, in percentage of the total (source: Knibbe (2007).

Year	Potatoes	Wheat	Rye	Dairy	Meat
1807/ '08	10	14	17	36	8
1815/ '24	16	12	15	33	8
1825/ '44	15	13	19	30	8
1845/ '55	12	12	25	26	7
1856/ '65	14	17	23	22	7
1866/ '82	13	22	18	20	7
1883/ '93	12	30	13	18	8
1893/ '13	12	32	10	16	10

Table 4 - Spending on food, alcohol, and tobacco as a percentage of the GDP and the total spendings between 1807-1980 (source: CBS, 2001).

Year	GDP	Total spendings
1807	39	34
1820	47	37
1840	49	38
1860	42	29
1880	39	25
1900	34	21
1923	36	24
1937	30	23
1960	22	17
1980	11	7

Until the Second World War, the focus was on scaling up and increasing efficiency. After the Second World War, during which the Netherlands had been plagued by hunger, the slogan 'Nooit meer honger' (Never hunger again) was coined by a Dutch farmer and first European Commissioner for Agriculture, Sicco Mansholt. Europe made food security a priority through agricultural investments and the upscaling of farms. This eventually caused the famous 'milk lakes' and 'butter mountains' but also led to bigger farms with fewer actual farmers (Geleijnse and Dekker, 2011). There was depopulation from the countryside. The earlier mentioned food shortage also had another effect; the small food retailer went through difficult times. The first 'self-service shops,' the forerunner of what we now understand as supermarkets, started to arise. Dirk van den Broek (an old dairy farmer) was the first in Amsterdam in 1950 that would sell dairy products that people could grab from the shelves themself (see figure 12) (Hondelink, 1998). Albert Heijn soon followed in 1952 and expanded its self-service concept to 100 stores throughout the Netherlands in 1958. From this self-service concept, the supermarket arose, which offered an extensive range of food products. "It is precisely during these decades that technologies to make new composite and highly processed products expanded and resulted in more convenience for the food consumer" (Spaargaren, Oosterveer, & Loeber, 2012, p. 64).

The city's food system and corresponding food provisioning started to change. The acquired foods were increasingly characterized by improved "shelf life, convenience, taste, consistency, smell, color and an ever-growing diversity" (Spaargaren et al. 2012, p. 71). This both due to developments in the system of provision, such as distribution, improved production techniques, and internationalization, as well as through various developments affecting the lifestyle practices, such as rising prosperity, increased free time (accompanied by a change in food culture), population growth, and urbanization (Sluijter, 2007).

Figure 12 - Dirk van den Broek in his self-service dairy shop, 1945-1950 (source: Hondelink, 1998).

All these factors together affected the food system considerably. Food acquisition practices were shaped accordingly, and with the rising prosperity, the differences in food consumption between rich and poor became smaller, coined the democratization of food (Hartog, 1987; Otterloo, 1990). The Dutch food culture changed with the introduction of the five-day work week in 1961 (Sluijter, 2007). The growing popularity of convenience foods also

contributed to, although only considerably from the 1970s onwards, women's increasing labor market participation (Sluijter, 2007). The idea of 'one-stop-shopping' was further stimulated by the introduction of shopping centers and the widespread possession and use of cars among the population. This is mainly due to supermarkets located on the city's outskirts due to layouts of traditional city centers, which "mess up the economies of scale" of the supermarket, which are best at "sourcing food cheaply and moving it around in bulk" (Steel, 2013, p.112). The increasing dominance of supermarkets becomes evident in their growing market share in total food sales in the Netherlands. From 1968 onwards, it is considered to have taken over, with 12,5% of the market share (Bakker, Nooteboom and Voolebregt, 1982), rising to 64% of the Dutch market in 1992 (Maandstatistiek detailhandel, 1996). Currently, these numbers are estimated at 94% of the Amsterdam market share (Gemeente Amsterdam, 2020)

In today's day and age, it is hard to imagine a world without supermarkets providing food for the city. Nevertheless, this work makes an effort to envision the future of food acquisition in Amsterdam in 2050, which will also shed light on the role of the supermarket and its developments. The following sections cover the methods applied throughout this thesis. This case study description functions as a starting point for understanding the food acquisition practices of Amsterdam residents throughout the past, present, and future.

4.2 - Expert Consultation

The theoretical framework on food acquisition practices functioned as input for the interviews, in which the three elements of the theoretical framework (lifestyle practices, food acquisition practices, and systems of provision) are discussed and explored. The semi-structured interviews were structured following an interview guide. The interview guide helps with having conversations in a standardized manner, ensuring that the main points of interest are covered during the conversations (Mason, 2002) while still allowing the opportunity for relevant and interesting insights to emerge (O'Keeffe et al. 2016). See Appendix A for the complete interview guide. Research can benefit from semi-structured interviewing due to its ability to produce plentiful and comprehensive data, allowing for a solid appraisal of various characteristics of the studied phenomena (Fallon, 2008). Throughout these interviews, experts were asked to identify trends and drivers they see within their professional environment. Trends are general developments or changes in a situation, potentially accompanied by changes in human behavior. Drivers are considered to make other things progress, develop or grow stronger. The goal is to envision the future food acquisition practices of 2050 based on the identified trends and drivers.

Overview Expert Consultation:

In order to get a good understanding of the future food acquisition practices and ensure that the pool of interviewees could be considered a representative sample, the experts interviewed were selected by means of purposive sampling. This sampling technique involves selecting participants with abundant information (within their field of expertise) regarding the topics of interest to the researcher (Guarte & Barrios, 2006).

A target sample population is determined based on potential information provided per sample population. The inclusion criteria of the populations are shown in table 5. The inclusion criteria for this study are concerned with the interviewees' occupation (1A-11A), the conceptual framework and case study (1B-10B), and lastly, the theoretical framework (1C-6C).

The experts interviewed were part of the researchers' networks, either directly or via this same network. The experts were approached via either email or Linkedin. A general introduction was given to the research, and the interviewees were asked whether they were interested in contributing. The interviewees consented to partake in the interviews by confirming the date and time of the appointment. Interviews were either online (via Zoom/ Microsoft Teams) or in person and took between 45 minutes and 1,5 hours. Initially, a total of seven interviews were conducted (see table 6a).

However, although all conversations resulted in trends and drivers, two interviews provided less insight than hoped. Specifically, interviews 06. and 07. resulted in a lower number of trends while also the depth of the conversations was not ideal. Interview 06. had particular knowledge regarding food access and food economics. However, most of the knowledge was not per se applicable to the Amsterdam context. Interview 07. did result in interesting insights, but the interviewee's knowledge was

Table 5 - Listing of inclusion criteria and how they are covered within the held scenarios

Field of work	Code	Understanding of	Code	Relating to food practice	Code
Municipality	1A	(Healthy) Food environment	1B	Food acquisition	1C
Large food retailer	2A	Amsterdam context	2B	Lifestyle practices (work)	2C
Supermarket	3A	Future food store concepts	3B	Lifestyle practices (dwelling)	3C
Food consultancy for both industry and government	4A	Consumer trends	4B	Lifestyle practices (mobility)	4C
Research institute	5A	Governmental trends	5B	Systems of provision (food provisioning)	5C
Food NGO	6A	Industry trends	6B	Systems of provision (food waste management)	6C
Frontrunner urban farming	7A	Diet criteria: low environmental impact	7B		
Frontrunner new food economy	8A	Diet criteria: healthy	8B		
Expert on mobility	9A	Diet criteria: culturally appropriate	9B		
Expert on dwelling	10A	Diet criteria: economically viable	10B		
Expert on work	11A				

Legenda	Colour
Covered in several interviews	
Covered	
Not covered	

somewhat limited to the initiative the interviewee represented, causing limited coverage of the other topics.

In addition, before the seven interviews were conducted, my thesis supervisor Anke Brons granted the possibility and access to include interviews from similar research conducted by herself. As part of the theoretical framework, insights into the broader lifestyle practices of the future remained under-represented during the initial seven interviews. Therefore an additional four interview results were used, conducted by my supervisor Anke Brons, during her research on a similar topic using a similar interview guide. The four additional interviews used consisted of three that focused on lifestyle practices, while one specifically focused on systems of provision. Together these four interviews would enrich the comprehensive understanding of future food acquisition practices and their corresponding lifestyle practices and systems of provision, as intended. See table 6b for an overview of the additional four interviewees. In total, 11 interviews form the basis of the findings for this thesis used to create future scenarios. The interviews were transcribed in their original language (Dutch) and, after that, summarized. The step-by-step explanation in Section 4.3 2 covers more in detail what steps were taken after that.

4.3 - DESTEP +S & Scenario Building

The data gathered throughout the different interviews is structured using the DESTEP + S method. The DESTEP method provides a systematic analysis of a variety of factors. Furthermore, it helps with grouping chunks of gathered information. The DESTEP methodology is considered a suitable tool specifically when depicting the current situation and occurring trends (Cornelissen, 2004). From which after that, future predictions can be made in an organized manner. This method is used to identify demographic, economic, social, technical, ecological, and political factors that came across during expert consultation.

Table 6a - Listing of initial seven interviews and main focus points

Interviewee	Industry	Inclusion criteria covered	Date	Live / Online
01.	Municipality	1A, 1B, 2B, 8B, 1C	10/05/2022	Live
02.	Large supermarket	3A, 3B, 4B, 6B, 1C, 5C	12/05/2022	Online
03.	Food transition consultant	4A, 4B, 5B, 6B, 8B, 1C	13/05/2022	Online
04.	Research institute	5A, 2B, 5B, 6B, 5C, 6C	13/05/2022	Online
05.	Large food retailer & Various 'New food economy' advisory roles	2A, 4A, 8A, 6B, 7B, 8B, 5C	16/05/2022	Live
06.	Researcher	5A, 5B, 10B, 1C, 5C	19/05/2022	Online
07.	New food economy initiative	8A, 3B, 5B, 10B	02/06/2022	Online

Table 6b - Listing of additional four interviews (conducted by supervisor Anke Brons) and main focus points

Interviewee	Industry	Inclusion criteria covered	Date	Live / Online
08.	Researcher	5A, 2B, 4B, 5B, 6B, 6C	08/04/2022	Online
09.	Expert mobility	9A, 2B, 6B, 2C, 4C	05/04/2022	Online
10.	Architect	10A, 2C, 3C, 4C	12/04/2022	Live
11.	Expert working	11A, 6B, 2C, 3C, 4C	22/04/2022	Online

However, using practice theory as the theoretical framework calls for revising the DESTEP methodology. Where lifestyle practices are adequately covered within the original six dimensions, the incorporation of the systems of provision is not. The role of the (urban) food environment, the spatial dimension, plays a significant role in food acquisition outcomes (Lovasi et al., 2009; Michimi and Wimberly, 2010; Walker et al., 2010; Engler-Stringer, Gerrad & Muhajarine, 2014; Wiliams et al., 2014). This food environment is therefore also argued to be a fundamental dimension when analyzing the various trends. This work reflects this emphasis by adding to the DESTEP methodology, which resulted in the DESTEP + S methodology (see figure 13). S standing for Spatial. Since the spatial dimension is one of the critical points of interest, introducing the S in the DESTEP methodology is a dual attempt to create a more comprehensive overview of the variety of trends while also adding to methodological literature. Structuring the gathered input this way allowed for a clear and complete overview of (future) trends. This methodological experiment will be will further reflected upon in the discussion.

Methodological Development:

In order to build the scenarios, a workable number of trends and drivers had to be identified. The goal is to get to seven workable trends, one trend per DESTEP + S dimension. To do so, a total of seven steps were undertaken. The reason for this extensive step-by-step explanation of how the scenarios resulted from the interviews is that often, very little attention is given to these crucial steps. There are numerous publications on how to develop scenarios (particularly for the public domain), such as van Notten (2005), van 't Klooster (2007), and van Asselt and colleagues (2007). Yet, these works lack concrete suggestions for the steps that can be taken in a scenario study and the choices that can be made (Dammers et al., 2013). Research papers often describe the means of gathering data and then continue by describing the yielded results. However, they do not shine a light on the (iterative) steps taken to arrive at these scenarios or narrative translations. This thesis argues that incorporating this detailed methodology also allows policymakers, or any reader for that matter, to understand the final conclusions better because the line of thought can be followed closely. See table 7 for a graphical explanation of steps 1 to 6. Step 7 can be found in figure 14. In what follows, the seven steps will be outlined and elaborated where deemed necessary. The following section also contains some of the results from the interviews, which have been included for readability and conciseness. This is to prevent an overload of information that would occur when the methodological steps would first be introduced here, whereafter they would be filled in again in the results section.

Figure 13 - DESTEP + S

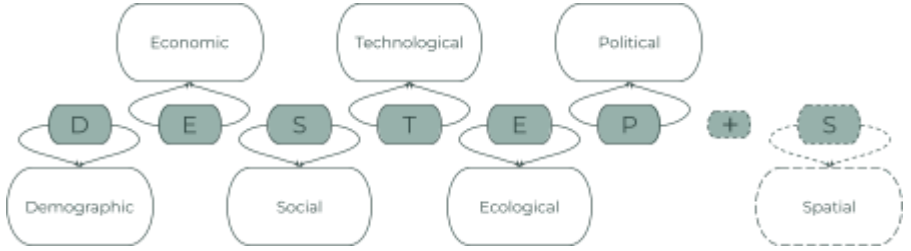


Table 7 - Listing of all methodological steps, from step 1: all individual trends to step 6: listing of 7 main trends with highlighted x and y-axis

Step 1 - Listing of all individual trends and drivers

All trends and drivers

Step 2 - Listing of all accepted and workable individual trends and drivers (see table 18 in Appendix B)

All accepted and workable trends and drivers

Step 3 - Listing of identified thematic trend clusters (see table 8 in this chapter or table 19 in Appendix B)

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
01.	Theme 1	x	x	x
....	...	...	...	...

Step 4 - Listing of identified cluster trends in DESTEP + S format (see table 20 in Appendix B)

Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
Trend 1	Trend 1	Trend 1	Trend 1	Trend 1	Trend 1		Trend 1
...	...	...	...	...	...		...

Step 5 - Listing of 7 main trends in DESTEP + S format, used for scenario building (see tables 21 and 22 (or table 9 in this chapter) in Appendix B)

Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
Main D Trend	Main E Trend	Main S Trend	Main T Trend	Main E Trend	Main P Trend		Main S Trend

Step 6 - Listing of 7 main trends in DESTEP + S format, with highlighted x and y-axis (see table 23 in Appendix B)

Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
Main D Trend	Main E Trend	Main S Trend	Main T Trend	Main E Trend	Main P Trend		Main S Trend

Step 1) Based on the interview transcripts, summaries were made, which yielded a broad overview of all trends and drivers from the interviews.

Step 2) To further validate these trends and drivers, they were discussed with my thesis supervisor Anke Brons during a 3-hour session. Those deemed irrelevant, weak or unclear were taken out, resulting in a narrowed list of 86 trends and drivers (see table 18 in Appendix B).

Step 3) These 86 findings still showed considerable overlap. Therefore, the next step was to group all the different findings into thematic clusters.

In total, 16 thematic clusters arose from identified trends (see table 8). The aim of dividing the findings into clusters was to improve the understanding of the trends as many overlap, enrich, or potentially contradict one another. This clustering can be seen as a step in between, as it allows for the abundance of trends to be structured in an ordered manner. It mainly functions as a way to create an overview as. Table 8 consists of several columns. The number of trends per thematic cluster is shown because it helps understand how often specific topics came about during the conversations. One could argue that those themes with more trends are more prevalent. However, this is not the case per se, as some trends and drivers were mentioned several times during the same interview, sometimes with a little extra context or nuance. They are still identified as separate findings to ensure that in steps 4 to 5, none of the context is lost in translation.

The 'Trends' column is shown as it indicates what trends and drivers the clusters are based upon. This way, the clusters can be traced down to the individual trends and clarify what these clusters are based upon. The numbers in bold are trends that have been put into more than one cluster. Lastly, the column on the right shows the amount of time a particular theme was touched upon during the different interviews. For example, the topic of consumer convenience came across in 7 of the 11 interviews, whilst plant-based consumption was discussed in only three interviews.

There is great variation between the different themes. Mobility, for example, despite having 14 individual findings, was mentioned in only four interviews. The reason for that is that different interviews focussed on different elements, aligning with the interviewee's expertise. Some more general aspects, such as urbanization, were discussed in most interviews. However, these numbers are mentioned as they indicate a certain depth and spread of coverage.

Step 4) All trends within the different themes were analyzed and structured utilizing the DESTEP + S methodology.

Having clustered the findings, the next step was to work towards the various dimensions of the DESTEP + S methodology. The different trend clusters can consist of various dimensions. Where

an aging population might be a clear demographic trend, the demand for convenience by consumers is harder to grasp with just one dimension and might take shape as both a social and an economic one. Therefore, all the different trends are analyzed and, where possible, merged into specific trends fitting with one of the seven dimensions of the DESTEP + S methodology. See table 20 in Appendix B for a complete overview of trends ordered via the DESTEP + S method.

Table 8 - Listing of identified thematic trend clusters

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
01.	Consumer convenience	19	4, **11**, 18, 20, 22, **23**, **24**, **27**, **28**, **31**, **32**, **33**, 34, 41, **42**, 49, **53**, **56**, 60, **61**	7
02.	Consumer's health	16	**2**, 5, 10, **15**, **20**, 21, **23**, 25, **31**, **37**, **42**, **44**, 52, **53**, **57**, **59**	7
03.	Mobility	14	**11**, 12, **27**, **65**, 66, 67, 68, 69, 70, 71, **72**, 73, **77**, **78**	4
04.	Degree of urbanization	13	16, **24**, **28**, **29**, 39, 51, 54, 64, **72**, 74, **75**, **78**, 79	8
05.	Work-life balance	9	**32**. 35. **65**, **75**, 76, 80, 82, 84, 86	4
06.	Consumer 'experience'	8	3, **8**, 9, **23**, **29**, **32**, **33**, **56**	5
07.	Awareness within the government regarding 'food' intake	6	14. **15**. **37**, **57**, **59**, **61**	5
08.	Dichotomy in society (well-off vs. badly-off)	6	1, **2**, 17, 36, 46, 81	5
09.	Robotization	6	**44**, **53**, 63, **72**, **77**, 83	6
10.	Plant-based consumption and offerings	4	**2**, 6, 30, 48	3
11.	Water & resources	4	**8**, 40, 45, 50	3
12.	Culturally specific foods	3	38, 43, 58	3
13.	Sustainability	2	19, 62	2
14.	Climate change & its effects	2	13, 26	2
15.	Population age	2	47, 85	2
16.	Role big five staples	2	7, 55	2

Step 5) The total number of trends was reduced to seven. These seven were deemed most relevant, impactful, and encompassing. These trends form the basis of the narratives in the scenario-building step.

After identifying how each trend fitted within the different DESTEP+S dimensions, it was time to level the playing field. Trends and drivers discussed during the interviews were of varying order of magnitude. Where some trends, such as urbanization, are of a high order level, the increase in micro-mobility is of a lower order level. To ensure comparability, it was decided to work with trends and drivers of the same order of magnitude to be able to compare the scenarios and corresponding narratives. Moreover, to arrive at meaningful narratives and ensure the practicability of this research, it was crucial to narrow down the number of trends. The total number of trends was thus reduced to 7, each corresponding to one of the DESTEP + S dimensions. The seven main trends are drafted and chosen as they best represent the main findings of this research. The interviews focussed on envisioning the food acquisition practices of Amsterdam residents in 2050. The final seven trends are deemed most relevant for this research as they touch upon various elements of both the theoretical framework as well as the conceptual framework introduced earlier. See table 21 in Appendix B for an overview of each specific trend and how they relate to the theoretical and conceptual frameworks. This table functions as a complete overview of how every trend might affect food acquisition practices, lifestyle practices, provision systems, and the conceptual framework's components. It forms the basis from which the scenario narratives are drafted.

The trends put forward here are argued to form the basis of many other individual findings from the interviews. They encompass the essence of what was said and take shape as assembled trends. See table 9 (or table 22 in Appendix B) for an overview of the seven trends. These seven trends were also fact-checked through an additional literature study. Scientific literature, municipal and governmental data, and sources from commercial and knowledge institutes were consulted here.

Table 9 - Listing of 7 main trends in DESTEP + S format, used for scenario building

Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
Dichotomy in society (badly-off vs. well-off)	Increased plant-based food consumption	Dichotomy in society (convenience vs. context)	Robotization	Water & nutrient scarcity	Increased awareness by government as to what people eat		Increased conflicting battles for space within the city

Step 6) The two most impactful yet uncertain trends and drivers were selected to function as x and y-axis during the scenario-building step. These trends were selected based on how strong or likely they were to mature in the coming years (see table 10).

The additional literature research formed the basis for making these decisions. During the interviews, some conflicting findings or uncertainties also arose that contributed to making the decision. All this is described in the results chapter, Chapter 5.

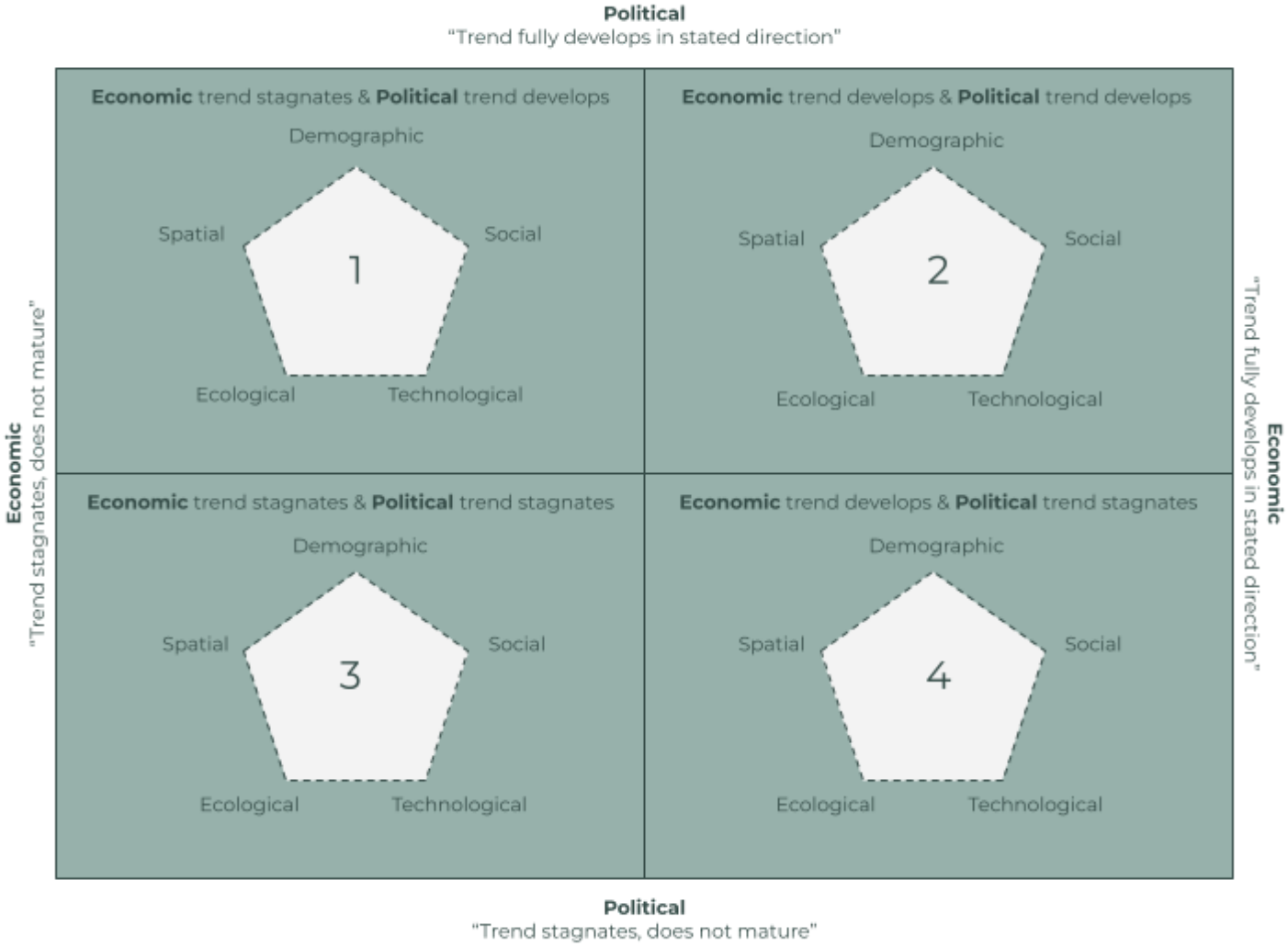
Step 7) The scenario diagram is drafted and functions as a canvas for the four different narratives that arise from combining the identified trends. Having identified the trends and drivers that will be investigated throughout this thesis, the final step is to draw up scenarios by means of writing narratives.

In each of the narratives (one corner of the scenario diagram), the different trends come to life as they are described within the corresponding context determined by the x and y-axis. The scenario-building diagram, as shown in figure 14, is thus filled in, creating an overview of four scenarios, each with different translations of a potential future. The Economic and Political trends were picked as x- and y-axis, respectively. Both trends come to life in the four different scenarios in the form of extremes. They either fully develop or stagnate in the future. Fully developing means, they follow the direction of the trend as shown in table 10, with its corresponding effects on that particular narrative. When stagnated, the trend does not mature, and the yielded outcome develops differently. Stagnation does not mean that the trend does not have an effect; on the contrary, their effects can be even more impactful. The other five trends are considered to mature and therefore presented and described in all four narratives as stated in table 10.

Table 10 - Listing of 7 main trends in DESTEP + S format, with highlighted x and y-axis

Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
Dichotomy in society (badly-off vs. well-off)	Increased plant-based food consumption	Dichotomy in society (convenience vs. context)	Robotization	Water & nutrient scarcity	Increased awareness by government as to what people eat		Increased conflicting battles for space within the city

Figure 14 - Overview of 7 main trends in DESTEP + S format, with highlighted x-axis and y-axis (see results section)



4.4 - Scenario Reflection

This section explores how each of the developed scenarios' scores' based on the predefined key components as put forward by Johnston et al. (2014). The aim here is to provide municipal or governmental policymakers, researchers, and other organizations interested in food practices with a clear overview of the impact a potential future could have on the diet's sustainability. It allows for the development of a comprehensible understanding of how factors and processes influence the key components of a sustainable diet. The idea of this schematic representation is that the various key components are related to one another but especially to the circle in the middle, representing the diet's sustainability. If one of the components falls short due to its processes and factors developing in a certain way (e.g., a decrease in diet diversity, high GHG emissions, and low food affordability), the sustainability of the diet is jeopardized, and the circle in the middle shrinks. Because of the connections between factors and processes, changes in one component can affect various other determinant categories. Essentially pulling the system out of balance.

The processes that harm the sustainability of the diet are marked red, and the components that these processes are a part of turn gray and shrink. Those components that are not affected remain in their original state and should be seen as contributing to the diet's sustainability (see figure 15). In its current state, it is assumed that all elements are weighted equally in terms of their ability to influence the diet's sustainability. The various factors can, in that sense, only pull or push the sustainability of the diet. When specific processes jeopardize the diet's sustainability, they push (dotted line) the circle and make it shrink. The arrows indicate the push effect (see figure 16). When the diet is entirely sustainable, the various processes pull the circle into a perfect circle.

Figure 15 - Components of the sustainable diet concept either shrink (jeopardize sustainability) or flourish (contribute to sustainability).

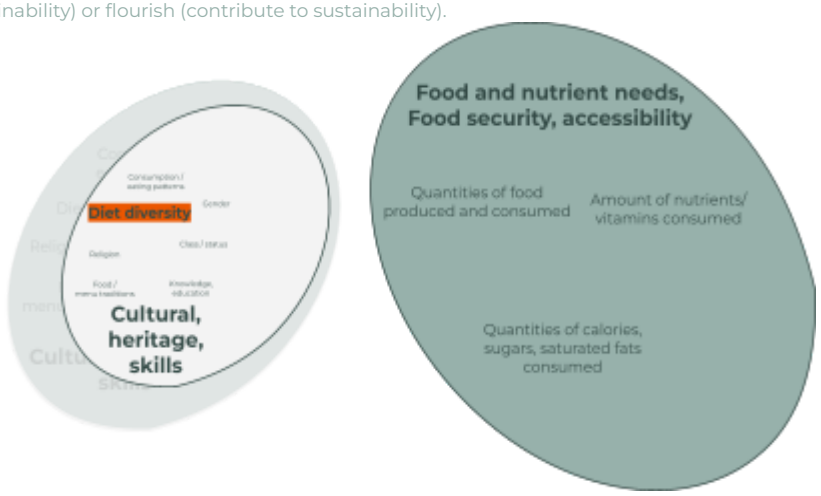


Figure 16 - Those factors and processes jeopardizing sustainability are visualized by a red marker and a shrinking circle.

The various processes and factors that fall within the various key components are touched upon in the narratives. Not all factors and processes in the framework have or will be extensively covered in this thesis. The goal of this framework is purely meant as a visual tool that helps to make normative claims, based on qualitative inputs from the consulted experts, about the future. In a more advanced state, with the key components and their processes and factors having been ascribed quantitative data, the conceptual framework could be capable of much more. Figure 17 is a visual representation of how the different scenarios will be reflected upon. Each scenario narrative receives one such visualization, which exposes the shortcomings of that same scenario—ending up with four comparable reflections, both in written text and as visualization. The actual scoring of the scenarios is not included within this thesis as that would require an in-depth coverage of every individual process, factor, and, ultimately, key component. These visual representations do, however, allow for an observation of what is flawed with which scenario.

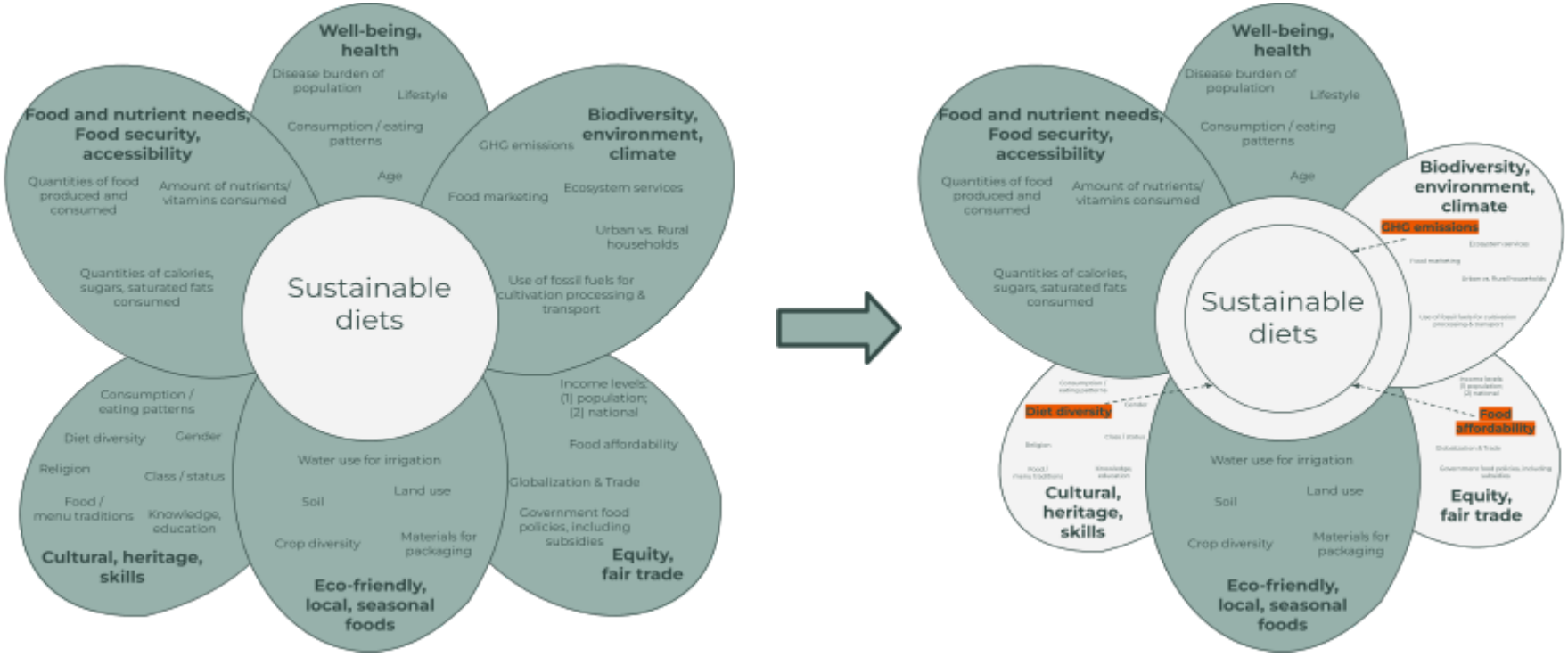
Concluding Remarks

The city of Amsterdam has always had a strong connection with food. From an early age, it was forced to look for ways to supply itself with food from afar. Where there were dairy farmers at first, providing milk through the waterways, this, later on, developed into self-service shops, which ultimately resulted in the supermarket concept we know today.

The rest of the chapter was dedicated to describing the various research methods deployed throughout this thesis. Experts were consulted, and the findings were analyzed using the DESTEP + S methodology. The seven main trends that resulted from this are further elaborated upon in Chapter 5. The identified trends are analyzed, and their relevance, truth, and direction are shaped using additional literature sources.
The last part of this chapter was concerned with explaining the application of the conceptual framework. While not all factors and processes have been covered extensively throughout this work, it is argued that the collection of these factors and processes together do hold value in that they allow for a normative judgment of the drafted scenarios. This thesis becomes a testing ground and aims to lead by example in an attempt to contribute to administrative innovation.

This chapter is elaborate as it aims to provide the reader an insight into the thought process of how the expert consultations were held, interpreted, and translated into four future narratives. This chapter has provided a glimpse of the results, which will be further elaborated in the following chapter containing the scenarios and scenario reflections.

Figure 17 - Schematic representation of how the sustainability of the future diets are going to be reflected upon (free from Johnston et al. 2014).



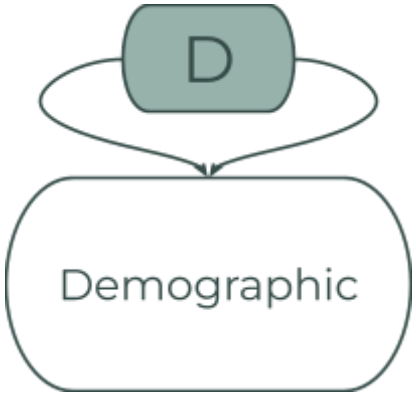
Chapter 5 - Results

Chapter description

This chapter consists of two sections. Section 5.1 is the end product of the held expert interviews and gives insight into the seven trends that form the basis for the scenarios in section 5.2. Section 5.2 displays the developed scenarios in which the trends come to life in the form of a narrative, answering the sub-research question. Each narrative is reflected upon by means of the conceptual framework of a sustainable diet, resulting in an overview of a scenario diagram that allows for a comparison of each scenario and their corresponding potential in approaching a sustainable diet. This diagram helps answer the main research question.

5.1 - Seven main trends

Exploring and trying to portray the food acquisition practices of 2050 means considering a broad scope of interrelations and many different variables. However, not all of them can be highlighted or discussed in this thesis. The following section describes each of the seven trends and motivates why these seven are specifically deemed relevant. As referred to earlier in the methodology, the interface between the theoretical and conceptual framework posed an important argument for making the final list, see table 21 in Appendix B. Each trend starts with findings directly from the interviews, presented as arguments put forward by the experts with the corresponding reference to which interviewee stated what. After that, these arguments are further solidified and backed up through findings from the literature.



Dichotomy in society (badly-off vs. well-off)

Findings from interviews

Expectations of multiple interviewees are that there will be a growing dichotomy throughout society, between people with lower levels of education and income and on the other side people who are considered to be well-off (IV, 02; IV 11). IV 01 states that those with a lower socioeconomic status (lower SES) are often more concerned with coming by and are also more susceptible to, and living near, unhealthy food offerings. According to IV 02, this translates into the number of people being considered obese in these communities. Their dietary patterns are also less plant-based (IV 02). Whether an individual belongs to the lower SES is determined based on their status regarding welfare, education, and job history (CBS). IV 03 mentioned that the number of people in the lower SES is still a relatively small group of people in the Netherlands.

Findings from literature

On the other hand, those considered to be well-off remain so and even become wealthier (IV 02; IV 05). This could pose problems since these people are less prone to being affected by rules and regulations trying to nudge people into certain dietary patterns through price mechanisms, such as raising taxes on meat or unhealthy products (IV 02). All this means that we are expected to follow what is occurring in the US, i.e., a growing number of people being overweight due to what and how much is being eaten (IV 01). This is accompanied by a decrease in the number of stores selling fresh produce and, on the other side, an increase in the number of stores selling unhealthy foods (IV, 01). The ongoing urbanization strengthens this dichotomy in the urban region of Amsterdam with rising housing prices as a consequence (IV 05, IV 09, IV 10).

From the literature, the dichotomy in Amsterdam becomes evident when looking at socioeconomic segregation within the city. Tammaru and colleagues (2015) conducted research and investigated 13 European cities. Their findings showed that Amsterdam scored second highest regarding the segregation of the rich (Tammaru et al., 2015). This means that the wealthy live close together, detached from the middle and lower class. Metropolitan development policies have caused a shift in those living in the city center, with primarily working-class people leaving the city interiors (Sleutjes et al., 2019). Sharply increasing housing prices have caused gentrification in the city center, causing low-income residents to find a home on the city's edges (Hochstenbach & van Gent, 2015). These districts on the edge of the city are Zuidoost (Southeast), Noord (North), and Nieuw West (New West). Table 11 shows that a large portion of these districts' food offerings is considered very unhealthy (Vlasakker, 2019). Research has shown that income negatively correlates with health across all age categories. This correlation is “robust” for a selection of 16 developed countries (incl. the Netherlands) (Smith, 2004; Semyonov et al., 2013; Leonard et al., 2017, p. 1). In figure 18, we see that overweight and obesity are more prevalent in the districts mentioned earlier: Oost, Nieuw West, and Zuidoost, with percentages for overweight going up to more than 59% and obesity up to almost 24 % for some of the neighborhoods (RIVM, 2020).

Figure 18 - Overweight and obesity Amsterdam neighbourhoods (Source: Gezondheidsmonitor Volwassenen en Ouderen 2020, GGD'en/CBS/RIVM)

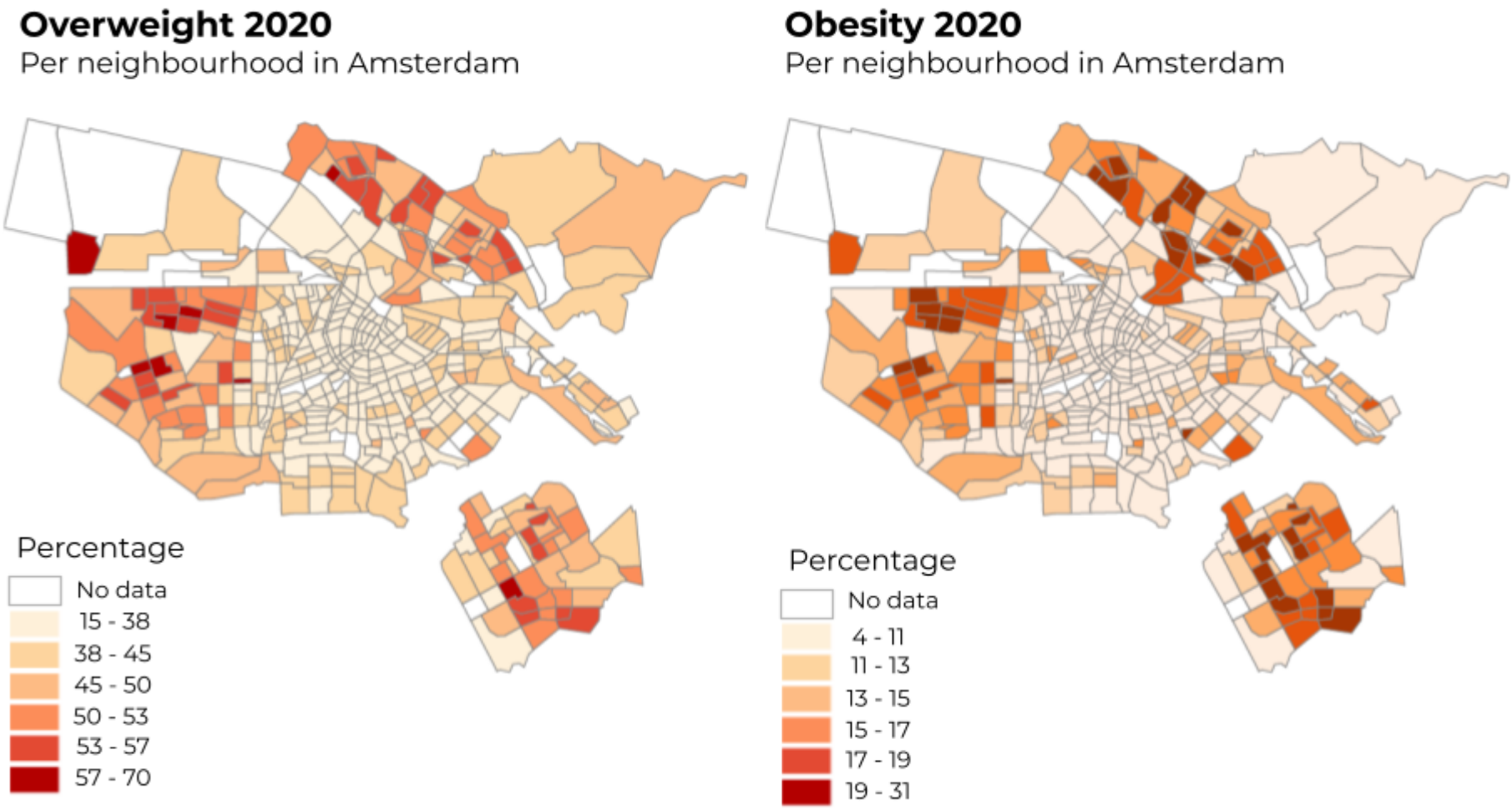
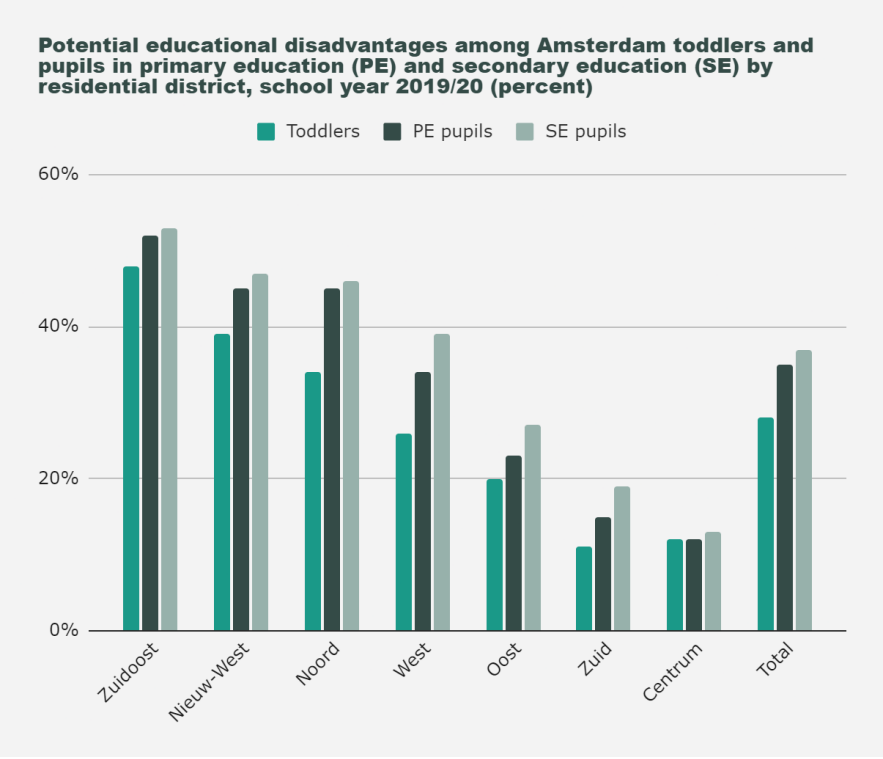


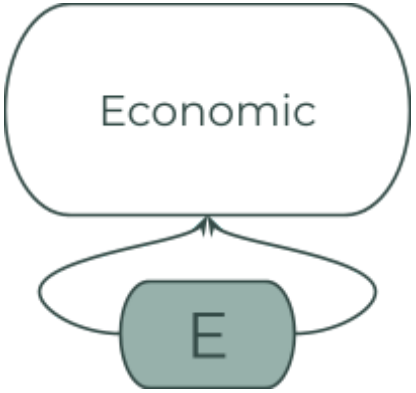
Table 11 - Overview food supply categorized per district (free from Vlasakker, 2019)

District	Very Unhealthy	Unhealthy	Healthy	Very Healthy	Total
A Centrum	486 (24,5%)	1.301 (65,6%)	162 (8,2%)	33 (1,7%)	1,982 (100%)
K Zuid	266 (25,0%)	614 (57,8%)	142 (13,4%	40 (3,8%)	1.062 (100%)
E West	227 (26,0%)	488 (55,9%)	126 (14,4%)	32 (3,7%)	873 (100%)
F Nieuw-West	**148 (32,7%)**	190 (42%)	84 (18,6%)	30 (6,6%)	452 (100%)
M Oost	137 (24,0%)	321 (56,3%)	92 (16,1%)	20 (3,5%)	570 (100%)
N Noord	**109 (36,6%)**	114 (38,3%)	54 (18,1%)	21 (7,0%)	298 (100%)
T Zuidoost	**79 (34,6%)**	104 (45,6%)	39 (17,1%)	6 (2,6%)	228 (100%)
Total Amsterdam	1,456 (26,53%)	3,137 (57,32%	702 (12,83%)	182 (3,33%)	5.477 (100%)

Numbers show that being able to acquire food is not a given for those struggling to make ends meet. What becomes apparent is that, mainly due to Covid-19, there has been a surge in the number of people using the food banks. With a 59% increase in households using the Amsterdam foodbank between January 2020 and December 2020 (Voedselbank, 2020). Furthermore, numbers show (see figure 19) that more than a third of Amsterdam students in primary education (35%) and secondary education (37%) had a potential educational disadvantage in the 2019/20 school year (Openresearch.Amsterdam, 2021). This is a lower percentage than in the previous school year. Among all Amsterdam toddlers (two to four years old), this concerns more than a quarter (28%) (Openresearch.Amsterdam, 2021). The definition of potential educational disadvantage is based on students' socioeconomic status (SES). Two primary data used to calculate the SES are parental education level and household income. Data shows that a considerable part of the population, especially in the same three districts of Zuidoost, Nieuw-West, and Noord, are part of or in the proximity of being part of the low SES.

Figure 19 - Potential educational disadvantages per Amsterdam district based on SES score (source: Openresearch.Amsterdam, 2021)





Increased plant-based food consumption

Findings from interviews

IV 03 states that the number of people eating plant-based food will increase over the years. IV 05 furthermore argued that we will see this being reflected in the amount of plant-based foods consumed. In addition, there is an increase in the number of places selling vegetarian options, and that alongside supermarkets now also fast food chains are offering plant-based meat replacement options (IV 01). However, the same interviewees also noted being careful when interpreting their statements saying that the rise of plant-based food consumption is relatively small compared to total meat consumption levels (IV 05). IV 03 furthermore noted that most people in the Netherlands will continue to eat meat 'business as usual' but that the rise in those eating plant-based meat comes from the group of people already considered to eat less meat. In addition, IV 01 noted that there is a decrease in the number of stores selling fresh produce, such as the greengrocer and that simultaneously there is an increase in the number of stores in Amsterdam selling unhealthy foods, such as grill- and lunchrooms.

What becomes clear from these interview results is that overall the interviewees are a bit hesitant when it comes to the plant-based trend. It is on the rise; however, to what extent is yet to be seen. The claim stating that there is an increase in plant-based food offerings is mainly based on supermarkets and fast food chains, whereas the claim for an increase in unhealthy food offerings is more concerned with restaurants and lunchrooms. Both are concerned with food offerings; the question

is whether this will also lead to more plant-based food consumption.

Findings from literature

Literature research shows that meat consumption in the Netherlands in terms of kilograms per inhabitant has indeed declined. Data from Dagevos and colleagues (2021) tells us that in 2020 75,9 kg was consumed compared to 77,8 in 2019. Plotting this on a trend line, see figure 20, portrays an image of a steep decline in total meat consumption in terms of kilos.

See table 12 for an overview of total meat, meat products (mainly slices of meat for sandwiches) and meat alternative sales through supermarkets in kilograms. What can be observed is that mainly meat was sold more often via the supermarket, with an increase of 23,3 million kilos, while meat products only increased by 1,3 million kilos (Dagevos et al., 2021). This tells us that not much has changed in terms of breakfast and lunch (where meat products are primarily consumed). What can be concluded is that the alternative for going out to dinner is partly compensated with an increase in the amounts of meat sold through retail. What can be seen is that 2020 shows a different trend than the years 2018-2019, where meat consumption was still on the rise. What must be noted here, however, is that the year 2020 was the year the Covid-19 pandemic disrupted all of our lives, including how and where Dutch residents would get their food. Restaurants and cafes were closed for long periods; thus, the channels through which we could acquire our foods were narrowed to only a few options, with the supermarket being the main one. This is reflected in how much meat and meats supermarkets have been selling.

Figure 20 - Meat consumption in kilograms (based on carcass weight) per Dutch inhabitant (source: free from Dagevos et al., 2021)

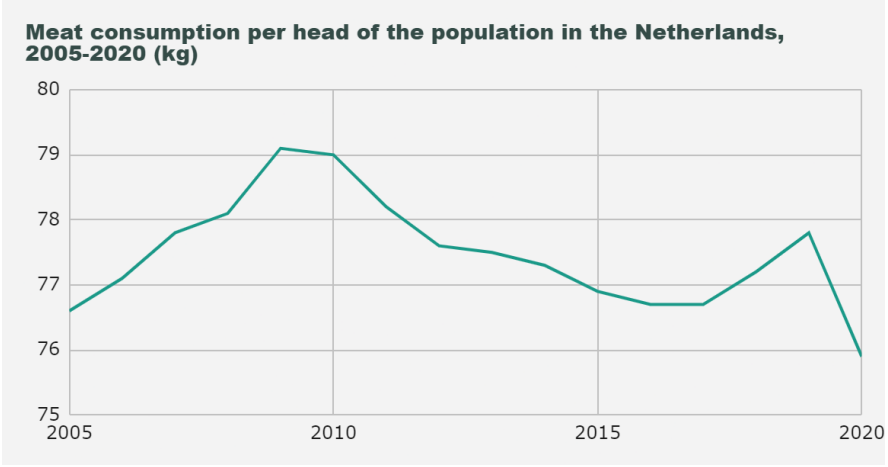


Table 12 - Meat, meat products and meat alternative sales in 1.000 kilograms through retail (source: free from Dagevos et al., 2021; ProVeg, 2021)

	2018	2019	2020
Total meat sales	384.642	382.712	406.040
Total meat products (% towards total meat)	148.874 (27,9%	148.432 (27,9%)	149.705 (26,8%)
Total meat replacement sales (% towards total meat)	9.800 ()	12.000 ()	15.000 ()

Plant-based meat replacements have seen double-digit growth rates in Europe in the past few years (Dagevos et al., 2021). Meat replacement sales in supermarkets doubled between 2017 and 2020 (Menkveld, 2020). Looking at the numbers regarding meat alternatives provided by ProVeg (2021), see table 12, and comparing them with data regarding meat sales volumes from Dagevos and colleagues (2021), we can plot figures 21a and 21b. In terms of total numbers, the rise in meat alternatives sold through supermarkets is negligible compared to actual meat sales volume; however, when indexing the year 2018 at 100, we see that meat alternative sales volumes are growing significantly.

Looking at volume is one way of seeing how meat and meat replacements develop over time. An alternative is looking at the sales value. Moreover, besides meat alternatives, there are other plant-based alternatives, such as dairy products. According to the same research conducted by market research agency Nielsen commissioned by ProVeg, for meat alternatives, there was a 54% increase in sales value between 2018 and 2020 (€113 to €174 million), for plain-milk alternatives 33% (€47 to €62 million), for flavored-milk alternatives 7% (€7,7 to €8,2 million), for cheese alternatives 400% (€0,96 to €4.8 million) and for alternatives yogurts the sales value increased by 59% (from €27 to €43 million) between 2018 and 2020 (ProVeg, 2021).

Findings from interviews

The environmental impact of our food system is evident. Interviewees noted that sustainability has also become a vital aspect of doing business for Dutch supermarkets (IV 02), and also consumers are interpreted as being more concerned with climate change (IV 08).

Figure 21a - Meat and meat alternative sales in 1.000 kilograms through retail (source: free from Dagevos et al., 2021 and ProVeg, 2021)

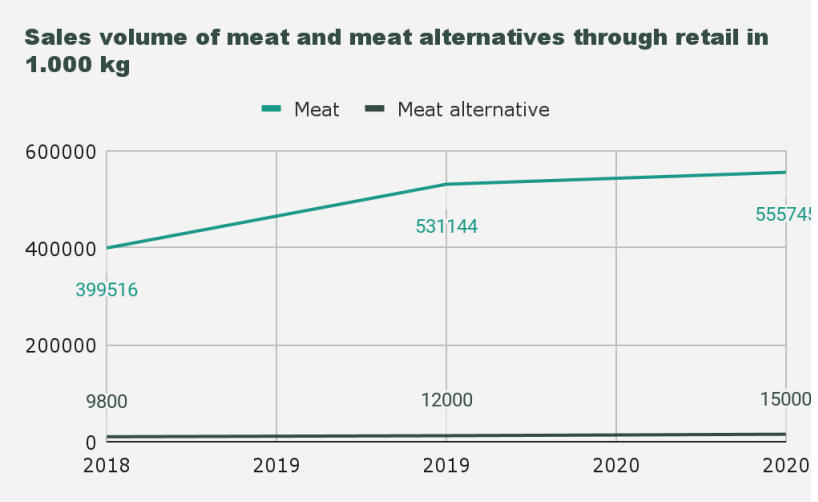
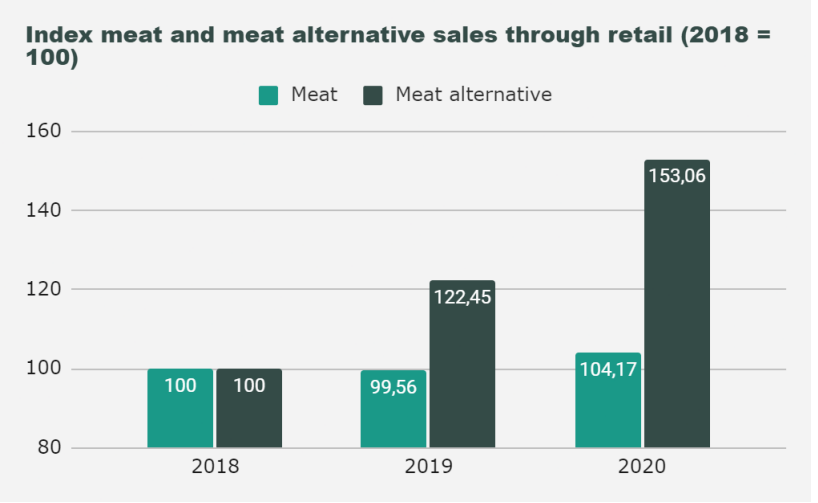


Figure 21b - Meat and meat alternative sales through retail indexed with 2018 indexed as 100 (source: free from Dagevos et al., 2021 and ProVeg, 2021)



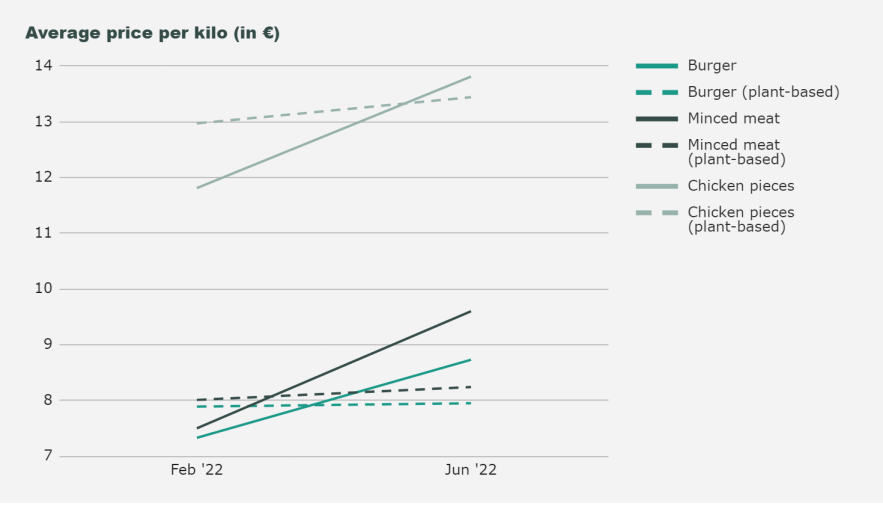
The rise in meat replacements also has to be seen from a health and economic perspective. Where eating plant-based is considered to have health benefits, the current meat replacements are highly processed foods and are considered unhealthy due to the number of salts they contain (IV 01). Furthermore, many meat substitutes are relatively expensive compared to alternative protein sources, causing unequal access to plant-based food options (IV 01). This ties in with the dichotomy trend discussed above.

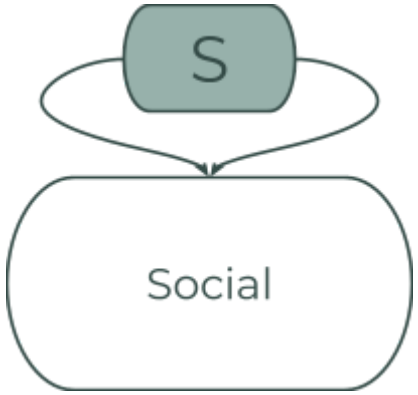
Findings from literature

In terms of how good meat alternatives are for the consumer's health, further research is required, as Hu, Otis & McCarthy (2019) argue. However, the remarks Hu and colleagues make, indicate a tendency toward meat alternatives not being healthy per se due to 'their highly processed nature,' which can cause excess caloric intake and weight gain (Hu et al. 2019, p. 1; Hall et al. 2019). Furthermore, assessing the health effects of meat alternatives also requires considering how and where they are consumed, such as in fast food restaurants and during BBQs (Hu et al., 2019). Regarding the economic aspect of meat alternatives, however, a recent study by ProVeg shows that meat alternatives have become cheaper than the meat products they are an alternative for. Figure 22 shows how three meat alternatives compare to the actual meat in terms of price development between February 2022 and June 20222 in the Netherlands. It must be stated, though, that this is primarily due to the inflation at the time of writing this thesis. Another development in this regard was the initiative by the Dutch government to research the potential of a meat tax, raising the VAT from 9% to 21% (Nieuwenhuis & Kok, 2022). This, however, was faced with a lot of backlash from the electorate from two of the leading parties (VDD & CDA), and with current prices rising due to inflation, this idea is currently not being pursued.

Whilst sales for dairy and meat alternatives have been increasing, the numbers compared to their original counterpart are difficult to interpret as significant. It is hard to state that plant-based consumption is a widespread trend which will fully develop in the coming years. This trend is therefore considered to be more debatable which is why in the scenario narratives it will be treated as a trend either fully developing (scenario 2 and 3) or as a trend which does not lead to the expected results due to it stagnating over time (scenario 1 and 4).

Figure 22 - Average price for meat and meat alternatives in Dutch supermarkets (free from ProVeg, 2021)





Dichotomy in society (convenience vs context)

Findings from interviews

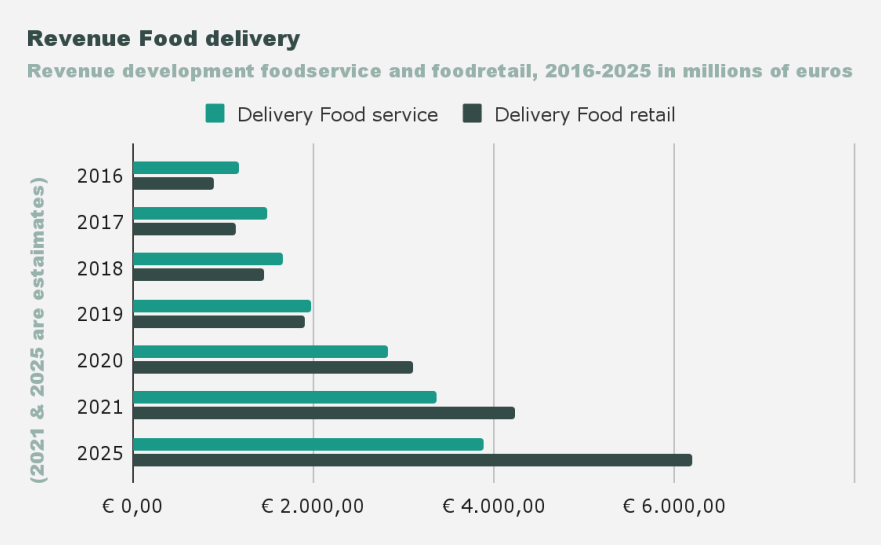
Another dichotomy that came about during the interviews was between consumers seeking 'convenience' and those seeking 'context' (IV 01, IV 02, IV 03, IV 04, IV 05, IV 06). Convenience is concerned with timely access to (fresh) food (IV 02), whereas 'context' consumers are more concerned with the origin and sustainability of their food (IV 03, IV 06). It is stated that access to food anytime, anywhere you like, is becoming increasingly apparent within the city (IV 03, IV 04). This is reflected in an increase in both food delivery and takeaway services, with fast delivery services (in Dutch: flitsbezorgers) in particular gaining market share (IV 01, IV 03, IV 05)) and a decrease in the number of stores selling fresh produce, which supermarkets take over both in terms of physical stores as well as through online presence (IV 01, IV 02). Supermarkets are gaining market share by providing breakfast and lunch ready to consume once purchased. Furthermore, there is strong growth in the market for (fresh) meal boxes (IV 02). IV 02 also stated that consumers increasingly spend money on foods consumed within two hours of purchase. We have been moving away from three meals a day and now have up to seven moments that we eat something (IV 04). IV 04 described this as a 'grazing culture' where food is present wherever we go. This quest for convenience is also reflected in our modes of transport, with electric bikes and mobility as a service gaining popularity (IV 09). In addition, convenience is also sought through services concerned with our health or sustainability. Convenience is not about carelessness but about being relieved from burdens that come with paying attention to our health and the

environment (IV 02, IV 03). Those who want to eat sustainably also want to do this most conveniently, and people who are actively pursuing a healthy lifestyle also want to do so in a convenient manner (IV 02, IV 03).

Findings from literature

FoodService Instituut has calculated that the revenue for food delivery in the Netherlands has been on the rise for the past few years, from just €2 billion in 2016 to an estimated €7,6 billion in 2021 (see figure 23) (FoodService Instituut Nederland, 2021). Grocery deliveries (food retail) in 2020 was €3,1 billion, surpassing meal delivery for the first time. Also, meal delivery revenue grew considerably in 2020 by 43,6% compared to 2019 (FoodService Instituut Nederland, 2021). This growth can be attributed to the Covid-19 pandemic, which saw many residents not leaving their houses for groceries due to the lockdown or general health concerns. In 2020 grocery delivery was responsible for 6,8% of the supermarket revenue. In 2021 this number was expected to grow to 9% (FoodService Instituut Nederland, 2021).

Figure 23 - Food delivery revenue 2016-2025 in the Netherlands (source: FSIN-analyze, 2021)

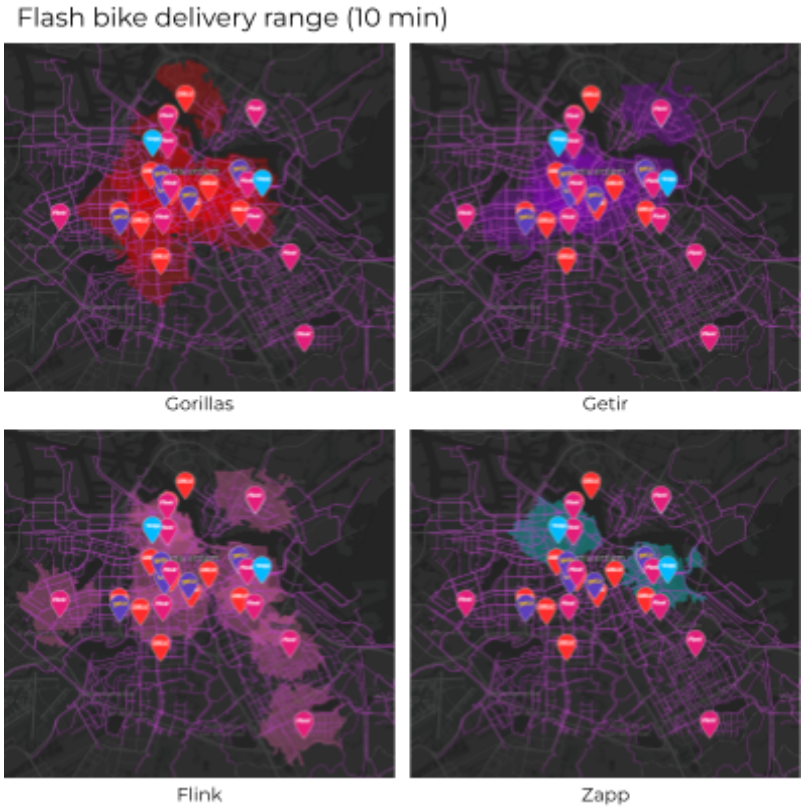


Flash delivery services offer consumers the convenience of ordering their groceries and getting them delivered to their home within 10 minutes, or at least faster than the consumer would be able to do groceries themselves (figure 24, 'Yes, we really are faster than you are'). The stores through which the city is supplied function as small warehouses and are called dark stores because their windows are tinted, and consumers are not allowed to go inside.

Figure 24 - Gorilla's add, claiming grocery delivery in 10 minutes, mailing from Gorilla's (source: https://www.adformatie.nl/campagnes/10-minuten-bezorgdienst-gorillas-presenteert-zich-met-campag & personal mailing)

In Amsterdam, four flash delivery services are present: Gorilla's, Getir, Flink, and Zapp (see figure 25 for the service area of these services and their dark-store locations). The flash delivery services entered the Dutch and Amsterdam market in December 2020 and have since grown to more than 100 stores in the Netherlands, of which around 30 are situated in Amsterdam alone.

Figure 25 - Flash bike delivery range in Amsterdam
(source: Tapp company page: https://www.tapp.nl/blog/dark-stores-amsterdam)

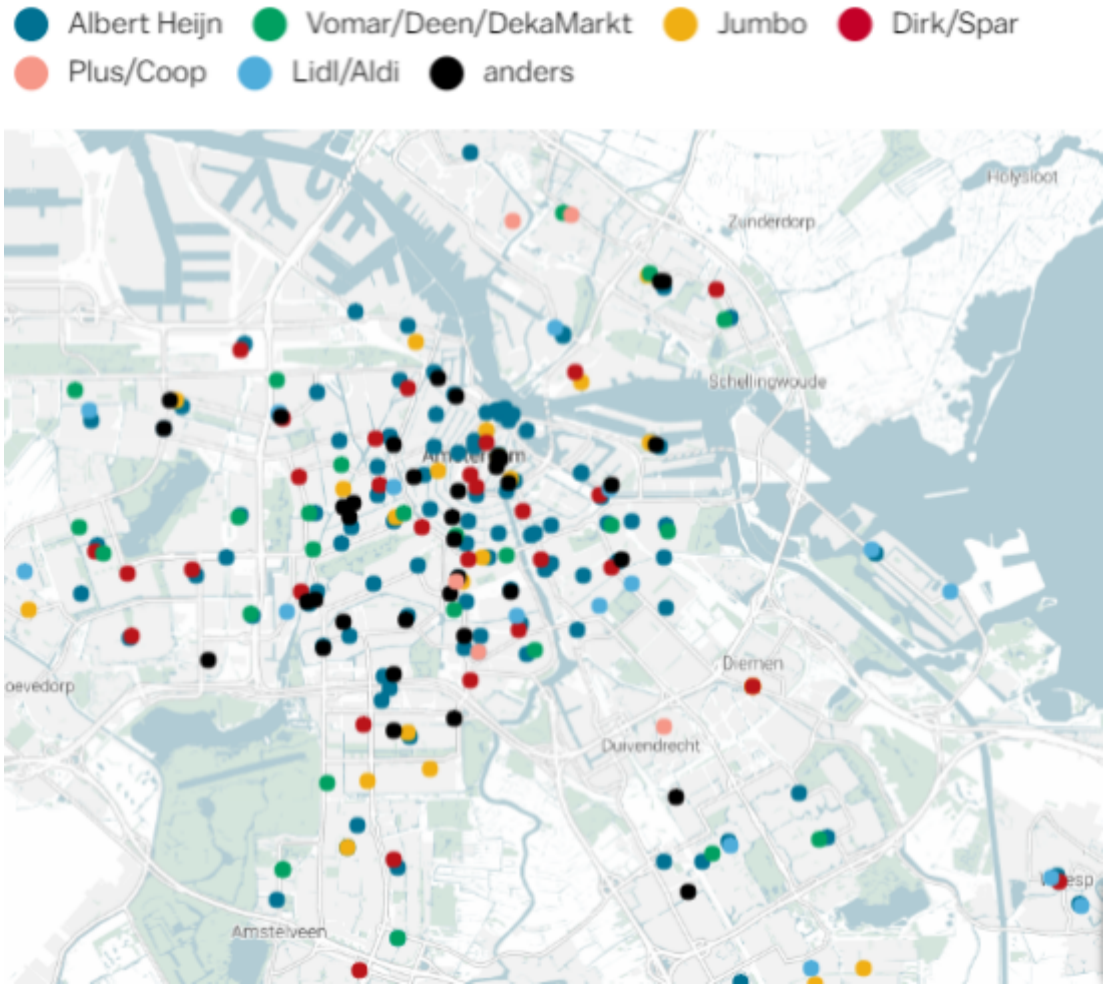


Van Amstel and colleagues estimated that around 150-200 million meal or flash delivery orders are placed annually in the Netherlands (2022). This comes down to about 500.000 vehicle movements per day, primarily by bicycle and scooter (van Amstel et al. 2022).

A new development in the delivery business is the collaboration between regular supermarkets and (flash)delivery services. Recently Jumbo has engaged in a partnership with Gorillas, and Albert Heijn and Spar have done the same with Deliveroo and Thuisbezorgd.nl (Pijpker, 2022). The market is developing fast, and at the time of writing this thesis, Zapp has already announced its leave from the Dutch market due to high levels of competition (Marée, 2022). Furthermore, Deliveroo stated to leave the Dutch market for economic reasons (Pelgrim, 2022).

Amsterdam has around 250 supermarkets, meaning 1 for every 3500 inhabitants (Stil, 2021). See figure 26 for an overview of supermarket stores in Amsterdam. The supermarkets have been gaining market share regarding where people get their food and groceries. This is at the cost of specialty stores such as greengrocers, butchers, liquor stores, and bakeries (CBS, 2022a). In Figure 27 2008 is indexed at 100, displaying the growth of supermarkets compared to specialty food stores. Numbers shows an increase in the number of supermarkets within a 1 km range from 3,8 in 2008 to 5,6 in 2021 (+47,7%). We can also see that the specialty stores decreased in presence, from 39,3 in 2008 to 29,4 in 2021 (- 25,1%) (CBS, 2022a).

Figure 26 - Supermarket stores Amsterdam (2021) (source: Stil, 2021))



Numbers confirming supermarkets' strong position in providing Amsterdam residents with food can be seen when looking at surface area data. The surface area of daily food stores, including supermarkets and specialty stores, has increased by 34% (Gemeente Amsterdam, 2020). This is mainly due to the rise in the number of supermarkets but also because supermarkets have grown larger (Gemeente Amsterdam, 2020). The purchasing power bond for daily groceries was 94% for Amsterdam residents in 2020 (Gemeente Amsterdam, 2020). Even though some groceries are done online, Amsterdam residents prefer to do their daily grocery shopping in physical stores (mainly supermarkets) within the city limits. It must be stated that even though the amount and surface area of stores used for daily groceries has grown, Covid-19 did affect the number of groceries being ordered online. See figure 28 for the increase from 2,5% in 2019 to 6,3% in 2021 (Gemeente Amsterdam, 2022).

The search for convenience not only shows in the number of stores, surface areas, or service area of stores but also in the food products being sold within the city and its stores. Particularly recipe boxes (in Dutch: verspakketten) are growing in both demand and supply. According to nieuws.ah.nl (part of Albert Heijn, the largest supermarket in the Netherlands), the recipe boxes in their stores were first introduced in 2004. They started with split pea soup back then. Nowadays, there are over 60 varieties of recipe boxes ranging from lasagne to curry madras (see figure 29). Apart from regular supermarkets that sell recipe boxes, some businesses solely focus on selling food through recipe boxes and, through that, respond to the increasing demand for convenience. HelloFresh is an example of that. This international organization, based in Berlin, has built a company

Figure 27 - Total amount and Indexed number of supermarkets and specialty stores proximity within Amsterdam (3km) (Source: CBS, 2022a).

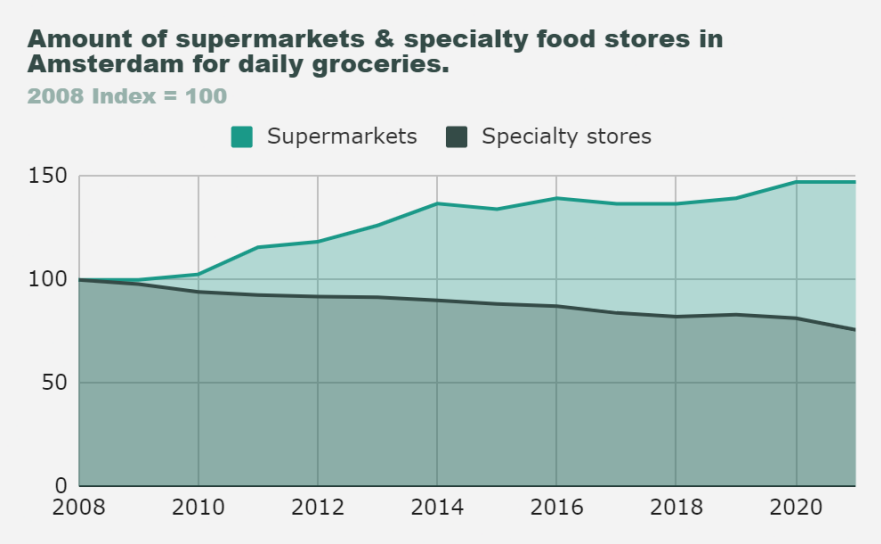
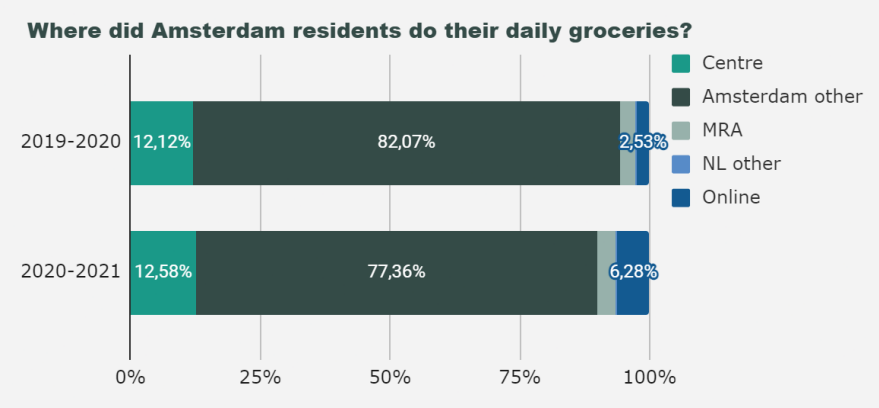


Figure 28 - Increase in online food shopping (free from Gemeente Amsterdam, 2022)



(founded in 2011) just around recipe boxes. People can get a subscription and decide how many days a week they would like to receive recipe boxes. HelloFresh has seen eminent growth over the past few years, with the company selling almost one billion meals online worldwide in 2021, which is a 243% growth compared to 2019 (HelloFresh, 2021). Exact numbers for the Netherlands are not available; however, HelloFresh does have a strong presence in Amsterdam, which also houses a considerable amount of its employees (659), only 5th after the US, Germany, the UK, and Australia out of a total of 17 countries in which the company is active.

Findings from interviews

The other side of the dichotomy takes shape in the form of residents and food consumers seeking context regarding their food acquisition. While we indeed see a rise in the total number of physical supermarkets, the stores are increasingly equipped and dressed as experience stores (IV 01, IV 02). Being able to buy fresh sushi or bread while they are produced right in front of you.

Consumers are increasingly concerned with eating more locally and want to know what it is they are eating and where it comes from (IV 01, IV 02, IV 03). Products that are transparently sourced, local and seasonal makeup for the value proposition for these consumers (IV 03). Community gardens see long waiting lists, and there is also an increased interest in urban farming practices (IV 01, IV 02). This development of seeking context also ties in with a shifting balance between work and life (IV 03). People tend to move away from the five-day work week and want to make more time available for food practices (IV 03).

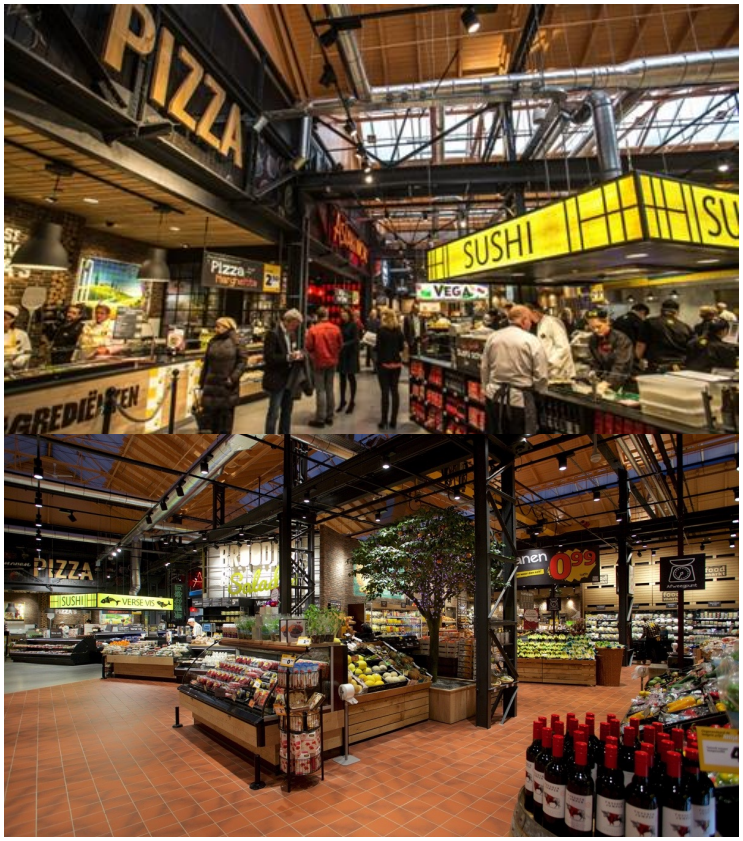
Figure 29 - Selection of recipe boxes from Albert Heijn (source: snapshot from AH.nl website)

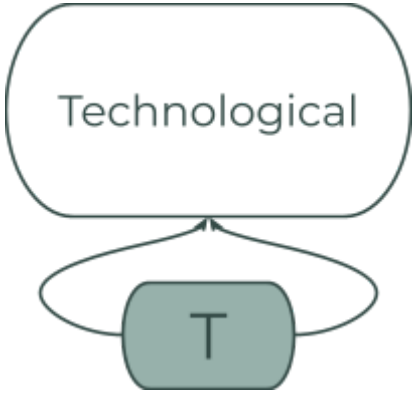
Findings from literature

This trend of taking the time to acquire one's food fits well with a more significant trend we have seen over the years—the growing demand for freshness. Where initially the supermarket was a place only to acquire food, the supermarket is developing increasingly into becoming a place to experience it as well. Consumers see value in learning about food, how it is prepared, and the feeling and assurance that their food is fresh. Supermarkets, especially larger ones, have incorporated this by displaying how certain foods are prepared and allowing customers to taste certain products. Data provided earlier backs this up; we have seen supermarkets growing larger, partly to allow for this food experience. Supermarkets are no longer characterized by narrow hallways but aim to invite the customer to experience the store as something special (see figure 30 for a Foodmarket example run by Jumbo, the second largest supermarket chain in the Netherlands). Apart from the experience lived within the supermarket, food related experiences

are also reflected in the amount of vegetable and community gardens. In the Amsterdam region, about 132 vegetable gardens, 30 community gardens, 20 children's farms, 17 herb gardens, 17 city farms, 14 food forests, 13 school gardens, and five vertical farms can be found. This significantly increased from the 70 vegetable and 13 school gardens in 2013 (de Vries, 2013).

Figure 30 - Atmosphere impression of Jumbo Foodmarkt in Amsterdam Noord (source: jumborapportage.com)





Robotization

Findings from interviews

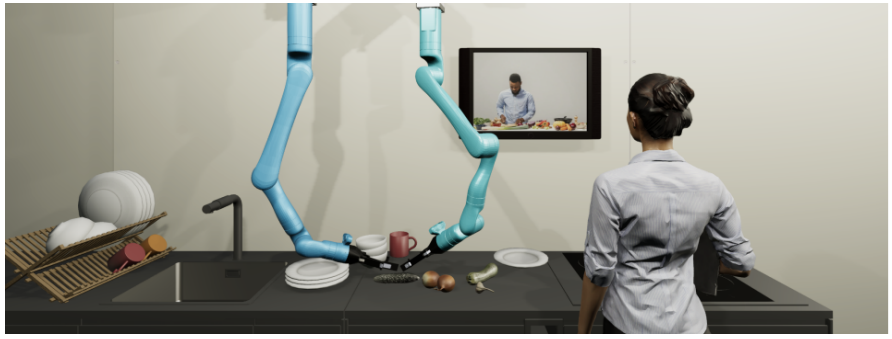
Various experts stated that machines will, in the future, execute many of the actions currently performed by humans. The trend of robotization will develop itself and affect various food (acquisition) practices. IV 04 states that cooking and kitchen applications will develop drastically into high-tech automated machines that will unburden us. It is expected that these cooking applications will be capable of working with unprocessed foods and turning them into healthy & nutritious meals (IV 04). Such complex cooking applications will most likely affect the food acquisition practices we engage with.

Furthermore, IV 05 expects that besides our cooking application, it is also possible that our houses will be equipped with more advanced and automated filling systems which neatly co-evolve with the food delivery infrastructure (IV 11). Robotization can alter not only how we provide ourselves with food but also can have an effect on our food waste management. IV 08 spoke of advanced waste separation systems that automatically help us sort waste like plastic.

Findings from literature

Robotization has been studied widely and is accepted as a trend that has been developing for a long time and is still very much in development. This is mainly due to its widespread potential uses and effects. It is studied chiefly for its potential to replace human jobs and activities (Frey & Osborne, 2013; Arntz, Gregory, & Zierahn, 2016; Lordan, 2018; Frey, 2019). Around the world, there has been a rapid increase in patent applications for robotics. In Europe, the number of patents doubled from 444 in 1995 to 1000 in 2016 (Cséfalvay and Gkotsis, 2020). This trend is also reflected in the amount of robotics produced, increasing from 109.000 in 1995 to 477.000 in 2018 (Cséfalvay and Gkotsis, 2020). Robots have been studied in an industrial setting for a long time. Recently, domestic applications have been developing, translated to the kitchen as innovations focussing on autonomous cooking practices. We have seen attempts at cooking robots who can complete tasks such as heating, stir-frying, and seasoning (Zhao et al., 2015) or peeling foods (Dong et al., 2021). However, only recently have we seen developments of robots being able to interact with humans safely and cooperatively (Oechsner, Mayer, & Butz, 2022). So-called cooperative robots (cobots) can, in the future, become integrated within the domestic context, see figure 31.

Figure 31 - An demo showcase of a potential future kitchen with an integrated cooperative robot during an interactive remote cooking session (Source: Oechsner et al. 2022).



Apart from the actual cooking, we have also seen robotic developments in the food acquisition sphere. Luo and colleagues (2008) researched the potential role of smart-fridges in unburdening people. Fridges that provide the user with healthy recipes, printable shopping lists for missing ingredients, storing medical and nutrition data to provide healthy suggestions, warning for food expiring, and many more. (Luo et al. 2008). All these innovations can help the user make more informed decisions when acquiring foods or potentially even take care of making these decisions altogether in the future. One key characteristic of these applications is their potential for interconnectedness with other various applications. For example, your fridge communicates with your online supermarket or health app (see figure 32). These applications are most likely to mature through the development of smart homes and smart cities (Alam, Reaz, and Ali, 2012).

Findings from interviews

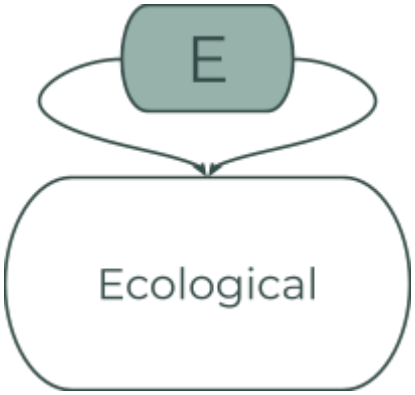
Another segment of the food industry where we are very likely to see robotization have its effects is the way food is transported. IV 09 spoke of autonomous vehicles making an advance. The smart city concept will likely develop with mobility as a service (MAAS) playing a significant role. People are less likely to own a car but rather have access to mobility through a mobility service provider (IV 09). Besides having access to moving ourselves, products are likely to be moved autonomously to us as well, drones delivering the food towards residents' homes as a potential form of that.

Having the burden of needing to move toward your food being removed leaves consumers with more time on their hands. The infrastructure surrounding this food delivery system is also more likely to gravitate towards more centralized points, or hubs, where the food is distributed (IV 01, IV 02). However, more on this is discussed in the spatial trend section.

Findings from literature

Autonomous vehicles, particularly autonomous cars, are becoming a global trend (Czech, Turoń, and Barcik, 2018). The implementation of autonomous vehicles is expected to cause a transport revolution (Herman et al., 2018). It is considered one of the three mobility revolutions alongside electric and shared vehicles (Daniel, 2018). Autonomous cars are expected to launch within the current decade (Jamthe, 2017). Food delivery services such as drones are other forms of transport deemed relevant for food acquisition practices. They are considered a promising alternative and addition to the current food delivery infrastructure (Bamburry, 2015; Hwang et al., 2019), especially considering current drawbacks such as road congestion and environmental pollution (Doole et al., 2018, Kim and Hwang, 2020).

Figure 32 - Potential usage of smart fridge and its effect on the food acquisition practices.



Water & nutrient scarcity

Findings from interviews

Cities are seen as magnets when it comes to resource attraction (IV 04). However, vital resources such as water and various nutrients will be scarce in the near future (IV 04, IV 05). IV 04 mentions phosphate as a resource likely to be depleted within 100 years with current usage levels. IV 04 and IV 05 spoke of water scarcity as one of the main issues we, the Netherlands, will face in the future. Both alerted that we need to work towards different infrastructures that allow the capture of valuable nutrients in and around the places they are disposed of—no longer draining nutrients through traditional sewage systems but instead focussing on recovering them. It was explicitly said that water and nutrient recovery will take shape in a decentralized form (IV 04). Also, more efficient use of water and nutrients is introduced as a path to pursue (IV 05). More efficient and local use of resources also provides an opportunity for urban farming, which is considered a local and resource-efficient food production method (IV 01, IV 05).

Findings from literature

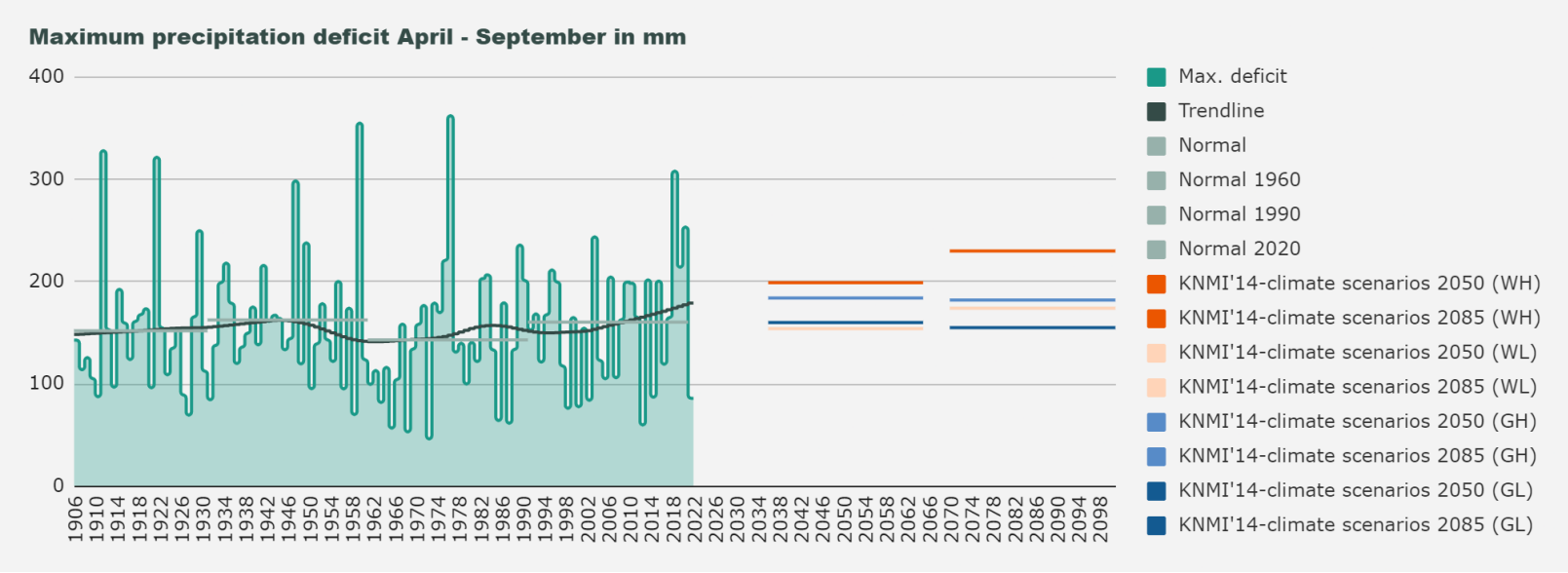
Water scarcity is defined as “the lack of sufficient available water resources to meet a particular region’s water needs” (Du Plessis, 2019, p. 1). It is estimated that there are about four billion people worldwide who are impacted by a lack of water for a minimum of one month per year (Mekonnen and Hoekstra, 2016). On the European continent, 60% of cities with over 100.000 inhabitants use groundwater unsustainable as they consume more than can be replenished (Du Plessis, 2019). IPCC reports note that water

stress due to scarcity is likely to increase due to climate change, population growth, and land-use change (including urbanization) (Bates et al. 2008).

In the Netherlands, the Royal Netherlands Meteorological Institute (KNMI) uses the ongoing potential precipitation deficit to determine water scarcity. They choose April 1st as a starting point, traditionally considered the start of the growing season. The increased precipitation deficit (figure 33) can be attributed to climate change for the Dutch inland; according to KNMI, this is due to an increasing average temperature (figure 34) and increasing sunshine (KNMI, 2021).

The climate scenarios visualized in figures 33 and 34 are the scenarios developed by the KNMI in 2014. The four potential futures are based on increased temperature and the possible change of airflow patterns. Average temperatures have increased by 0,4°C every ten years since 1970 (KNMI, 2021). Precipitation has been increasing by 21% since 1906, however, precipitation has decreased in both spring and autumn since 2000 (KNMI, 2021). The precipitation deficit in the growing season has been increasing by 8% per ten years in the period 1991-2020 (KNMI, 2021). This is mainly due to increased evaporation, which can partly be ascribed to increased solar radiation and temperatures (KNMI, 2021). The figures provided support for the idea of increased drought in the Netherlands in the coming years.

Figure 33 - Maximum precipitation deficit in growing season in mm with KNMI climate scenarios (source: KNMI, 2021).



Apart from water scarcity in the form of water shortage, it is also becoming an increasing issue to deal with the water quality, which, if not up to certain standards, also leads to water scarcity (van Vliet et al. 2017). Research by PBL has shown that in 2019 less than 1% of Dutch water bodies were considered to be of good ecological status (Brugh, 2022). Furthermore, it is expected that in 2027 approximately 5% of the Dutch water bodies will be of the desired quality according to EU regulations (Brugh and Wassens, 2022). In total, 745 water bodies deteriorated between 2015 and 2021, a body of water can have deteriorated on several characteristics. Figure 35 gives an overview of the types of deterioration and how many water bodies have deteriorated accordingly.

Figure 34 - Average annual temperature in °C with KNMI climate scenarios (source: KNMI, 2021).

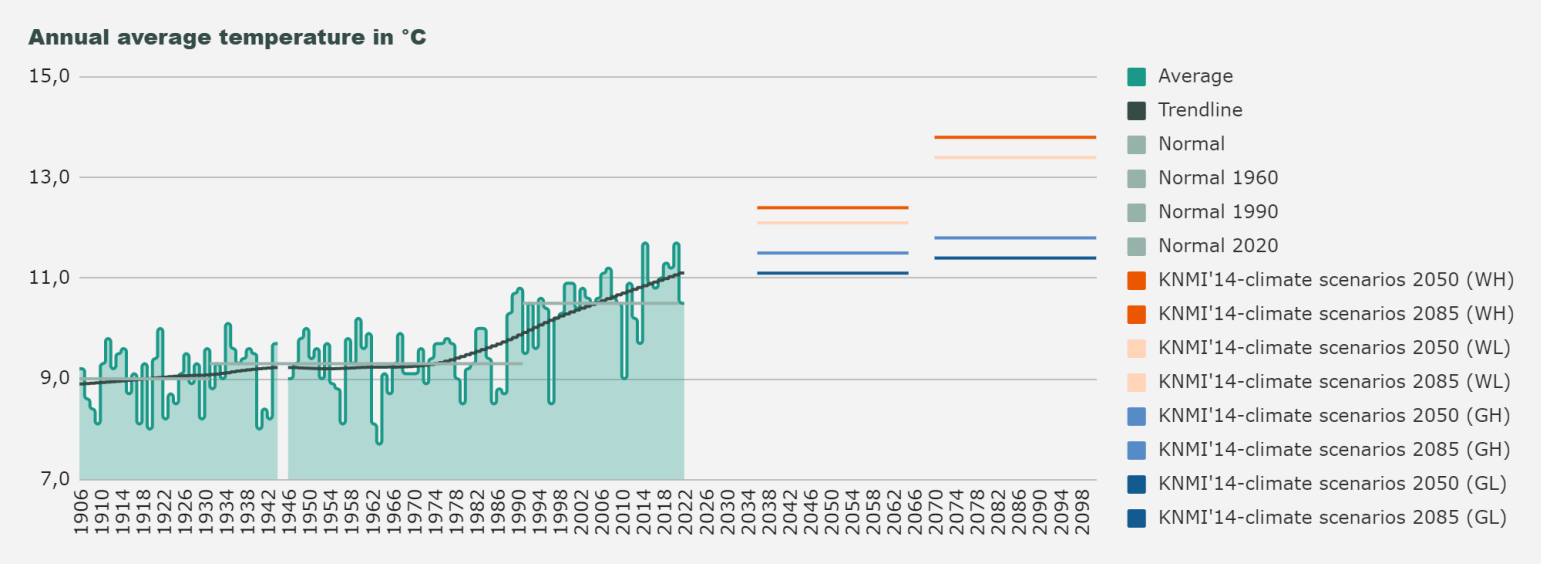
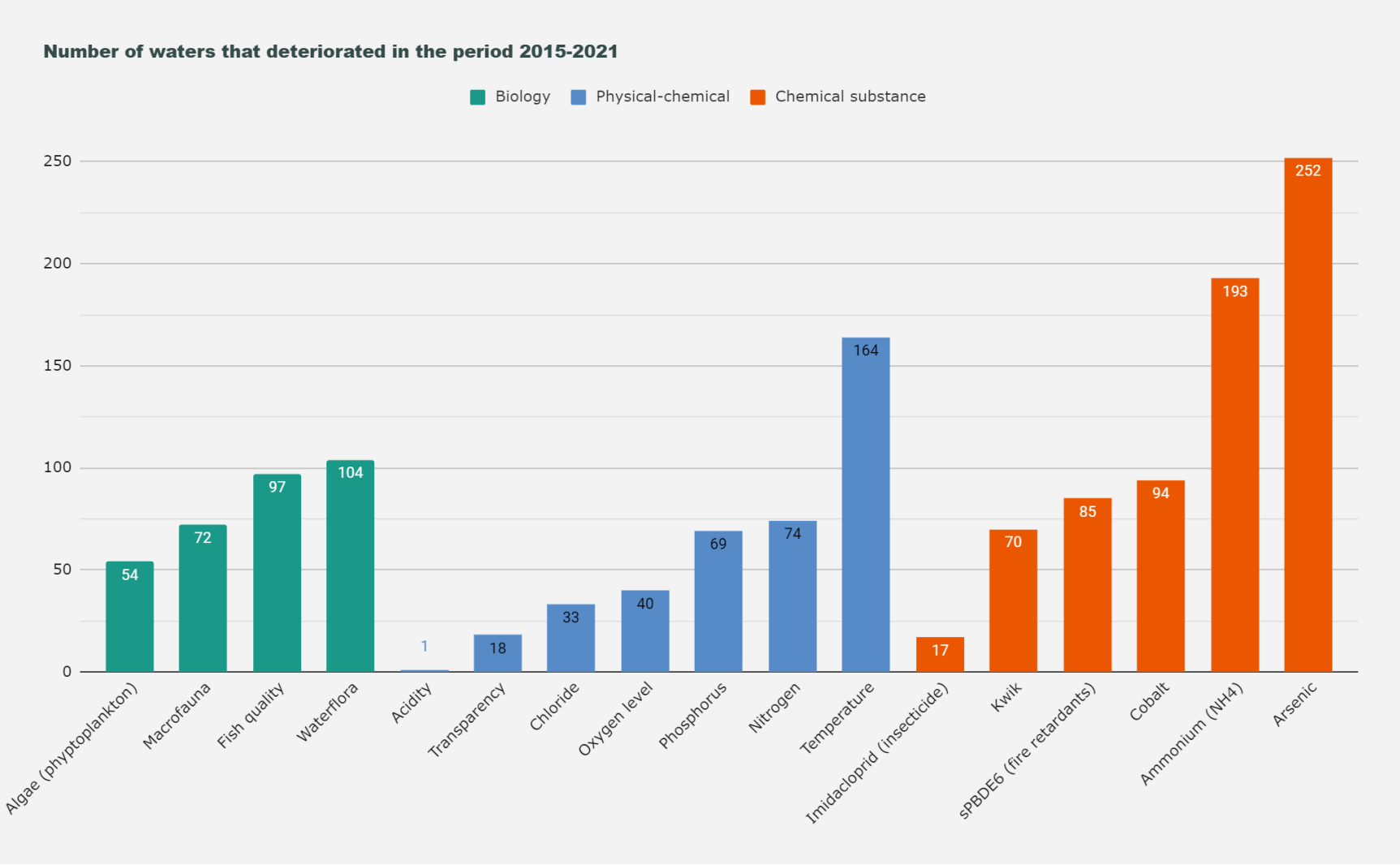
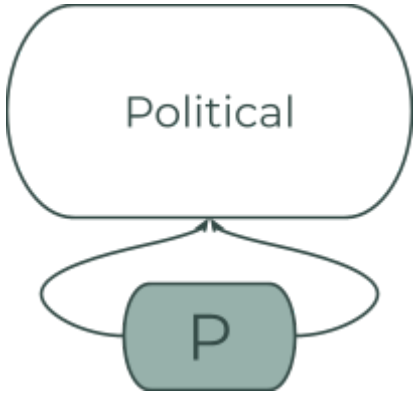


Figure 35 - Number of waters that deteriorated in the period 2015-2021 (source: Informatiehuis Water through Brugh and Wassnes , 2022)





Increased awareness by governments as to what people eat

Findings from interviews

Increased awareness from governmental bodies as to what people eat is observed by various interviewees (IV 01, IV 03, IV 06, & IV 07). IV 01 considers governmental interference as essential in pursuing a healthier diet. Specifically, products with high amounts of salt and sugar are gaining political attention (IV 01). This shift in governmental orientation has particularly been noted in the past year, mainly due to Covid-19, which has shed light on the costs of an unhealthy population (IV 03). This increased awareness has been spotted on both local and international governmental levels (IV 03). The tendency to focus more on prevention in healthcare is considered a result of a more holistic approach by governmental organizations (IV 06). This increased tendency to be willing to investigate the role of governments in shaping healthy food practices is also reflected in the City Deal initiative (IV 07). This tendency toward a healthier food intake can be seen as an overhauling trend. The rise of health apps through technological innovation and the tendency toward more tailored food options stem from the increased focus on a healthier lifestyle (IV 02; IV 05).

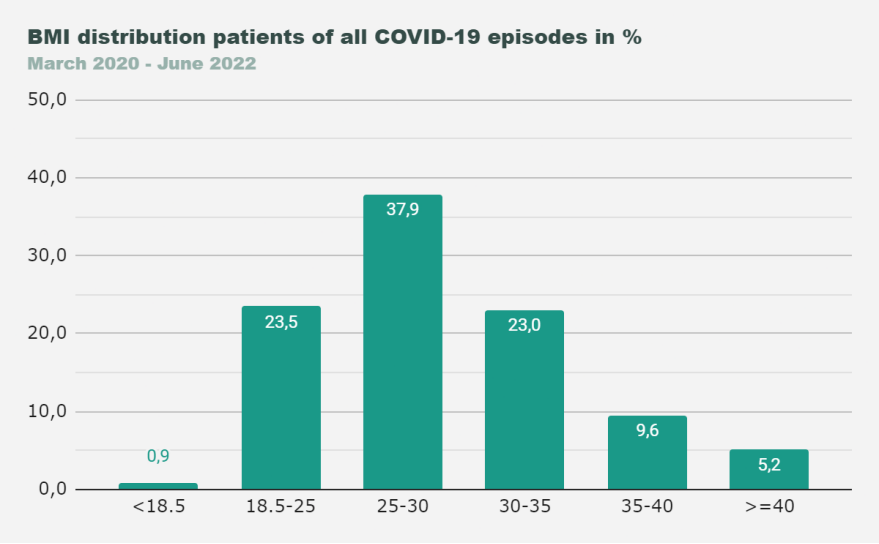
Due to its nature, this trend is more difficult to validate through additional literature research. Most interviewees noted that they are observing awareness, regarding what people should eat, through their professional networks. However, this increased awareness does not lead to tangible actions as it is much more a shift in tendency observed through various professional interactions. However, the following paragraph presents a

potential starting point from where the observed awareness originated. In addition, several initiatives are introduced, which can be seen as the first steps taken regarding this increased awareness.

Findings from literature

An overall trend towards more unhealthy food habits has been described earlier in this chapter. Simultaneously, however, there are groups of people from which a "heightened awareness of healthy food" can generally be observed (Mandemakers and Roters, 2015). These seemingly conflicting trends of eating unhealthy vs. eating healthier shows overlap with the dichotomies in society regarding convenience vs. context and well-off vs. badly-off. Spending less time eating food as a primary activity has been associated with obesity (Hamermesh, 2010). Spending more time on food-related practices such as cooking and eating can result in higher quality and healthier meals (Mandemakers and Roters, 2015). While eating healthy has become a trend amongst certain parts of society, Covid-19 has shed light on the reality that this can not be concluded for a significant group of people and that the general idea regarding governmental intervention is shifting. Many illnesses and deaths in the Netherlands have a lifestyle-related causes. The Dutch Healthcare system, however, is primarily focused on health treatment rather than prevention, as reflected in the 0,03% healthcare budget that goes to prevention. In 2021 €31,3 million was spent on prevention, following the National Prevention Agreement, which was initiated in 2018 (Ministry of General Affairs, 2022a). The total healthcare spending, however, amounted to €125 billion (CBS, 2022b). More than one in three (37,5%) corona patients in the Dutch Intensive Care is seriously overweight (a BMI of >30 is considered obese), while this percentage in the average population is 13-21% (see figure 36) (Santen, 2020a; NICE, 2022). Initial studies and figures show that the course of corona and the chance of ending up in the ICU or dying are associated with diseases with a lifestyle-related cause (Santen, 2020b).

Figure 36 - BMI distribution of patients of all Covid-19 episodes in % (source: NICE 2022)



Lifestyle, however, is much more than just food intake. Smoking, drinking alcohol, and (not) exercising regularly are also important aspects to consider. This thesis, however, focuses solely on food intake. As the interviewees stated, a shift in awareness regarding healthy food intake can be observed. Whether this alteration in the course of action can be ascribed solely to Covid-19 is difficult to prove. Three recent examples are highlighted here that give the impression of a change in awareness: the Nutri-Score, the VAT

reduction on fruits and vegetables, and the VAT increase for sugars in soft drinks.

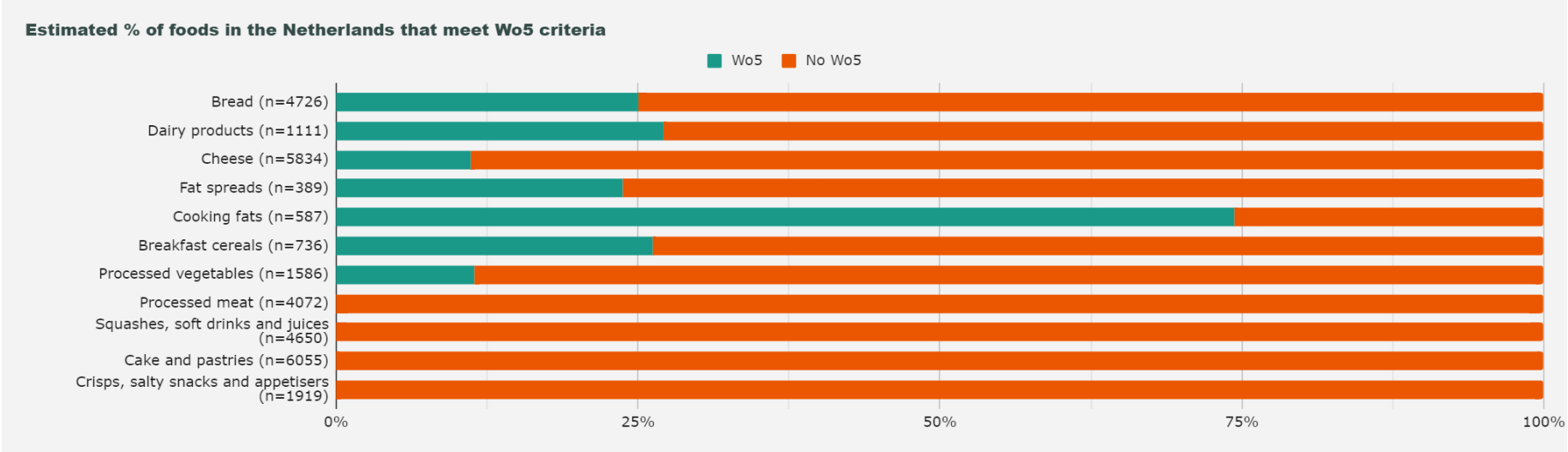
In 2019 independent consumer research was carried out that compared various food choice logos. Of the three logos, the Nutri-Score was considered the best fit. Scientists commissioned by the French government developed the Nutri-Score. The idea of the Nutri-Score is that it helps consumers compare products easily and quickly, allowing them to make healthier choices when shopping for food (see figure 37). However, the current Nutri-Score version does not correspond with the Dutch Wheel of Five guidelines (National dietary guidelines of the Netherlands), as research by RIVM and Voedingscentrum points out (see figure 38). Particularly processed vegetables score high on the Nutri-Score metric whilst this is not mirrored by the Wheel of Five guidelines. It is, therefore, yet to be officially introduced. However, supermarkets have already started piloting the Nutri–Score (AH, 2022).

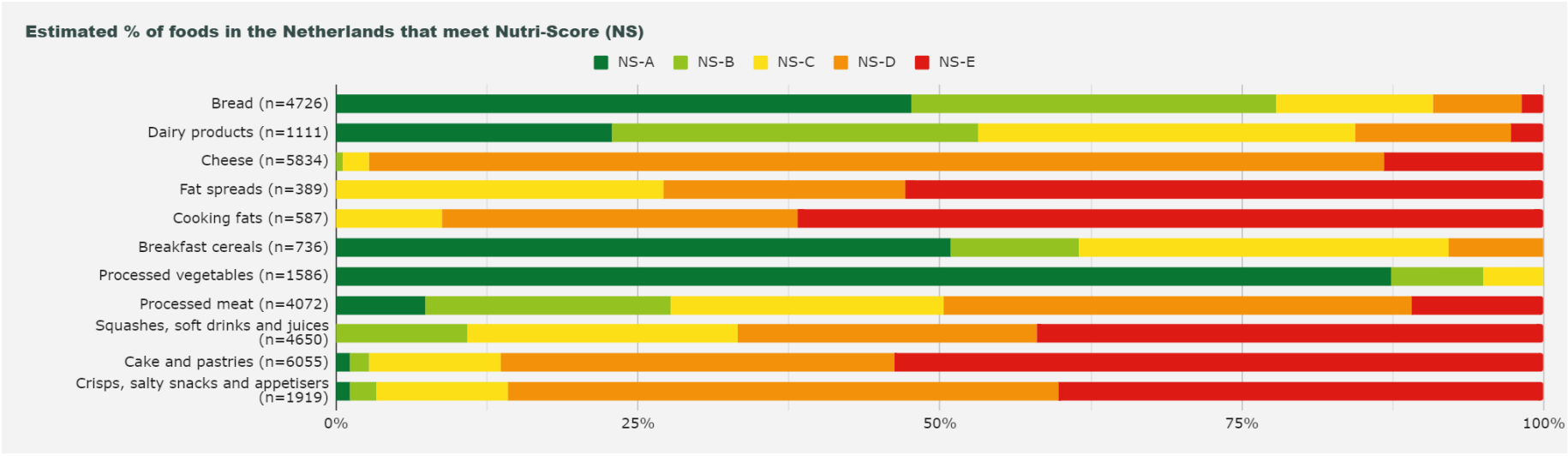
The Dutch cabinet is researching the possibility of VAT reduction for fruits and vegetables. The goal is to have the regulation implemented in 2024. Fruits and vegetables are, however, not an easily defined product group like petrol and diesel (for both excise duty has been reduced recently) which is why it requires further research. This is because it is not always clear what can be defined as a fruit or vegetable; pasta sauce or fruit juice is, for example, no clear-cut categories. In addition to the reduced fruit and vegetable VAT, research regarding the ‘soda tax’ is expected to finish at the beginning of 2023 (NOS, 2022).

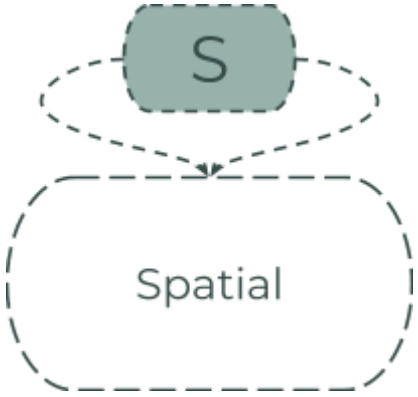
Again, these provided findings do potentially awaken the idea that indeed a heightened awareness can be observed amongst government officials. Yet, whether this awareness is widespread and whether this eventually will lead to action is yet to be seen. This trend is therefore also considered to be more debatable which is why in the scenario narratives it will be treated as a trend either fully developing (scenario 1 and 2) or as a trend which does not lead to the expected results due to it stagnating over time (scenario 3 and 4).

Figure 37 - Nutri-Score and its elements (source: Ministry of General Affairs, 2022b)

Figure 38 - Estimated percentage of foods in the Netherlands that meet the criteria of the Wheel of Five (Wo5) or the Nutri-Score (NS). n is the number of food products within the food group. (source: RIVM, 2019)







Increased conflicting battles for space within the city

Findings from interviews

The spatial trend that came forward from the interviews was the ongoing battle for space within Amsterdam. Urbanization is expected to continue (IV 04; IV 09; IV 10). Specifically, young people are moving toward the city while, on the other hand, families are most likely to leave the city (IV 03; IV 010; IV 11). Various reasons are given for this specific group of people to leave the city, mainly due to the lack of space to maintain a family. IV 01 spoke of an increasing battle for space with the current housing crisis, causing people to be unable to find a fitting home. Furthermore, IV 11 mentioned that certain groups of people no longer feel the need to live within the city since their work-life balance is shifting, with fewer physical office hours and more working from home. Another consequence of the battle for space directly affects the food acquisition practices. Housing prices are increasing, and with this ongoing battle for space, apartments in the future are likely to be smaller than current apartments (IV 02; IV 05; IV 10). With apartments getting smaller, it is expected that the kitchen as a standard part of the house might be one of the first to be left out of the new building plans (IV 02; IV 05; IV 10). This development is furthermore strengthened by the convenience trend, which states that fewer people are taking time to cook a meal in their home. Smaller apartments mean less space to store products, leading to more trips to supermarkets or other places where food can be acquired (IV 10).

The battle for space does not only translate to the composition of the future house. Hubs, specifically food hubs, are expected to

take shape in the periphery of Amsterdam (IV 02). Multifunctional hubs can potentially replace the supermarket altogether and provide various services to city residents while optimizing the available space (IV 01; IV 02). Dark kitchens are an example of the more centralized food provisioning services. These dark kitchens and other centralized provisioning services will likely grow (IV 03). Cities are considered to become truly residential areas with fewer physical store spaces, which is compensated for by the various hubs (IV 09). Housing people within the city is considered the main priority (IV 09).

In addition to hubs providing products and services, it is expected that more hubs will arise; mobility hubs are an example of another translation of the urge to make the most efficient use of space (IV 10). Densification around mobility stations does not mean that city residents are becoming more mobile. In contrast, the most significant mobility shift is expected to be that city residents are becoming less mobile since they can find most of their needed products and services nearby in the earlier mentioned hubs (IV 09; IV 10). These mobility hubs function as a gateway into the city, specifically aimed at providing mobility across larger distances (between cities).

Findings from literature

Numbers show that the Amsterdam urban population has been increasing and is also expected to keep increasing in the coming years, see figure 39 (CBS, 2022c; CBS, 2022d). Furthermore, the total share of the Dutch population living in Amsterdam is expected to increase (CBS, 2022d). While the total population is increasing, the domestic moving numbers show that more people are leaving the city (through moving to another place in the Netherlands) than people entering the city from somewhere else in the Netherlands. See figure 40 for the balance of domestic moving for the whole Randstad (incl. Rotterdam, the Hague, and Utrecht). Calculations by CBS show that more people are leaving the Randstad; 75,000 people have moved to other municipalities, which is 5000 more than last year. This mostly comes from young families seeking more spacious housing outside the city. The number of people who moved to the Randstad, on the other hand, decreased slightly to 53,000 (Kruyswijk, 2022). Foreign migration and a birth surplus are the main drivers of population growth. What also becomes evident from figure 40 is that the younger generations (18-25 and 25-30) are still moving into the city. For the age group 25-30 this trend is decreasing.

Figure 39 - Amsterdam population past, present and future with share of total Dutch population (source: CBS 2022c, d)

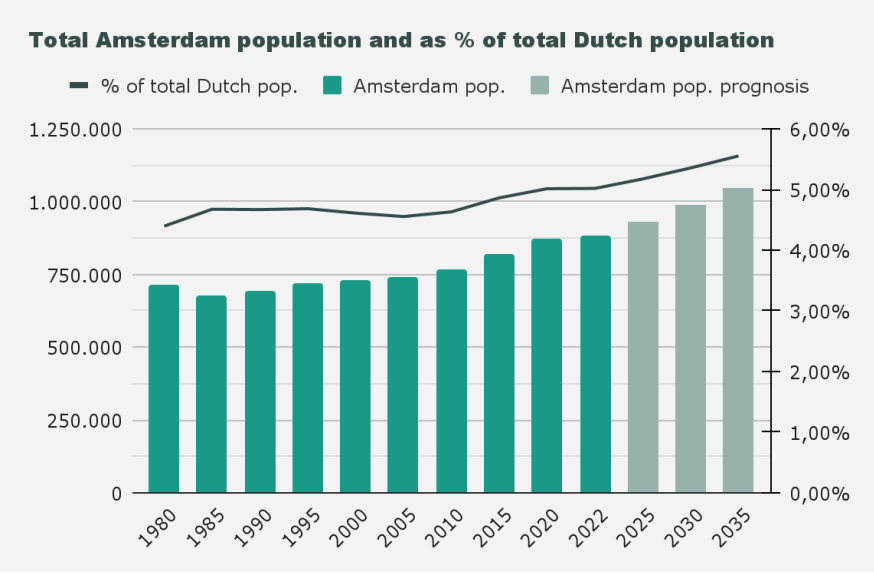
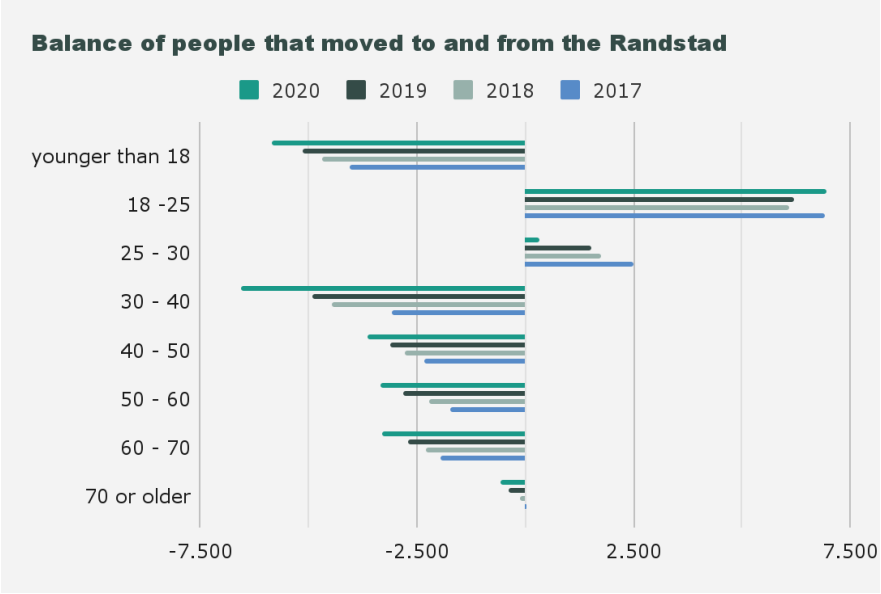


Figure 40 - Balance of people that moved to and from the Randstad (source: CBS 2022e)

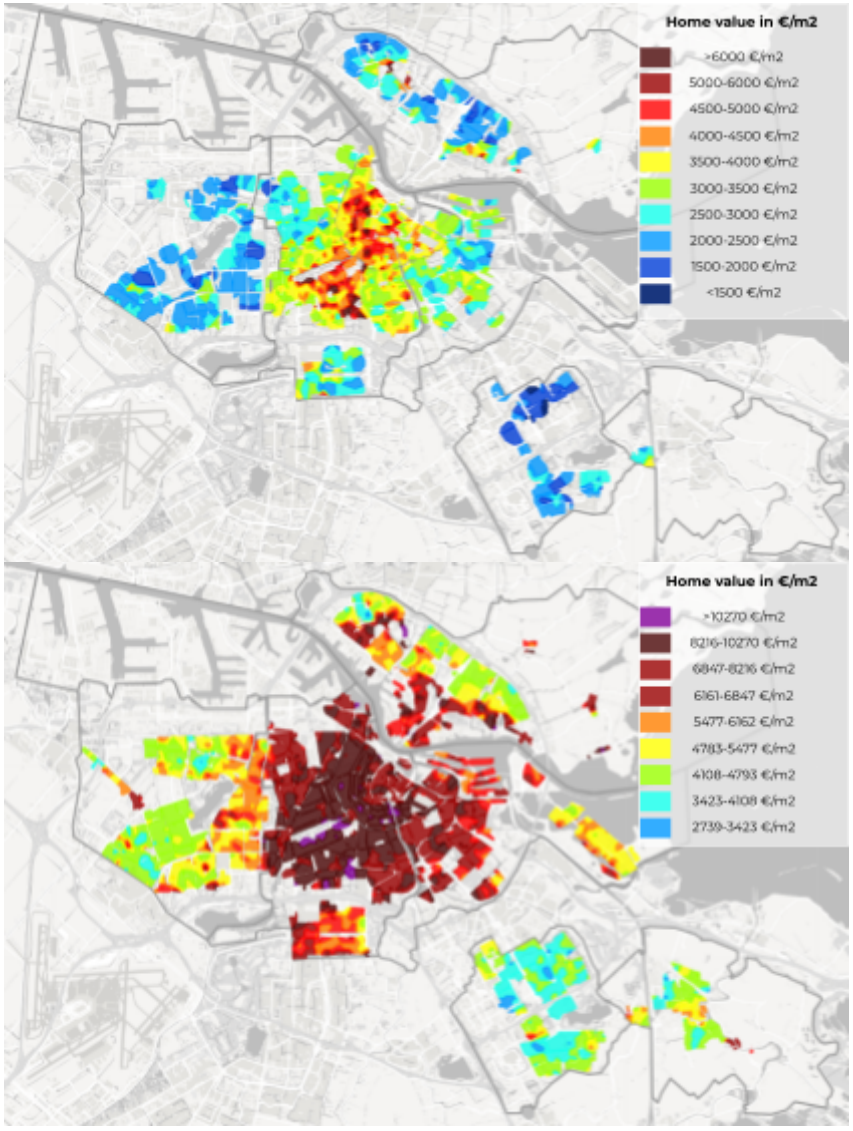


One of the consequences of urbanization in the Netherlands is the rising housing prices. Taking 2002 as 100 in the consumer price index, this increased to 136,94 in 2021 also, see figure 41 for a spatial overview of the value increase per m2 in Amsterdam (Gemeente Amsterdam. 2022). In 2002 the average price for a single-family home in Amsterdam was €358.065, which increased to €853.798 in 2021 (De Hypotheker, 2022). For apartments, the average selling price was €233.544 in 2002, which increased to €575.290 in 2021 (De Hypotheker, 2022). These numbers together paint a clear picture of rising housing prices within the city. Also, put forward by the interviewees was the point that house sizes are likely to decrease due to the battle for space and increasing housing prices. Various sources provide different outcomes, but when drafting the calculations ourselves by taking the initial position of housing stock and multiplying that with the average living space, whereafter we this divide by the total population, we see that the average living area has been increasing since 2012 (see table 13, for 2022 the numbers available at the time of writing were used). Whether the statement can be made that kitchens are disappearing is therefore difficult to confirm. However, with the urge for convenience, it is imaginable that kitchens in the future are likely to be used to a lesser extent.

Table 13 - Average available living area in m² in Amsterdam (source: CBS, 2022f)

	2012	2017	2022*
Initial position of housing stock	408.888	428.035	456.730
Average living area (in m²)	73	75	76
Amsterdam population	790.110	844.947	882.633
Average available living area (in m²)	37,78	37,99	39.33

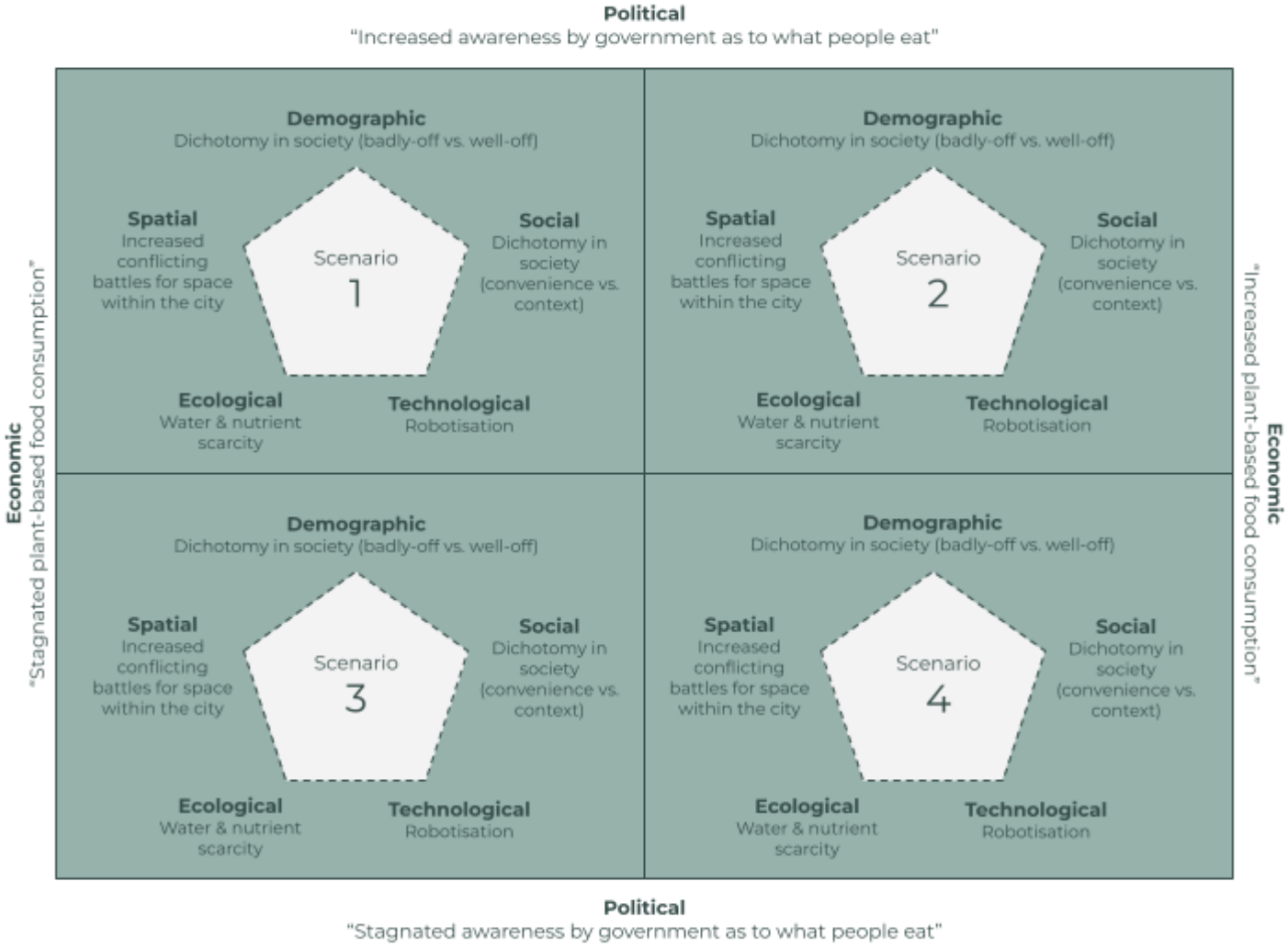
Figure 41 -Property value in Amsterdam in €/m2 (source: Gemeente Amsterdam. 2022)



Concluding Remarks

The two trends considered most impactful and uncertain are used as the Y and X axes in the scenario diagram in figure 42. In this research, the economic trend: "Increase in plant-based consumption" is used as the X-axis, while the political trend: "Increased awareness by governments as to what people eat," is put on the Y-axis. Both trends potentially significantly affect how the future of Amsterdam food acquisition practices might take shape. However, it is uncertain for both in what direction they might develop. Plant-based consumption has indeed been on the rise, specifically in Amsterdam. However, compared to meat consumption, these numbers are yet to be proven significant. Furthermore, even though an increased sense of awareness is seen with governmental bodies as to how the food intake and food environment might be part of their responsibility. This trend is relatively new and is yet to translate into concrete rules and regulations. Both trends are thus picked because they are relatively new, and their longevity and direction are yet to unfold.

Figure 42 - Overview of 7 main trends in scenario diagram format and with corresponding DESTEP + S dimension.



5.2 - Developed Scenarios

From the seven identified trends, a total of four scenarios are created. Each scenario is described by means of a 'day in the life.' These narratives are built around four fictional individuals, Rens, Helene, Finn, and Durdane, living in Amsterdam in 2050 (see table 14). The narratives describe how each individual engages with acquiring food in Amsterdam in 2050. It is chosen to portray the food acquisition practices of four individuals for the reason that both the demographic (well-off vs. badly-off) and social trend (convenience vs. context) are dichotomies. The idea is that all the different extremes of the dichotomies are covered with these four individuals. Important to note here is that in each scenario, the specific individuals can be described differently. The only thing the four different Helenes have in common is their name and dichotomy characteristics. The described working or housing situations can overlap between the different narratives, but this is unintentional. Each scenario should be treated as a standalone in this regard. This warning is meant to prevent the reader from becoming confused when particular descriptions of the individuals do or, in other cases, do not overlap.

The two trends that have been picked as x- and y-axis, the political trend (increased political awareness in regards to food intake) and the economic (increase in plant-based consumption), respectively, are described differently depending on the scenario. Both trends will have two extremes, meaning either a further increase in plant-based consumption or stagnation in plant-based consumption. It is also possible that political awareness will increase and lead to action in the future. However, a more conservative approach to the role of governmental bodies in determining what people eat is also plausible. These four different extremes make the most significant difference between the four scenarios. The remaining three trends are then described in the context of each specific scenario and are described as if they were to develop fully. The technological (robotization), ecological (water & nutrient scarcity), and spatial (conflicting battles for space) will potentially be worked out differently due to the interplay with the different dichotomies and four different extremes.

Table 14 - Overview individuals and their characteristics

Name	Dichotomy well-off vs. badly-off	Dichotomy convenience vs. context
Rens	Badly-off	Context
Helene	Badly-off	Convenience
Finn	Well-off	Convenience
Durdane	Well-off	Context

The four narratives described in this section potentially contain a glimpse of what the food acquisition practices of the future might hold. In addition to the narratives, this section also provides a better understanding of how sustainable each specific scenario could be considered according to the conceptual framework introduced by Johnston and colleagues (2014). Each scenario is reflected upon, and the visual representation of the sustainability of the diets is shown, which helps in understanding the various interrelations that come with a sustainable diet. These reflections are meant as a thought experiment; the arguments put forward are based on literature introduced in the previous chapter, which should be kept in mind while reading the reflections.

Scenario 1 - Increased awareness from the government / Stagnation in plant-based food consumption

Rens has been working remotely from home. He is about to get some food near his house for lunch and later that evening. Even though his family is not well-off, they can usually acquire healthy foods. The reason is that the government has put forward regulations regarding the food environment. Food provisioning should be healthy, which shows in what Rens and his family eat daily. His neighborhood is considered to be housing predominantly people with a lower SES. Rens works on a community garden near his home, located on top of an eight-floor apartment block, which was developed because the area did not have enough free space. Rens is compensated with fresh produce every week for working at the community garden. He likes to take the time and learn about what he and his family eat; working 8 hours at the farm really helps with that. The community garden is not in full bloom this year, unfortunately. It was a dry summer, so the garden manager had to choose which crops to water. Rens grabs some fresh *Carrots* before he gets back to work.

Helene has been working at the office this morning. Because Helene came to work on foot, she was granted a travel allowance, as her work rewards those who engage with healthy habits. Through new regulations being passed, she can now exchange that allowance for lunch, saving her money while also becoming healthier. She got rid of quite some extra kilos because of this. The office has a canteen that is supplied by an automated restock infrastructure. So-called cabinets are filled through the back via standard large retailers. All Helene has to do is grab a *BLT Sandwich*, and she is ready to go.

Finn is one block away and is ready for lunch as well. His office does not have a canteen, but he can order some food through a food service app. He feels like eating meat because he plans on going to the gym afterward and can use some energy. He orders *Beef noodles*. The food delivery is quite fast; a new generation drone delivered it. He was lucky; his colleague last week had an autonomous drone from an older generation, causing it to take longer.

Durdane works part-time and is free this afternoon. She just got home from work and wants to test this new recipe. She lives in one of those blocks without a kitchen at home but has decided to rent one with some friends. Before she goes to the rented kitchen, she drops by the food hub, where she picks up the order she made that morning. Fresh produce from the region is packed and ready to be prepared. She uses a shared electric cargo bike because she also needs to bring food for 5 of her friends. The kitchen also has a dining table, allowing her and her friends to have an extensive dinner together. They are feasting on *Codfish* this evening. Whatever she and her friends do not consume that night has to be thrown away, according to the structured nutrient recovery regulation. Cuttings and leftovers are separated, and the nutrients are recovered due to the kitchens being attached to the central sewage system.

Reflection scenario 1 - Increased awareness from the government / Stagnation in plant-based food consumption

'Contributing' to diet sustainability

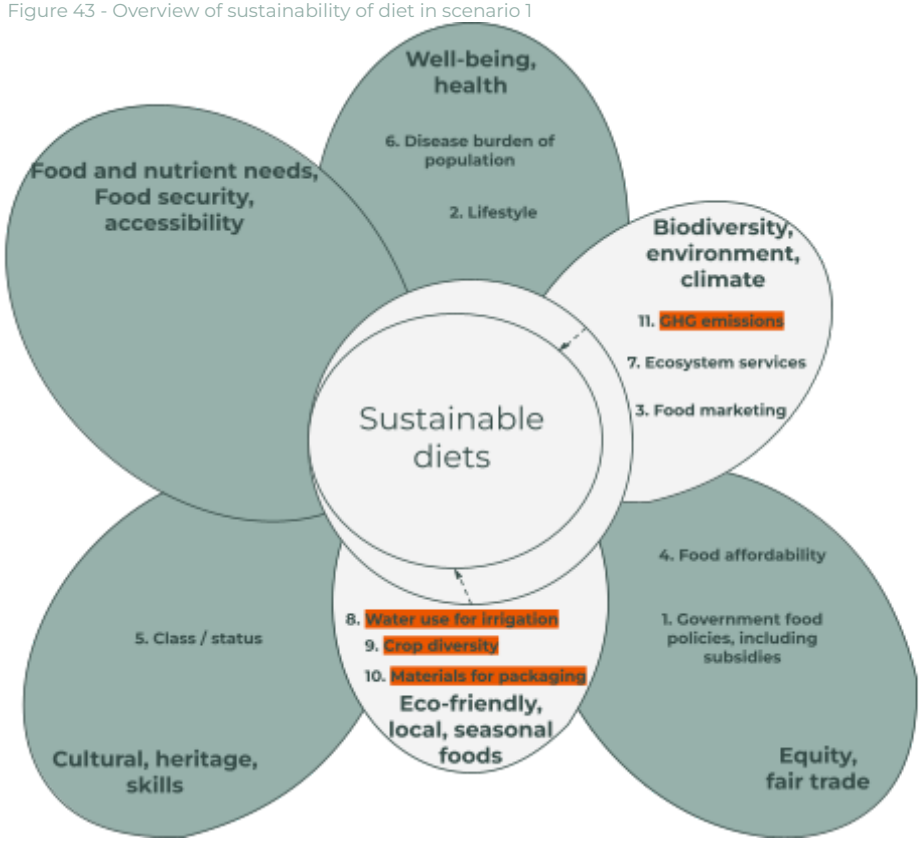
In the first scenario described here, governmental awareness regarding what people eat surfaced. With the implementation of rules and regulations (1, see numbers in figure 43), both Rens and Helene were granted access to food. Both incentives matched the interest of the individuals; Rens was required to work in his community garden while Helene had to perform healthy habits (2) to get access. Numerous other nudges can be thought of through which an exchange between food and something accessible can be realized. Being exposed to a healthy food environment (3) and healthy habits while having access to healthy food options (4) opens the door for those considered part of the lower SES (5) to live a healthier life (6). Furthermore, greenery in the form of urban gardening can benefit not only those working in it or harvesting the fruits from it, but it also has the potential to contribute to the biodiversity of the city, providing people and other living beings with benefits such as cultural identity, habitat and climate adaptation (7).

'Jeopardizing' diet sustainability

In this scenario, we saw that the urban vegetable garden was not used to its full potential due to a water shortage. In an ideal situation, the irrigation system in place is tuned as such that maximum yields can be generated. Water scarcity, however, proved to be an issue in this example (8), resulting in fewer varieties of crops being able to grow (9).

Finn and Durdane are considered well-off; their food acquisition practices were characterized by more freedom of choice. The governmental interference in their food acquisition practices was not as dominant in this particular narrative. Behind the ease with which Finn could order a meal lurks a world of externalities. With increased food delivery often comes more packaging material (10), and the meat consumed generates relatively high GHG emissions (11).

Figure 43 - Overview of sustainability of diet in scenario 1



Scenario 2 - Increased awareness from the government / Increase in plant-based food consumption

Rens has always been curious about what he exactly eats. He and his father used to read the labels of all the products they bought. He remembers his father was struggling to find healthy products that were at the same time affordable. For a couple of years, however, he has seen a steady decline in the number of sugars and fats in affordable food options. The updated Nutri-Score v.5.0 was implemented last week and is now set to plant-based as the standard. It provides insights into what best to eat when eating plant-based. Rens still likes to spend time reading all the different labels. Even if Nutri-Score v.5.0 states that the product is healthy, he wants to know why and see for himself. He came across this new *Seaweed protein bar* the other day and wants to bring some home for later that day.

Helene has a quick lunch break but has no idea what to eat. All she knows is that she is hungry. With the new integration of the Nutri-Score v.5.0 and her DigiD (Digital Identification), however, she can request a meal proposal from the governmental database specifically meant for people with a relatively lower level of income. All she has to do is send out the request, and the application suggests what is best to eat according to her digital identification and the Nutri-Score. She walks to a 3D printer around the corner, where she scans the received QR code from her DigiD app. Out of the two options she gets, she picks the one with the shortest print duration; it is *Courgetti with tomato sauce and fresh basil*.

Finn has a date coming over tonight, and he aims to impress the other by ordering the best meat he can get his hands on. He usually eats plant-based; however, now and then, he likes to treat himself. Meat has become very expensive due to water shortages which saw most Dutch meat farms change their business model. Only very high-end restaurants and a lucky few can still afford it. Finn is one of them. He orders the best part of the cow for making *Chimichurri*. All necessary ingredients are delivered to his home. He has a new kitchen application that does most of the work for him; all he has to do is scan the provided QR code, and the machine reads out loud when to turn the beef or when to season the vegetables.

Durdane has lived in the same apartment for quite some years now. The common area used to facilitate a large roof garden which enabled the growing of vegetables. She used to spend hours working in the garden. Most of her neighbors asked her for advice on how to grow certain greens and crops best. Unfortunately for her, however, recent policies made it so that water restrictions have been tightened up. Furthermore, the roof garden was relatively big, and with the new renovation plans, a significant part was used to house an additional four families. Growing crops became much more challenging, so the association of owners decided to replace the open garden with a more automated urban garden concept. Now no longer is Durdane asked to water or harvest the plants, but an automated farm drone does most of the work for them. Luckily Durdane has a small vacation home outside of the city where she can still run her own small garden; with fresh eggs and tomatoes from there, she can make a nice *Shakshuka*.

Reflection Scenario 2 - Increased awareness from the government / Increase in plant-based food consumption

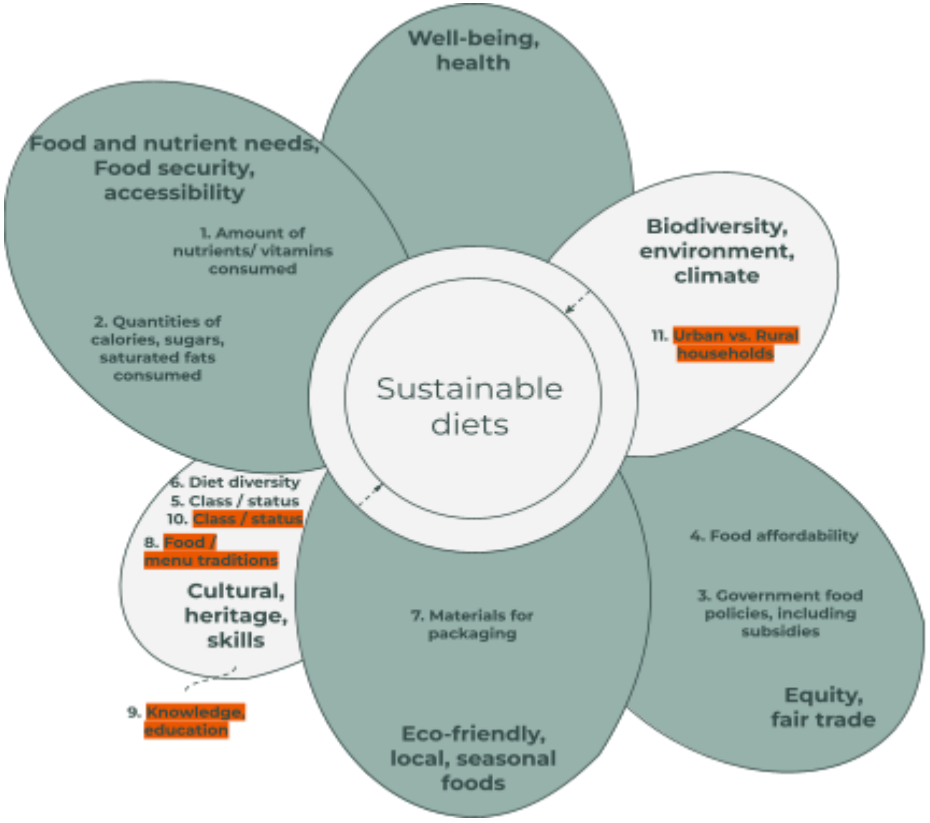
'Contributing' to diet sustainability

In the second scenario, there was a clear emphasis on the Nutri-Score and how it provided an overview for those seeking to eat healthily. With fewer sugars and fats in general, people's diets are expected to become more healthy, with more nutritional value (1, 2, 3, see numbers in figure 44). This way, healthy food becomes accessible to more people as the government is actively involved in providing information (4, 5). Having the government provide options also potentially leads to situations wherein individuals eat more diverse diets since they are less likely to fall into certain undesirable consumer behavior patterns (6). Lastly, portion-sized meals are a potential gateway towards less meal packaging. While this can develop both ways, as recipe boxes often cause more packaging, it is argued that 3D-printed foods can potentially diminish the acquired food packaging (7).

'Jeopardizing' diet sustainability

However, an apparent downside of this active role for the government is that people will become less invested in what they eat. Having a set of options presented to them, which can be accessed on every street corner whenever they feel hungry, is likely to cause people to lose touch with certain traditional values as well as general knowledge about what it is they are eating (8, 9). Having people blindly follow what they are presented with could not be ideal. What also came forward was that meat has become a very rare product. While for environmental reasons, this could be a good thing, in terms of cultural and social values, it can be argued that having no access to meat for some, can be seen as a clear dividing line between various groups of people (10), which is why this factor is seen as both contributing as well as jeopardizing the sustainable of the diet. Lastly, the narrative noted a clear difference between the urban and rural environment, with the urban being characterized as a place no longer able to facilitate open greenery due to a lack of space and resources (11).

Figure 44 - Overview of sustainability of diet in scenario 2



Scenario 3 - Stagnation in awareness from the government / Stagnation in plant-based food consumption

Rens works two jobs and is mostly concerned with coming by. He lives in an underprivileged neighborhood in the city. When having dinners with family, he sees that most of them fall for the incentives of the unhealthy food environment they find themselves in. Most family dinners are not always very healthy. His family is characterized by a high degree of non-communicable diseases. When it was his turn to make something, he used to try and bring fresh vegetables from a large farm afar. He used to bike two hours back and forth to work there the whole day and, in return, would get vegetables for a week. However, his two jobs do not allow him to go there as much as he wants to. Also, the farmer told him that he would soon purchase a new robot because he needed to scale up his farming practices. This probably means there will be less work for Rens to take care of, meaning even less fresh vegetables for him and his family. He can almost already smell the *Hamburgers* his uncle is going to make next family dinner.

Helene enjoys going to Sloterpark and its nice beach during the summer days. On her way home, she often grabs a quick bite from the food vending machine spread across the city. She enjoys using those because the food is cheap and accessible anytime and anywhere she likes. There are days when she acquires all her daily food intake from such vending machines, meaning she sometimes purchases from them seven times in one day. Today she planned to hang out near the lake. She grabs two quick meals for her and her friend, a *Pasta salad*. Hanging near the beach is different, though, now that swimming in the lake is unfortunately no longer allowed due to the deteriorated waters.

Finn lives in an all-in-one service hub. These are large building blocks clustered around train stations. Most are found at the city's periphery for the easy transportation of goods. Living in such proximity means having easy access to almost all the services and products one can wish for, but it requires a significant yearly salary. Finn goes to visit the food market, which contains a showroom. This showroom is part of the more luxurious Albert Heijn food store brand. Besides allowing for the pick up of goods ordered online, the food market also houses several cooks who work with the stores' ingredients and prepare the food for people to taste, from Japanese sushi to Mexican tacos. Today Finn does a quick tour throughout the store before he picks up his ordered groceries and other packages from the service desk and immediately places a new order, *Sushi* for lunch tomorrow

Durdane often visits a local biological farmer near the city's edge. However, access to local produce is becoming much more challenging because the farmer struggles to make ends meet. He is relatively small and has been offered a reasonable price for his plot of land. The potentially new owner wants to integrate it into his large commercial farm. Unfortunately, his biological farm is not subsidized by the government. Durdane cannot grow any crops on her own balcony due to the new high-rise projects currently being developed. Her balcony does not see enough sunshine anymore. Durdane is thinking of leaving the city for a place where she has enough space to acquire the produce she likes. While looking for a place to move to, she cooks some biological eggs she had left in the fridge to make an *Omelet*.

Reflection Scenario 3 - Stagnation in awareness from the government / Stagnation in plant-based food offerings

'Contributing' to diet sustainability

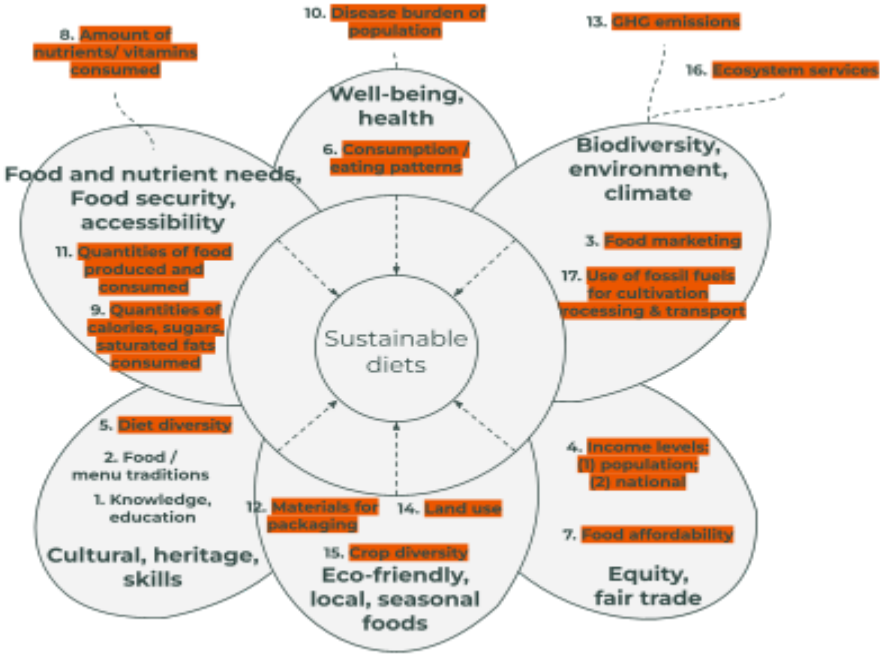
In the third scenario, we read that the showroom Finn finds himself in has different foods on display. Furthermore, various chefs cook with the products so that people can see and learn how certain things are to be prepared (1, see numbers in figure 45). In addition, we see that, although perhaps considered unhealthy, Rens' family often organizes family dinners with hamburgers from his uncle. From a health perspective, one could argue that change is needed, yet many family traditions are of cultural value nonetheless (2).

'Jeopardizing' diet sustainability

With no apparent government support, many individuals are often exposed to unhealthy food environments. Individuals like Rens who want to consume healthier are hampered by their physical and social environments. With unhealthy incentives (3), no financial stability (4), and social lock-ins (5, 6), it becomes challenging to access foods (7) with nutritious values (8, 9). Often leading to non-communicable diseases (10). Furthermore, in the scenario narrative, we see Helene eating up to 7 times a day (11), all prepackaged meals to facilitate her urge for convenience (12). Having access to food as she pleases causes her to develop an unhealthy habit of snacking. When faced with complete freedom, people will likely over consume or consume whatever they like. Finn, however, in his consumption behavior does potentially cause higher emissions due to eating meats and fish on a daily basis (13).

In addition to the unhealthy consumption practices, the production side was also briefly touched upon in this narrative. The inability of small farmers to run their biological farm vs. large farmers seeking ways to scale up. The scaling of farmers in search of efficiencies causes soil exhaustion (14), while efficiencies are often also paired with fewer varieties of crops (15), leading to less biodiverse environments (16). Furthermore, running large farms with automated machinery can require large amounts of fossil fuels (17).

Figure 45 - Overview of sustainability of diet in scenario 3



Scenario 4 - Stagnation in awareness from the government / Increase in plant-based food consumption

Rens lives just outside of the city to save himself some money. Housing prices have soared through the roof, and he cannot afford to live there anymore. He does still work within the city and also has friends there. He often goes and visits them via the autonomous metros that were installed a few years back. Rens likes to cook; however, his kitchen is not very spacious at his own house. Some of his friends have a nice kitchen as they can afford it. When dinner parties are planned, he often offers to make dinner so he can cook in the lovely kitchen of his friends. Tonight is such a night; he went to the food market to get fresh vegetables for himself and his friends. His friends usually step in and pay for a little extra so Rens can eat along. He plans to make excellent vegetable stock for *Risotto*. Upon arriving at his friend's house, he spots the newest generation all-in-one kitchen application. All of his friends are standing around it in a circle. Rens, his friend, got it as a gift because of his ten-year work anniversary. They ask Rens to test it out that night. Unfortunately for Rens, he did get to be in a large kitchen but did not have to do much of the work since the kitchen application did most of it.

Helene has a monthly foodservice membership at the food hub. She gets six meals a week for a relatively low price. With this membership comes a specific kitchen application that works neatly with the recipe boxes she gets from the same manufacturer. This way, she can access relatively affordable food while the kitchen application does most of the work. Most of the food she eats is plant-based because she has a bronze membership with the food manufacturer. Plant-based is cheaper than eating fish or meat because of the high water prices. Helene likes that she is unburdened from deciding what to eat daily. However, she cannot easily switch food brands because her machine only accepts the original food boxes from the same manufacturer. She is somewhat locked into using this company's specific products and services. She signed a contract for two years, meaning she has to stick with this commercial party for quite a few more meals. Tonight she eats *Hotchpotch*.

Finn has a golden membership with the same food service company. Gold membership has various benefits, such as a personal health monitor. In return for your personal data, the company provides you with healthy meals to your liking. Shipping happens fast, and often Finn receives his meals in under 10 minutes upon ordering. Tonight he orders a fresh *Poke bowl with plant-based tuna*.

Durdane
Durdane did not want to be dependent on any membership and decided to get her own private home farm. She bought the home farm to grow various greens and herbs. She now grows various herbs from her home country in a two-square meter space on her balcony. She can control the nutrients and water flows from her phone and find the optimal balance. She likes to spend time tweaking that to get the best result. However, she recently received an email that most of the water monitoring will soon be automated due to new governmental regulations. She, therefore, invites her mother tonight to enjoy her (probably last) own grown spinach in a self-made *Pine*.

Reflection Scenario 4 - Stagnation in awareness from the government / Increase in plant-based food offerings

'Contributing' to diet sustainability

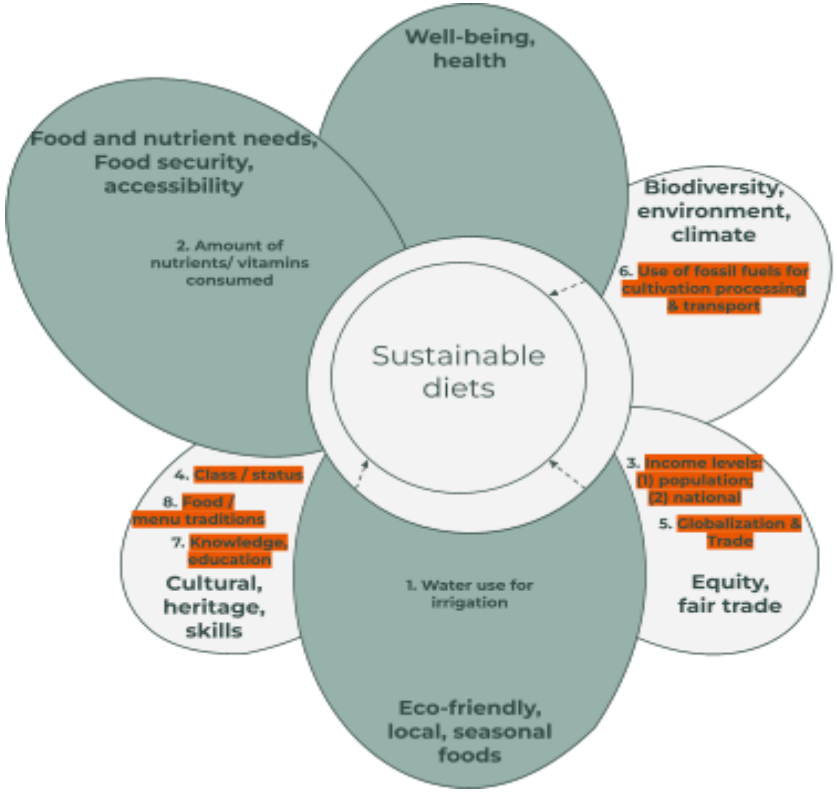
Even though Durdane is cut off from managing her home farm, the act of taking control when it comes to water management could prove vital in the future (1, see numbers in figure 46). In addition, the role of food provision continued to be in the hands of commercial parties. Having advanced technologies regarding people's health and consumer behavior work together potentially results in healthy food consumption (2).

'Jeopardizing' diet sustainability

However, leaving consumers' health in the hands of commercial parties does beg the question of whether that is desirable. It becomes apparent that those not considered well-off are bound to deal with what they get. In the case of Helene, a bronze membership, compared to a gold membership for Finn (3, 4). With commercial parties taking over the food chain and increased globalization (5), this could expose consumers to various types of food. It also generates an unbalanced and dependable relationship. Moreover, the global trade of goods and foods is often characterized by emitting emissions and using fossil fuels (6). Furthermore, having such responsibility comes with much power. This scenario does show similarities with scenario two, which also portrays a future where the burden of deciding what to eat is outsourced and paid for in this particular scenario.

Lastly, we can read that being able to live within the city is not a given. A clear unbalance in who gets to live where or who gets to own a kitchen in the future is also something to raise concerns about. Kitchens are places where we can learn about food and keep food cultures alive (7, 8,). In fact, in the urban environment, it is one of the only few moments we are confronted with the actual (creation of the) food itself.

Figure 46 - Overview of sustainability of diet in scenario 4



Concluding Remarks

In section 5.1 the seven main trends are brought forward and covered in depth. What becomes evident is that the trends itself contain various arguments, nuances and specificities all mentioned by the interviewees. The well-off vs. badly-off dichotomy for example, is the result of many different things, has an effect on a people and the city in many different ways and ultimately also translates into the food acquisition practices in various manners. This goes for all seven trends, the reasons for their existence and impacts they potentially have are wide diverse.

Each trend, which thus compiles various insights in and of itself already, is thereafter supported by findings from literature. Here again we see that one trend is the result of, and brings forth, many different developments in itself. The social trend, a dichotomy between convenience vs. context has an influence not only on what foods we acquire, but also on where, how and why. More supermarkets that also grow larger whilst at the same time more food is ordered online than ever before. Five years ago it was not so evident that groceries would arrive at your doorstep in a matter of minutes. Yet simultaneously we see developments in urban gardening with people in search of the context of their foods. Hoping to experience more than just its nutritional value.

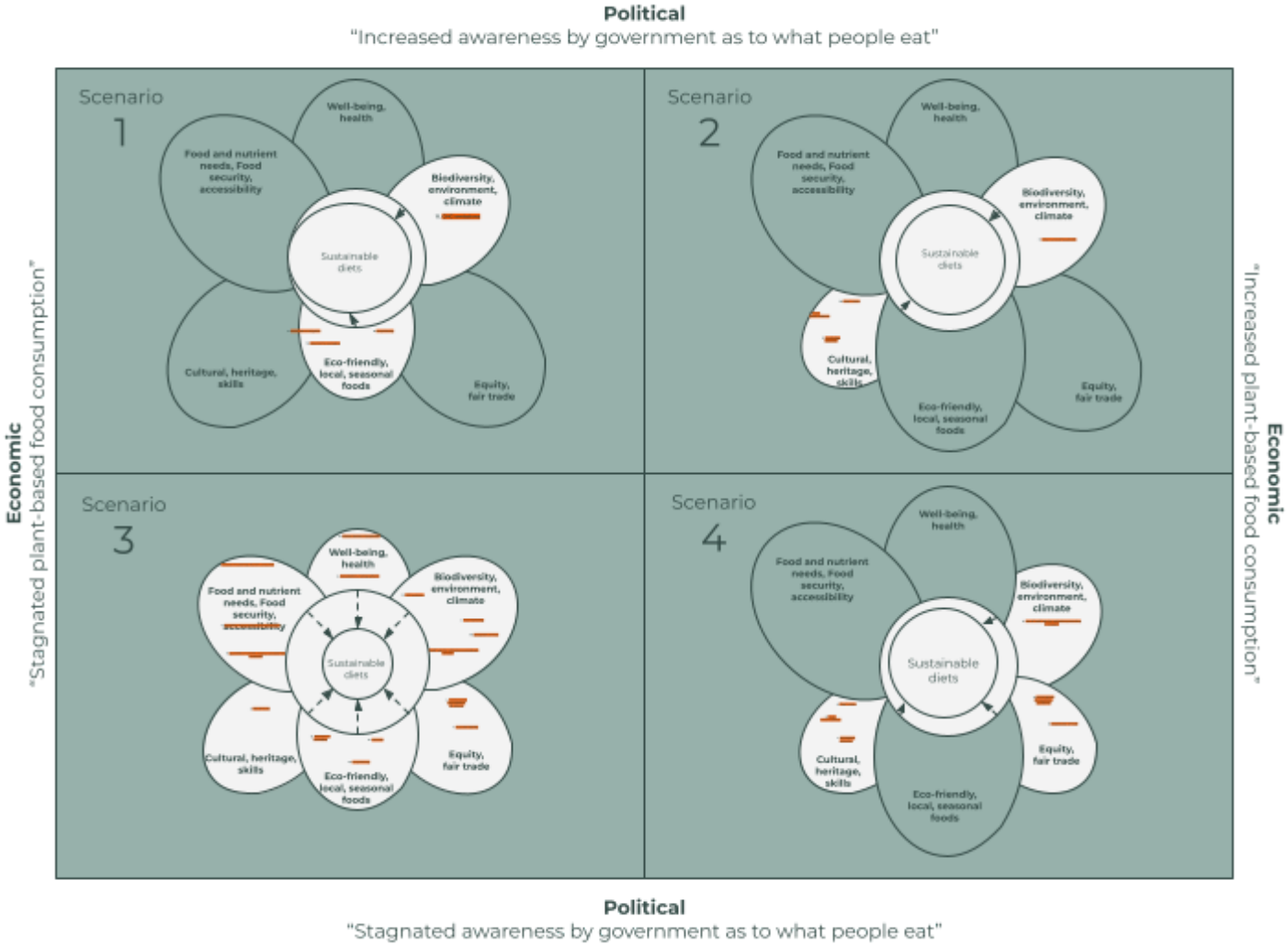
In section 5.2 the trends come to life as they are described in either full maturity or various stages of their development. These scenarios presented are by no means a conclusive picture of reality. Many facets of the trends were not included in the narratives since for that the narratives would need to be much more extensive, which however was not the goal of writing this thesis. The aim was to get a glimpse of the future food acquisition practices. Four different individuals were described and each engaged with food acquisition whilst the interplay with both the lifestyle practice and system of provision was explored.

What the narratives furthermore showed is that various conflicts arise when trying to 'score' the sustainability of a future diet. The concept of sustainability, due to it containing a multitude of key components each containing another layer of processes and factors makes it difficult not to have collisions. Family traditions are good for culture and heritage whilst learning about food is good for people's skills. Yet some traditions or practices bring along externalities in the form of health or environmental pressure which raises the question on how to seek a balance. More on this in the next two chapters.

Lastly, figure 47 on the next page is an attempt to integrate the findings from both the interviews and literature study and bring those together, through the conceptual framework, in an attempt to show city officials, governments and researchers the interrelations within the food system. The role of political stability clearly affected the equity and fair trade component. The cultural, heritage and skills component also underwent extensive coverage, however in a different way in each of the scenarios.

The visualizations are a mere reflection of the introduced narratives and are therefore to be interpreted as such. Inherent to the food system is its interconnections, which is also what makes it difficult to cover in its entirety. Especially in a masters thesis. This visualization is an attempt to show these very interrelations.

Figure 47 - Overview of 7 main trends in DESTEP + S format, with highlighted x-axis and y-axis



Chapter 6 - Conclusions

Chapter description

This chapter is kept relatively short compared to the overall work. The provided chapters above each already contain some elements of concluding remarks. This chapter, therefore, functions solely as a summary of the key findings, to be found in section 6.1, and an answer to both the sub- and main-research question in section 6.2.

6.1 - Key findings of this study

This thesis aimed to research and contribute to Amsterdam's urban food acquisition transition. The current food acquisition practices bring along a multitude of externalities which this thesis was only partly able to cover. A list of trends was generated and eventually synthesized into seven main trends. The results indicate that the seven main developments that are expected to affect the future food acquisition practices of Amsterdam residents in 2050 are:

The uneven distribution of wealth amongst city residents is expected to increase. Due to segregation, divergent educational levels, and a different food environment, the groups in society indicated to be of lower SES are expected to face increased externalities from their food practices. This expresses itself mainly in food-related health issues such as obesity. One main reason is the food environment those with a lower SES often find themselves in.

A key element of acquisition is the actual food consumed. It is unclear what direction the currently observed trend of an increase in plant-based consumption will develop into. Plant-based food consumption could help battling health and environmental pressure from our current diets. Whilst consumption numbers do indicate that a rise in plant-based food alternatives is ongoing. The question remains whether this will eventually mature into a new standard. Current meat-alternative consumption levels are far from significant compared to actual meat consumption levels.

In addition to a dichotomy considering the wealth distribution, another dichotomy is expected regarding the orientation and dedication of time and resources of people regarding their food acquisition. On the one hand, people are seeking ways to spend less time on their food acquisition practices. The industry answers to the urge for convenience with a surge in convenient food options such as flash delivery or recipe boxes. Opposite to that is the group of people who wish to dedicate more time, resources, and effort towards various food practices, amongst which food acquisition is one. The context behind the food they eat is part of the value proposition as they wish to experience (and know more about) the food they eat. Local and environmentally friendly products are often the outcomes of that.

A technological development that is most likely to affect food acquisition significantly but even more so the system of provision is robotization. The integration of automated provision systems is expected to affect how food is delivered, received, and stored. Furthermore, automated technologies are capable of helping the

consumer make decisions. They can become more informed and potentially lead to healthier food practices.

Another element of food provision is the infrastructure behind the production. Water and nutrients form the basis of the food we eat. However, it is expected that water and nutrients will be scarce in the near future. Mainly due to water pollution and drought. With such scarcity, however, also comes a different value of these same resources, which has implications for the food waste management system of provision. Decentralized and local infrastructures are expected to be realized to collect valuable resources after the consumption and production cycle. These infrastructures will automatically influence the way our consumption practices take shape.

Potentially the most impactful development to be expected in the coming years is the level of governmental interference when it comes to food intake. Increased awareness has been observed regarding the health effects of our food intake. It is too preliminary, however, to state that this increased awareness will also lead to actions. Some initiatives have been observed regarding health prevention, nudging, and food-related information provision. Where this development will lead to is still unclear. However, its potential impact is argued to be significant.

Lastly, this thesis aimed to contribute to the DESTEP methodology. Each paragraph of this section is drafted according to it. The Demographic, Economic, Social, Technological, Ecological, and Political developments are described. Yet this work argued that how these developments affect the urban is often translated into a spatial dimension. Therefore the spatial dimension was brought forward, resulting in the DESTEP + S methodology. The spatial development most likely to affect Amsterdam's food practices is the ongoing and increased battle for space within the city. Due to rising housing prices and a multitude of solutions that need to find their way (and with that take-up space) within the city are considered the main reasons for this. The effects on various food practices are diverse. One example could be the disappearance of the kitchen in a standard house, which would have exceptional implications for the entire food system.

Methodological experimentation

In addition to the substantive results and conclusions, this master thesis also aimed to contribute to the development and execution of three methodologies.

As introduced, the DESTEP methodology was expanded upon by introducing the Spatial dimension. It is argued that, especially when viewing the world of consumer behavior from the practice theory lens, the system of provision (the food environment) requires adequate levels of analysis. This resulted in the DESTEP + S method. This method was used to analyze the various trends and enable the clustering of the multitude of developments.

The methodology chapter presents the process of analyzing the various findings from the interviewees in a clear step-by-step manner. Furthermore, an in-depth and filled-in version can be found in Appendix B. The reason for shedding light on these steps and dedicating a significant part of this thesis towards it is for reiteration purposes. Furthermore, it is part of the third and final

methodological development, which integrates the conceptual framework and the scenario analysis. Combining these methodologies is an attempt to contribute toward the administrative innovation as sought-after by the City Deal partnership. By deploying these various methodologies and applying them in this thesis, a first step is taken towards a more integrated approach to understanding the (urban) food acquisition practices.

6.2 - Answers to the research questions

This thesis's main focus was on acquiring insights into the sustainability of future diets. Specifically, the acquiring of insights has been brought forward in the previous section. In addition, however, there are two research questions left to answer. The sub-question read:

What are potential future urban food acquisition practices for Amsterdam residents in 2050?

This question has mainly been answered in section 5.2 of the results chapter. Integrating it in that section stimulated readability, as both the explanation for the creation and interpretation of these scenarios are kept together into one part of the thesis. Nonetheless, the summarized conclusions for the potential future urban food acquisition practices for Amsterdam residents in 2050 are briefly touched upon here.

As mentioned in section 6.1, the various developments had different effects based on how they were interpreted, whom they affected, and in what part of the food practice they interfered with. We saw that the role of the government had a significant effect on the economic accessibility of healthy foods. With potential incentives playing a large role for those in Amsterdam that are considered part of underprivileged neighborhoods. In addition, we saw that governmental interference in food practices could lead to negligence of certain food-related traditions and know-how. Having the option to choose can thus have benefits; however, without any governmental interference, the levels of overconsumption are expected to increase. In the case of underdeveloped plant-based food consumption, devastating externalities for the environment are expected as a consequence. Finding the balance between setting boundaries while still engaging people and leaving them to choose what they want to eat is thus difficult to pin down.

In the scenario where the economic and political trends were expected to remain underdeveloped, we saw the least sustainable diet. With challenges for people with lower income to access healthy food options while, on the other hand, people with resources partook in overconsumption. The current health constraints are expected to be ongoing in this specific scenario.

Many different interventions furthermore proved to have effects on various factors and processes simultaneously and often resulted in conflicting implications for the sustainability of the future diet. Some examples of conflicts are the healthy vs. affordable diet, the affordable diet vs. the profitable diet (for farmers), and the culturally appropriate diet vs. the healthy diet.

What remains is the main research question of this thesis:

How can future urban food acquisition practices contribute toward a 'sustainable diet' in 2050?

Various narratives and reflections were brought forward describing how future urban food acquisition practices can contribute toward a sustainable diet. However, as observed, many contributing aspects can potentially jeopardize the diet's sustainability. This is because the diet's sustainability in this conceptual framework consists of six key components that each hold up to seven factors and processes. The interrelations between all elements make this conceptual framework a reasonably good reflection of reality. It, however, does not make it easier to find a sustainable diet simply because a balance between all the different elements has to be found—a rather challenging task. The next chapter is dedicated to what next steps might be useful to take in order to approach the solution to this challenge. However, this challenge is simultaneously the answer to the main research question: striking a balance between the multitude of interrelated key components of the future sustainable diet. For that, the various components and corresponding factors and processes need to be recognized and studied extensively, both in isolation as well as through their role in the entirety of the global food system. Only then can the future urban food acquisition practices result in a real, sustainable diet instead of a conceptual one.

Chapter 7 - Discussion

Chapter description

The previous chapter provided the key findings and answers to the research questions. However, this thesis was experimental. With that, various shortcomings and disclaimers need to be noted. This chapter provides the limitations and gives suggestions for future research.

7.1 - Limitations of this research

This thesis started with two research questions it aimed to answer. Furthermore, it tried to contribute toward administrative innovation as mentioned in the City Deal plan. The goal was to provide a framework that could be used to make sense of the complex food system. Specifically, this thesis focussed on the urban food system through food acquisition practices. For this, the conceptual framework by Johnston and colleagues was introduced. It is argued to encompass a wide variety of components that together form a reasonable reflection of the food system's complexity. The complexity, however, is also one of the limitations of this research. Employing the conceptual framework and aiming to describe all of its components requires extensive work. Each and every component deserves a master thesis on its own. The components, on an individual basis, did not receive much attention. The goal was, however, to see them as one group and interpret them as such. However, to develop the scenarios and future narratives, it was required to engage with every component individually, at least with some of them. This is in order to make the narratives come to life. Describing the food

acquisition practices and their effects on these factors and processes allowed for narratives to arise. However, the outcomes of the narratives and reflections cannot be seen as scientifically underpinned realities of the future. They are simply a potential representation of a mix of trends and conceptual components. Therefore, it is essential to note that Section 5.2 of this thesis predominantly has far less scientific underpinning than section 5.1. Also, the conclusion made regarding the sub-research question is merely an interpretation of the author of this work. They are, so to say, a generated representation that could have been described in a completely different manner if this specific research were to be repeated. This, however, is inherent to the creation of qualitative scenarios. But nonetheless, it is important to note this.

An extensive description of the methodology furthermore characterizes this thesis. Reasons for this are that scenario building was considered a valuable method to use; however, it was difficult to find clear examples describing each step to take to create meaningful scenarios. Particularly considering the qualitative nature of this research. It was, therefore, decided to 'build the plane while flying it.' Meaning that the various steps taken were developed on the go. This methodology, found in Appendix B, was argued to be potentially valuable for future scenario-building research. It was therefore decided to include it as such. However, the methodology employed was not particularly and consciously based on any scientific methods. Subconsciously practical steps must have originated through the reading of literature. However, no apparent sources of inspiration are provided, nor can they be. This requires the reader of this work to be cautious when interpreting the results and conclusions. The seven main trends that resulted from the interviews are the main product of this scenario-building exercise. The various interview findings were analyzed and processed, eventually leading to seven tangible trends. While an additional consultation with my thesis supervisor Anke Brons was set up to take the first step of the method, steps two to seven were solely executed. This process, therefore, could be characterized by some subjectivity.

Lastly, the DESTEP methodology was expanded to the DESTEP + S methodology. One of the main reasons was that the food environment, as a spatial dimension, was not represented sufficiently in the original DESTEP method. The DESTEP method was employed in this work and was integrated with the scenario-building method. It was furthermore used as a framework to which eventually the seven trends could be ascribed to. Although arguments have been put forward as to why the DESTEP methodology was expanded, the addition on its own could require an entire thesis before sufficient scientific substantiation is realized. In this thesis, however, it formed to be just one of the various tools used.

7.2 - Suggestions for future research

The first steps taken in this research hopefully function as a starting point for future research.

One clear focus point for future research would be to quantify the conceptual framework and its components. Potential research questions could be: Determining food diet-related GHG emissions for specific Amsterdam communities. With a particular focus on socioeconomic status, neighborhood, and general food

orientation. Gathering data on, first of all, the diets of various communities would yield valuable results for the research of the other components. A broad understanding of diet compositions of various city resident groups would potentially allow for the extrapolation of the diet-related externalities.

A more fundamental question that can be asked is concerned with striking a balance between the various components. Is there a particular priority to be given? Moreover, is there a different priority for these components, depending on whom you ask? How do certain Amsterdam communities value these different components, and what is the view of the hinterland (farmers, retailers) in this regard?

Another suggestion mentioned earlier is understanding the spatial role in food acquisition practices. What would it mean if kitchens were to disappear? What effects would that have on food provision, food acquisition, and our diets in general?

Lastly, it would be exciting to see research of participatory nature regarding all the aforementioned research directions. While conceptual frameworks are attempts to grasp reality. It is the actual people within the city that truly define and undergo what reality is. Integrating governmental officials in their search for administrative innovation could also benefit from co-creation with relevant stakeholders. Furthermore, drafting scenario narratives in collaboration with Amsterdam residents would truly make them come to life.

Chapter 8 - References

Albert Heijn. (2022, January 3). Albert Heijn start met volgende stap van geleidelijke invoering Nutri-Score. Albert Heijn. Retrieved August 11, 2022, from https://nieuws.ah.nl/albert-heijn-start-met-volgende-stap-van-geleidelijke-invoering-nutri-score/

Aligica, P. D. (2005). Scenarios and the growth of knowledge: Notes on the epistemic element in scenario building. Technological Forecasting and Social Change, 72(7), 815–824. https://doi.org/10.1016/j.techfore.2005.01.001

Alam, M. R., Reaz, M. B. I., & Ali, M. A. M. (2012). A review of smart homes—Past, present, and future. IEEE transactions on systems, man, and cybernetics, part C (applications and reviews), 42(6), 1190-1203.

ARNOLD, J., et al., 1991. Work Psychology: Understanding human behaviour in the workplace. 2nd ed. ed. London: Pitman.

Arntz, M., T. Gregory, and U. Zierahn. 2016. “The Risk of Automation for Jobs in the OECD Countries: A Comparative Analysis.” OECD Social, Employment and Migration Working Papers 189. Paris: OECD Publishing. https://doi.org/10.1787/5jlz9h56dvq7-en

Asselt, M.B.A. van, J. Mesman & S.A. van ‘t Klooster (2007) ‘Dealing with prognostic uncertainty’, Futures: 669-684.

Bakker, K., Nooteboom, B. & Voolebregt, S., 1982, ‘Ontwikkelingen in de levensmiddelenhandel 1950-1978’, in: Economisch Statistische Berichten, 27 januari 1982, p.93-94.

Bamburry, D. (2015). Drones: Designed for product delivery. Design Management Review, 26(1), 40-48.

Bates, B., Kundzewicz, Z., & Wu, S. (2008). Climate change and water. Intergovernmental Panel on Climate Change Secretariat.

Billen, G., S. Barles, J. Garnier, J. Rouillard, and P. Benoit. 2008. The food-print of Paris: Long-term reconstruction of the nitrogen flows imported into the city from its rural hinterland. Regional Environmental Change 9(1): 13–24

Blockmans, W. (1990). Stedelijke netwerken in de Nederlanden voor de industrialisatie. Leidschrift: Stad en platteland in pre-industrieel Europa, 7(December), 59-68.

Bray, J. P. (2008). Consumer behaviour theory: approaches and models.

Bronner, F., de Hoog, R., 2018. Conspicuous consumption and the rising importance of experiential purchases. International Journal of Market Research 60, 88–103.https://doi.org/10.1177/1470785317744667

Brons, A., Oosterveer, P., & Wertheim-Heck, S. (2020). Feeding the melting pot: Inclusive strategies for the multi-ethnic city. Agriculture and Human Values, 37(4), 1027–1040. https://doi.org/10.1007/s10460-020-10031-x

Brugh (2022, March 18) ‘Schoon water is in Nederland nog ver weg’ NRC. https://www.nrc.nl/nieuws/2022/03/18/nederland-riskeert-watercrisis-in-2027-a4102852

Brugh and Wassens (2022, July 24) ‘Een volgende crisis dient zich aan: de kwaliteit van Nederlandse wateren is slecht en verbetert amper’ NRC. https://www.nrc.nl/nieuws/2022/07/24/na-de-stikstofcrisis-volgt-straks-ook-de-waterkwaliteitcrisis-a4137254

Burlingame B, Dernini S. eds. Sustainable diets and biodiversity: directions and solutions for policy, research and action. Proceedings of the International Scientific Symposium on Biodiversity and Sustainable Diets: United Against Hunger; 2010 Nov 3–5. Rome: Food and Agriculture Organization; 2012.

Burlingame, B., & Dernini, S. (2010). Sustainable diets and biodiversity.

CBS (2001), Tweehonderd jaar statistiek in tijdreeksen

CBS (2022a) Nabijheid voorzieningen; afstand locatie, regionale cijfers via: https://www.cbs.nl/nl-nl/cijfers/detail/80305ned#Binnen1Km_25

CBS (2022b) Zorguitgaven stegen in 2021 met 7,6 procent via: https://www.cbs.nl/nl-nl/nieuws/2022/27/zorguitgaven-stegen-in-2021-met-7-6-procent

Campbell, C. (1991) ‘Consumption: the new wave of research in the humanities and social sciences’, Journal of Social Behavior and Personality, vol. 6, pp. 57-74.

CDC. 2013. Leading causes of death. https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm (accessed February 24, 2022).

Chatzimpiros, P. and S. Barles. 2013. Nitrogen food-print: N use related to meat and dairy consumption in France. Biogeosciences 10(1): 471–481.

Cornelissen, J. (2004) “Corporate Communications - Theory and Practice”, London: Sage Publications

Crul, M. (2016). Super-diversity vs. assimilation: How complex diversity in majority–minority cities challenges the assumptions of assimilation. Journal of Ethnic and Migration Studies, 42(1), 54–68. https://doi.org/10.1080/1369183X.2015.1061425

Cruijningen, P. van. (2020). Food for Amsterdam: Grain, meat, milk, c. 1400-c.1800.

Cséfalvay, Z., & Gkotsis, P. (2020). Robotisation race in Europe: the robotisation chain approach. Economics of Innovation and New Technology, 1-18.

Czech, P., Turoń, K., & Barcik, J. (2018). Autonomous vehicles: basic issues. Zeszyty Naukowe. Transport/Politechnika Śląska.

Dagevos, H., Verhoog, D., van Horne, P., & Hoste, R. (2021). Vleesconsumptie per hoofd van de bevolking in Nederland, 2005-2020 (No. 2021-120). Wageningen Economic Research.

Dammers, E., van't Klooster, S., de Wit, B., Hilderink, H., Petersen, A., & Tuinstra, W. (2013). Scenario's maken voor milieu, natuur en ruimte: een handreiking. Planbureau voor de Leefomgeving, Den Haag.

Daniela, M. A. (2011). Fundamental Theories on Consumer Behaviour: An Overview of the Influences Impacting Consumer Behaviour. 2, 5.

Davies, A, Fahy, F, Rau, H, et al. (2014) CONSENSUS: Consumption, Environment and Sustainability. Report number: 138Affiliation. Environmental Protection Agency, Ireland.

de Vries, H. (2013, November 19). Voedsel en Amsterdam. Gemeente Amsterdam. Retrieved July 26, 2022, fromhttps://eetbaaramsterdam.files.wordpress.com/2014/02/2013-12-03-voedselvisie-voedselvisie-lage-resolutie-voor-gemeenteraad-19112013.pdf

Development Initiatives 2017, 2017. Global Nutrition Report. Nourishing the SDGs. Development Initiatives, Bristol, UK.

Drewnowski, A. (2018). Measures and metrics of sustainable diets with a focus on milk, yogurt, and dairy products. Nutrition reviews, 76(1), 21-28.

Dollard and Miller, Personality and Psychotherapy (New York: McGraw-Hill Book Company, Inc., 1950), Chapter II

C. Dong, L. Yu, M. Takizawa, S. Kudoh, T. Suehiro, Food Peeling Method for Dual-arm Cooking Robot, in: 2021 IEEE/SICE International Symposium on System Integration, SII'21, IEEE, Iwaki, Fukushima, Japan, 2021, pp. 801–806. doi:10.1109/IEEECONF49454.2021.9382700

Doole, M., Ellerbroek, J., & Hoekstra, J. (2018). Drone delivery: Urban airspace traffic density estimation. In SIDs2018: 8th SESAR Innovation Days.

Du Plessis, A. (2019). Current and future water scarcity and stress. In Water as an Inescapable Risk (pp. 13-25). Springer, Cham.

Engler-Stringer, R., Le, H., Gerrard, A., & Muhajarine, N. (2014). The community and consumer food environment and children's diet: a systematic review. BMC public health, 14(1), 1-15.

European Environment Agency (EEA). 2005. Household Consumption and the Environment. EEA Report No 11/2005. Copenhagen: EEA.

Eurostat. (2015). EU SILC data, https://ec.europa.eu/eurostat/web/income-and-living-conditions/overview, last accessed on 22th March 2022

Fallon, P.: Life events; Their role in onset and relapse in psychosis, research utilizing semi-structured interview methods, J. Psychiatr. Ment. Hlt., 15, 386–392, doi:10.1111/j.1365-2850.2007.01244.x, 2008.

FAO. (2012). Sustainable Diets and Biodiversity: Directions and Solutions for Policy, Research and Action. International Scientific Symposium, Biodiversity and Sustainable Diets United Against Hunger, FAO Headquarters, Rome, Italy, 3-5 November 2010. Paper presented at the Sustainable Diets and Biodiversity: Directions and Solutions for Policy, Research and Action. International Scientific Symposium, Biodiversity and Sustainable Diets United Against Hunger, FAO Headquarters, Rome, Italy, 3-5 November 2010., Rome.

FAO and WHO. 2019. Sustainable healthy diets – Guiding principles. Rome.

FoodService Instituut Nederland (2021) FSIN: Dossier Delivery accessed on 26/07/2022 via: https://fsin.nl/actueel/nieuws/683/extreme-groei-fooddelivery-nederland#:~:text=Ook%20bleek%20maaltijdbezorging%20tijdens%20corona,FSIN%20uit%20op%2019%20procent.

FREUD, S., 1923. Das Ich und das Es, Internationaler Psycho-analytisher Verlag, Lepzig, Vienna, and Zurich. English translation, The Ego and the Id, Joan Riviere (trans.), Hogarth Press and Institute of Psycho-analysis, London, UK, 1927. Revised for The Standard Edition of the Complete Psychological Works of Sigmund Freud, James Strachey (ed.), W.W.Norton and Company, New York, NY, 1961.

Frey, C. B., and M. Osborne. 2013. “The Future of Employment: How Susceptible are Jobs to Computerisation?” Working Paper. Oxford: Oxford Martin School. https://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf.

Frey, C. B. 2019. The Technology Trap: Capital, Labor, and Power in the Age of Automation. Princeton, NJ: Princeton University Press.

Galli, F., Hebinck, A., & Carroll, B. (2018). Addressing food poverty in systems: Governance of food assistance in three European countries. Food Security, 10(6), 1353–1370. https://doi.org/10.1007/s12571-018-0850-z

Gemeente Amsterdam. (2022) Amsterdammers kopen (weer) meer online: Onderzoek, informatie en statistiek. Accessed on 19/07/2022 via https://onderzoek.amsterdam.nl/artikel/amsterdammer-kopen-weer-meer-online

Gemeente Amsterdam. (2020). Monitor Detailhandel 2020: Onderzoek, informatie en statistiek. Accessed on 19/07/2022 via https://onderzoek.amsterdam.nl/publicatie/monitor-detailhandel-2020

Geleijnse, J. M., & Dekker, M. (2011). Opzouten. In Je bent wat je eet (No. jrg. 30 nr. 2, pp. 38-41). Stichting Bio-Wetenschappen en Maatschappij.

Georg, S., 1999. The social shaping of household consumption. Ecological Economics 28, 455–466.

Gezondheidsmonitor Volwassenen en Ouderen 2020, GGD'en/CBS/RIVM)

Giddens, A. 1991. Modernity and self-identity. Cambridge: Polity Press.

Global Panel on Agriculture and Food Systems for Nutrition, 2017. Improving Nutrition Through Enhanced Food Environments. Policy Brief London. Global Panel on Agriculture and Food Systems for Nutrition, UK.

Gonzalez Fischer, C & Garnett, T (2016) Plates, Pyramids, Planet: Developments in National Healthy and Sustainable Dietary Guidelines: A State of Play Assessment. Rome & Oxford: Food & Agriculture Organisation, and Food & Climate Research Network.Google Scholar

Gossen, M., & Kropfeld, M. I. (2022). “Choose nature. Buy less.” Exploring sufficiency-oriented marketing and consumption practices in the outdoor industry. Sustainable Production and Consumption, 30, 720-736.

Halkier, B., Katz-Gerro, T., & Martens, L. (2011). Applying practice theory to the study of consumption: Theoretical and methodological considerations. Journal of consumer culture, 11(1), 3-13.

Hall, K. D., Ayuketah, A., Brychta, R., Cai, H., Cassimatis, T., Chen, K. Y., ... & Zhou, M. (2019). Ultra-processed diets cause excess calorie intake and weight gain: an inpatient randomized controlled trial of ad libitum food intake. Cell metabolism, 30(1), 67-77.

Hallström, E., J. Davis, A. Woodhouse, and U. Sonesson. 2018. Using dietary quality scores to assess sustainability of food products and human diets: A systematic review. Ecological Indicators 93: 219–230.

Hamermesh DS (2010) Incentives, time use and BMI: The roles of eating, grazing and goods. Economics & Human Biology 8(1): 2–15.

Hartog, A.P. den, 1987, ‘Voedingsgewoonten en een veranderende samenleving’, p.28

Hermann Andreas, Walter Brenner, Rupert, Stadler. 2018. Autonomous Driving: Howthe Driverless Revolution Will Change the World. Somerville, MA: Emerald Publishing
Limited. ISBN: 1787148343.

Hersey, J., Anliker, J., Miller, C., Mullis, R. M., Daugherty, S., Das, S., Bray, C. R., Dennee, P., Sigman-Grant, M., & Thomas, H. O. (2001). Food Shopping Practices Are Associated with Dietary Quality in Low-Income Households. Journal of Nutrition Education, 33, S16–S26. https://doi.org/10.1016/S1499-4046(06)60066-3

Hilmers, A., Hilmers, D.C. & Dave, J. 2012. Neighborhood disparities in access to healthy foods and their effects on environmental justice. American Journal of Public Health, 102(9):1644-1654. (also available at: https://doi.org/10.2105/AJPH.2012.300865).

Hochstenbach, Cody, & Van Gent, Wouter P. C. (2015). An anatomy of gentrification processes: Variegating causes of neighbourhood change. Environment and Planning A, 47(7), 1480–1501. https://doi.org/10.1177/0308518X15595771

Hodson,M., S. Marvin, B. Robinson, and M. Swilling. 2012. Reshaping urban infrastructure. Journal of Industrial Ecology 16(6): 789–800.

Hondelink (1998, Januari 1) Opkomst van de supermarkt in Amsterdam LEVENSMIDDELENHANDEL IN AMSTERDAM accessed on 26/07/2022 via https://onsamsterdam.nl/opkomst-van-de-supermarkt-in-amsterdam

Hu, F. B., Otis, B. O., & McCarthy, G. (2019). Can plant-based meat alternatives be part of a healthy and sustainable diet?. Jama, 322(16), 1547-1548.

International scientific symposium biodiversity and sustainable diets united against hunger, B., Barbara, & Dernini, S. (2012). Sustainable diets and biodiversity: Directions and solutions for policy, research and action: proceedings of the intenational scientific symposium Biodiversity and sustainable diets united against hunger, 3-5 november 2010, FAO headquarters, Rome. FAO.

Jisana, T. K. (2014). Consumer behaviour models: an overview. Sai Om Journal of Commerce & Management, 1(5), 34-43.

Jobse-van Putten, J. (1995) Eenvoudig, maar voedzaam: Cultuurgeschiedenis van de dagelijkse maaltijd in Nederland, Nijmegen, Netherlands: Sun.

Johnston, J. L., Fanzo, J. C., & Cogill, B. (2014). Understanding Sustainable Diets: A Descriptive Analysis of the Determinants and Processes That Influence Diets and Their Impact on Health, Food Security, and Environmental Sustainability. Advances in Nutrition, 5(4), 418–429. https://doi.org/10.3945/an.113.005553

Kardes, F.R.; Cronley, M.L., Cline, T.W. Consumer Behavior, Cengage Learning, 2010, p.15;

Kassarjian, H. H. (1971). Personality and Consumer Behavior: A Review. Journal of Marketing Research, 8(4), 409–418.

Keats, S & Wiggins, S (2014) Future Diets: Implications for Agriculture and Food Prices. London: ODI.Google Scholar

Kim, J. J., & Hwang, J. (2020). Merging the norm activation model and the theory of planned behavior in the context of drone food delivery services: Does the level of product knowledge really matter?. Journal of Hospitality and Tourism Management, 42, 1-11.

Klooster, S.A. van 't (2007), Toekomstverkenning: ambities en de praktijk, Delft: Eburon.

Knibbe, M. T. (2007). De hoofdelijke beschikbaarheid van voedsel en de levensstandaard in Nederland, 1807-1913. TSEG-The Low Countries Journal of Social and Economic History, 4(4), 71-107.

KNMI. (2021). KNMI Klimaatsignaal'21: Hoe het Klimaat in Nederland snel Verandert.

Kotler, P. (1965). Behavioral Models for Analyzing Buyers. Journal of Marketing, 29(4), 37–45. https://doi.org/10.2307/1249700

Kowalski, K., Stagl, S., Madlener, R., & Omann, I. (2009). Sustainable energy futures: Methodological challenges in combining scenarios and participatory multi-criteria analysis. European Journal of Operational Research, 197(3), 1063–1074. https://doi.org/10.1016/j.ejor.2007.12.049

Kumbargeri, A., & Sinha, P. K. (2017). The influence of social practices on consumer behaviour: Arguing for its greater incorporation in consumer research. ResearchGate, November.

Lairon, D. (2012). Biodiversity and sustainable nutrition with a food-based approach. Sustainable diets and biodiversity.

Lang T, Barling D. Nutrition and sustainability: an emerging food policy discourse. Proc Nutr Soc 2013;72:1–12.

Lang, T., & Mason, P. (2018). Sustainable diet policy development: implications of multi-criteria and other approaches, 2008–2017. Proceedings of the Nutrition Society, 77(3), 331-346.

Leonard, T., Hughes, A. E., & Pruitt, S. L. (2017). Understanding how low–socioeconomic status households cope with health shocks: an analysis of multisector linked data. The Annals of the American Academy of Political and Social Science, 669(1), 125-145.

Lordan, G. 2018. Robots at Work. A Report on Automatable and non-Automatable Employment Shares in Europe. Brussels: Directorate-General for Employment, Social Affairs and Inclusion, European Commission. https://eprints.lse.ac.uk/90500/1/Lordan__robots-at-work.pdf

Lovasi, G. S., Hutson, M. A., Guerra, M., & Neckerman, K. M. (2009). Built environments and obesity in disadvantaged populations. Epidemiologic reviews, 31(1), 7-20.

Luo, S., Xia, H., Gao, Y., Jin, J. S., & Athauda, R. (2008, October). Smart fridges with multimedia capability for better nutrition and

health. In 2008 International Symposium on Ubiquitous Multimedia Computing (pp. 39-44). IEEE.

Maandstatistiek detailhandel, no.3, 1996, p.13 en Detailhandel magazine, no.4, 1998, p.36-37

Mäkinen, O.E.; Wanhalinna, V.; Zannini, E.; Arendt, E.K. Foods for Special Dietary Needs: Non-dairy Plant-based Milk Substitutes and Fermented Dairy-type Products. Crit. Rev. Food Sci. Nutr. 2016, 56, 339–349.

Mandemakers, J. J., & Roeters, A. (2015). Fast or slow food? Explaining trends in food-related time in the Netherlands, 1975–2005. Acta Sociologica, 58(2), 121-137.

Marée (2022, July 13) 'Flitsbezorger Zapp vertrekt definitief uit Nederland' NRC. https://www.nrc.nl/nieuws/2022/07/13/flitsbezorger-zapp-vertrekt-definitief-uit-nederland-a4136399

Marshall, A. – The Principles of Economics, 8th Edition, Macmillan And C o., 1920, p.7180;

Mason, P., & Lang, T. (2017). Sustainable diets: how ecological nutrition can transform consumption and the food system. Routledge.

Mason, J.: Qualitative Researching, SAGE Publications Ltd, London, second edn., doi:10.1016/S0143-6228(97)90005-9, 2002.

McLaren, S. J. 2010. Life cycle assessment (LCA) of food production and processing: An introduction. In Environmental assessment and management in the food industry, pp. 37–58, edited by U. Sonesson, J. Berlin, and F. Ziegler. Cambridge, UK:Woodhead.

Mekonnen, M. M., & Hoekstra, A. Y. (2016). Four billion people facing severe water scarcity. Science advances, 2(2), e1500323.

Menkveld, N. (2020). Tweespalt in voedingsindustrie houdt aan. ABN AMRO.
https://www.abnamro.nl/nl/zakelijk/insights/sectoren-en-trends/food/tweespalt-invoedingsindustrie-houdt-aan.html

Mennell, S. J. (1985) All manners of food: Eating and taste in England and France from the Middle Ages to the Present, Oxford: Basil Blackwell.

Mohanty SP, Choppali U, Kougianos E (July 2016)Everything you wanted to know about smart cities: The Internet of things is the backbone. IEEE Consumer Electron Magaz 5(3):60–70. https://doi-org.tudelft.idm.oclc.org/10.1109/MCE.2016.2556879

Mommaas (1993), Moderniteit, Vrijetijd en Stad: Sporen van maatschappelijke transformatie en continuiteit, Utrecht: Van Arkel, pp. 159-81.

Michimi, A., & Wimberly, M. C. (2010). Associations of supermarket accessibility with obesity and fruit and vegetable consumption in the conterminous United States. International journal of health geographics, 9(1), 1-14.

Miller, D. (Ed.) (1995) Acknowledging Consumption. A Review of New Studies, Routledge, London.

Ministry of General Affairs. (2022a, May 18). Zorg: uitgaven in 2021. Verantwoordingsdag | Rijksoverheid.nl. Retrieved August 11, 2022, from https://www.rijksoverheid.nl/onderwerpen/verantwoordingsdag/uitgaven-in-2021/zorg

Ministry of General Affairs. (2022b, July 29). Nieuw voedselkeuzelogo Nutri-Score. Voeding | Rijksoverheid.nl. Retrieved August 11, 2022, from https://www.rijksoverheid.nl/onderwerpen/voeding/gezonde-voeding/nieuw-voedselkeuzelogo-nutri-score

Nelson, M.E., M.W. Hamm, F.B. Hu, S.A. Abrams, and T.S. Griffin. 2016. Alignment of healthy dietary patterns and environmental sustainability: A systematic review. Advances in Nutrition 7 (6): 1005–1025.

NICE. (2022). Covid-19 in Dutch Intensive Care Units: Patient characteristics and outcomes compared with pneumonia patients in the ICU from 2017-2019 (Version 2022-07-07). Uitgever. Accessed on 11/08/2022 via https://stichting-nice.nl/covid-19-publications.jsp

Nicolaou, M., C.M. Doak, R.M. van Dam, J. Brug, K. Stronks, and J.C. Seidell. 2009. Cultural and social influences on food consumption in Dutch residents of Turkish and Moroccan origin: A qualitative study. Journal of Nutrition Education and Behavior 41 (4): 232–241.

Nieuwenhuis & Kok (2022, March 29) 'Onderzoek naar invoering vleestaks: opvallend want VVD en CDA waren altijd fanatiek tegen. Het Parool: https://www.parool.nl/nederland/onderzoek-naar-invoering-vleestaks-opvallend-want-vvd-en-cda-waren-altijd-fanatiek-tegen~b746633b/

Nicolini, D. 2013. Practice theory, work, and organization: An introduction. Oxford: Oxford University Press.

NOS. (2022, July 5). Btw-verlaging groente en fruit in 2024 is het doel, maar simpel is dat niet. NOS.nl. Retrieved August 11, 2022, from https://nos.nl/artikel/2435407-btw-verlaging-groente-en-fruit-in-2024-is-het-doel-maar-simpel-is-dat-niet

Notarnicola, B., G. Tassielli, and P. A. Renzulli. 2012. Modeling the agri-food industry with life cycle assessment. In Life cycle assessment handbook: A guide for environmentally sustainable products, pp. 159–183, edited by M. A. Curran. Hoboken, NJ, USA: John Wiley & Sons, Inc.; Salem, MA, USA: Scrivener.

Notten, P.W.F. van (2005), Writing on the wall, Amsterdam: Thela Thesis.

Oechsner, C., Mayer, S., & Butz, A. (2022). Challenges and Opportunities of Cooperative Robots as Cooking Appliances.

O'Keeffe, J., Buytaert, W., Mijic, A., Brozović, N., & Sinha, R. (2016). The use of semi-structured interviews for the characterisation of farmer irrigation practices. Hydrology and Earth System Sciences, 20(5), 1911-1924.

Onsamsterdam (2011). Hoe Albert Heijn Amsterdam veroverde. Accessed on 29/07/2022 via https://onsamsterdam.nl/hoe-albert-heijn-amsterdam-veroverde

Openresearch.Amsterdam, (2021) Ruim een derde van de Amsterdamse leerlingen heeft een potentiële onderwijsachterstand. (2021, June 21). Retrieved August 17, 2022, from https://openresearch.amsterdam/en/page/72256/ruim-een-derde-van-de-amsterdamse-leerlingen-heeft-een-potenti%C3%ABle

Otterloo, A.H. van, 1990, Eten en eetlust in Nederland, p.42-51.

R. Paping en V. Tassenaar, 'The consequences of the potato disease in the Netherlands 1845-1860: a regional approach' in: C. O'Grada, R. Paping en E. Vanhaute (eds.), When the potato failed. Causes and effects of the last European subsistence crisis, 1845-1850 (Turnhout 2007) 149-183.

Peattie, K., 2010. Green consumption: behavior and norms. Annual Review of Environment and Resources 35, 195–228.

Pelgrim (2022, August 10) 'Deliveroo verlaat Nederland, vlak voor rechterlijke uitspraak over in dienst nemen koeriers' NRC. https://www.nrc.nl/nieuws/2022/08/10/deliveroo-verlaat-nederland-vlak-voor-rechterlijke-uitspraak-over-in-dienst-nemen-koeriers-a4138603

PERSKY, J., 1995. The Ethology of Homo Economicus. The Journal of Economic Perspectives, 9, (2) 221-231

Pijpker (2022, Januari 3) 'Fietskoeriers van Gorillas gaan flitsbezorgen voor Jumbo' NRC. https://www.nrc.nl/nieuws/2022/01/03/fietskoeriers-van-gorillas-gaan-flitsbezorgen-voor-jumbo-a4075479

Powell, L.M., Wada, R. & Kumanyika, S.K. 2014. Racial/Ethnic and Income Disparities in Child and Adolescent Exposure to Food and Beverage Television Ads across U.S. Media Markets. Health Place, 29:124-131. (also available at: https://doi.org/10.1016/j.healthplace.2014.06.006).

Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. Science, 360(6392), 987-992.

ProVeg (2021a). Prijsverschillen vlees en vleesvervangers - Update juli 2022, accessed on 25/07/2022 via https://proveg.com/nl/wp-content/uploads/sites/6/2022/07/Rapport-Proveg-Update-2022-FINAL_v1.0.pdf

ProVeg (2021b). Plant-based foods in Europe: How big is the market? Smart Protein Plant-based Food

Sector Report. https://smartproteinproject.eu/plant-based-food-sector-report ;https://proveg.com/nl/blog/nederlanders-eten-meeste-vleesvervangers-van-europa/

Reckwitz, A. (2002). Toward a Theory of Social Practices. A Development in Culturalist Theorizing. European Journal of Social Theory.

Reisch, L., Eberle, U., & Lorek, S. (2013). Sustainable food consumption: An overview of contemporary issues and policies. Sustainability: Science, Practice and Policy, 9(2), 7–25. https://doi.org/10.1080/15487733.2013.11908111

Reynolds, CJ, Buckley, JD, Weinstein, et al. (2014) Are the dietary guidelines for meat, fat, fruit and vegetable consumption appropriate for environmental sustainability? A review of the literature. Nutrients 6, 2251–2265.CrossRefGoogle ScholarPubMed

Ritchie and Roser (2018) - "Urbanization". Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/urbanization' [Online Resource]

Ritchie and Roser (2020) - "Environmental Impacts of Food Production". Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/environmental-impacts-of-food' [Online Resource]

RIVM (2019) Factsheet: Voedselkeuzelogo's onder de loep | RIVM. (2019, November 28). RIVM. Retrieved August 11, 2022, from https://www.rivm.nl/documenten/factsheet-voedselkeuzelogo#039;s%20onder%20de%20loep

Røpke, I (2009) Theories of practice - New inspiration for ecological economic studies on consumption. Ecological Economics 68(10): 2490–2497.

Rose, D., Heller, M. C., & Roberto, C. A. (2019). Position of the Society for Nutrition Education and Behavior: the importance of including environmental sustainability in dietary guidance. Journal of nutrition education and behavior, 51(1), 3-15.

Sanne, C., 2002. Willing consumers—or locked-in? Policies for a sustainable consumption. Ecological Economics 42, 273–287.

Sandström, V., Valin, H., Krisztin, T., Havlík, P., Herrero, M., & Kastner, T. (2018). The role of trade in the greenhouse gas footprints of EU diets. Global Food Security, 19, 48-55.

Santen (2020a, April 10) 'Cijfers bevestigen: veel coronapatiënten op IC hebben overgewicht' NRC. https://www.nrc.nl/nieuws/2020/04/10/cijfers-bevestigen-veel-coronapatienten-op-ic-hebben-overgewicht-a3996512

Santen (2020b, April 7) ''Covid-patiënten die geen overgewicht hebben, komen bijna niet op de IC terecht'' NRC.

https://www.nrc.nl/nieuws/2020/04/07/veel-buikvet-is-slecht-nieuws-als-je-covid-19-krijgt-a3996090

SCHIFFMAN, L. G., et al., 2007. Consumer Behavior. 9th ed. New Jersey: Prentice Hall.

Scott, D., Willits, F., 1994. Environmental attitudes and behavior: a Pennsylvania survey. Environment and Behavior 26, 239–260.

Semyonov Moshe, Lewin-Epstein Noah, Maskileyson Dina. Where wealth matters more for health: The wealth–health gradient in 16 countries. Social Science & Medicine. 2013;81:10–17.

Shove, E., Watson, M., Ingram, J., & Hand, M. (2008). The design of everyday life. Oxford: Berg.

Shove, E., 2010. Beyond the ABC: climate change policy and theories of social change. Environment and Planning A 42, 1273–1285.

Shove, E., Pantzar, M., & Watson, M. (2012). The dynamics of social practice: Everyday life and how it changes. SAGE.

SIMON, H., 1997. Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations. 4th ed. ed. New York: The Free Press.

Sleutjes, Bart, Ooijevaar, Jeroen, & De Valk, Helga A. G. (2019). Residential segregation in the Amsterdam metropolitan region: A longitudinal analysis using scalable individualised neighbourhoods. Tijdschrift voor Economische en Sociale Geografie, 110(3), 359–377. https://doi.org/10.1111/tesg.12356

Sluijter. (2007). Kijken is grijpen: zelfbedieningswinkels, technische dynamiek en boodschappen doen in Nederland na 1945. https://doi.org/10.6100/IR629964

Song, G., Li, M., Fullana-i-Palmer, P., Williamson, D., & Wang, Y. (2017). Dietary changes to mitigate climate change and benefit public health in China. Science of the Total Environment, 577, 289-298.

Spaargaren, G. (2003). Sustainable Consumption: A Theoretical and Environmental Policy Perspective. Society & Natural Resources, 16(8), 687–701. https://doi.org/10.1080/08941920309192

Spaargaren, G., & Van Vliet, B. (2000). Lifestyles, consumption and the environment: The ecological modernization of domestic consumption. Environmental Politics, 9(1), 50–76. https://doi.org/10.1080/09644010008414512

Spaargaren, G., Oosterveer, P., & Loeber, A. (Eds.). (2012). Food practices in transition: Changing food consumption, retail and production in the age of reflexive modernity. Routledge.

Sperling Daniel. 2018. Three Revolutions: Steering Automated, Shared, and Electric Vehicles to a Better Future. Washington, DC: Island Press. ISBN: 9781610919050.

Spotswood, F, Chatterton, T, Tapp, A, et al. (2015) Analysing cycling as a social practice: an empirical grounding for behaviour change.

Transportation Research Part F: Traffic Psychology and Behaviour 29: 22–33.

Springmann, M., M. Clark, D. Mason-D'Croz, K. Wiebe, B.L. Bodirsky, L. Lassaletta, W. de Vries, S.J. Vermeulen, M. Herrero, K.M. Carlson, M. Jonell, M. Troell, F. DeClerck, L.J. Gordon, R. Zurayk, P. Scarborough, M. Rayner, B. Loken, J. Fanzo, H.C.J. Godfray, D.
Stets, J., Biga, C., 2003. Bringing identity theory into environmental sociology. Sociological Theory 21, 398–423.

Staatscourant (2017) CITY DEAL Voedsel op de Stedelijke Agenda. Accessed on 28/07/2022 via https://zoek.officielebekendmakingen.nl/stcrt-2017-11558.html?zoekcriteria=%3fzkt%3dUitgebreid%26pst%3dStaatscourant%26vrt%3d%2522City%2bDeal%2522%26zkd%3dInDeGeheleText%26dpr%3dAlle%26spd%3d20170810%26epd%3d20170810%26sdt%3dDatumPublicatie%26planId%3d%26pnr%3d1%26rpp%3d10&resultIndex=5&sorttype=1&sortorder=4#

Steel, C. (2013). Hungry city: How food shapes our lives. Random house.

STEWART, J., 1994. The psychology of decision making. In: D. JENNINGS AND S. WATTAM, eds. Decision Making: an Integrated Approach. London: Pitman,

Stil (2021, September 10) 'Amsterdam telt 250 supermarkten, veel te veel volgens deskundigen' Het Parool.https://www.parool.nl/nederland/amsterdam-telt-250-supermarkten-veel-te-veel-volgens-deskundigen~bd1d8467/

Sudha Jamthe. 2017. 2030 The Driverless World: Business Transformation from Autonomous Vehicles, Stanford: CreateSpace Independent Publishing Platform. ISBN13: 978-1973753674.

Swann, P. (2002) 'There's More to the Economics of Consumption than (Almost) Unconstrained Utility Maximisation', in A. McMeekin, K. Green, M. Tomlinson and V. Walsh (eds) Innovation by Demand:An Interdisciplinary Approach to the Study of Demand and its Role in Innovation, pp. 23–40. Manchester: Manchester University Press.

Swidler, A., 1986. Culture in action: symbols and strategies. American Sociological Review 51, 273–286.

Tammaru, Tiit, Marcińczak, Szymon, Van Ham, Maarten, & Musterd, Sako. (2015). Socio-economic segregation in European capital cities: East meets west. Routledge.

Tansey, G. and Worsley, A., 2014. The food system. Routledge.

Temme, E. H. M., Toxopeus, I. B., Kramer, G. F. H., Brosens, M. C. C., Drijvers, J. M. M., Tyszler, M., & Ock , M. C. (2015). Greenhouse gas emission of diets in the Netherlands and associations with food, energy and macronutrient intakes. Public Health Nutrition, 18(13), 2433–2445. http://dx.doi.org/10.1017/S1368980014002821.

Tilman, D., & Clark, M. (2014). Global diets link environmental sustainability and human health. Nature, 515(7528), 518–522. http://dx.doi.org/10.1038/nature13959.

Tilman, J. Rockström, and W. Willett. 2018. Options for keeping the food system within environmental limits. Nature 562 (7728): 519–525.

Tobler, W. (1993). Three presentations on geographical analysis and modeling: non-isotropic geographic modeling; speculations on the geometry of geography; and global spatial analysis (93-1).

Tukker, A., Huppes, G., Guin e, J., Heijungs, R., de Koning, A., van Oers, L., ... Jansen, B. (2006). Environmental impact of products (EIPRO). European Union: Joint Research Centre.

Turner, C., Aggarwal, A., Walls, H., Herforth, A., Drewnowski, A., Coates, J., Kalamatianou, S., et al. 2018. Concepts and critical perspectives for food environment research: A global framework with implications for action in low- and middle-income countries. Global Food Security, 18:93-101. (also available at: https://doi.org/10.1016/j.gfs.2018.08.003).

United Nations, Department of Economic and Social Affairs, Population Division (2018). World Urbanization Prospects: The 2018 Revision, Online Edition. Available at: https://esa.un.org/unpd/wup/.

UN World Urbanization Prospects (2018). Available at: https://esa.un.org/unpd/wup/Download/.

UNSCN (2017) Sustainable Diets for Healthy People and a Healthy Planet. Geneva: UN Standing Committee on Nutrition.Google Scholar

van Amstel, W. P., Weltevreden, J., Quak, H., & Hopman, M. (2022, March). Bezorgeconomie: de effecten op mobiliteit, milieu en leefomgeving. In Vervoerslogistieke werkdagen (VLW).

Van Berkum, S., Dengerink, J., & Ruben, R. (2018). The food systems approach: sustainable solutions for a sufficient supply of healthy food (No. 2018-064). Wageningen Economic Research.

Van Rossum, C. T. M., Fransen, H. P., Verkaik-Kloosterman, J., Buurma-Rethans, E. J. M., & Ock , M. C. (2011). Dutch National Food Consumption Survey 2007–2010: Diet of children and adults aged 7 to 69 years. Bilthoven: RIVM.

Veblen, T. (1899). The Theory of the Leisure. Class (New York: The New American Library, 1953).

van Vliet M T H, Flörke M and Wada Y 2017 Quality matters for water scarcity Nat. Geosci. 10 800–2

Vlasakker (2019). Heatmap voedseldruk Amsterdam, GGD Amsterdam, accessed 01-07-2022 via https://www.ggd.amsterdam.nl/publish/pages/1009912/heatmap-voedseldruk-amsterdam-wgac-wt22.pdf

Von Thünen, J. (2009). The isolated state in relation to agriculture and political economy: part iii: principles for the determination of rent, the most advantageous rotation period and the value of stands of varying age in pinewoods. Springer.

Voedselbank, Jaarverslag 2020, Voedselbank Amsterdam (2020).

Walter Willet et al., "Food in the Anthropocene: The EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems", in The Lancet Commissions, Vol. 393, No. 10170 (2 February 2019), p. 447-492

Walker, R. E., Keane, C. R., & Burke, J. G. (2010). Disparities and access to healthy food in the United States: A review of food deserts literature. Health & place, 16(5), 876-884.

Warde A and Martens L (2000) Eating Out: Social Differentiation, Consumption and Pleasure. Cambridge: Cambridge University Press.

Warde, A. (2005). Consumption and Theories of Practice. Journal of Consumer Culture, 5(2), 131–153. https://doi.org/10.1177/1469540505053090

Wollenberg, E., Richards, M., Smith, P., Havlík, P., Obersteiner, M., Tubiello, F. N., ... & Campbell, B. M. (2016). Reducing emissions from agriculture to meet the 2 C target. Global change biology, 22(12), 3859-3864.

Wilkinson, A., & Eidinow, E. (2008). Evolving practices in environmental scenarios: A new scenario typology. Environmental Research Letters, 3(4), 045017. https://doi.org/10.1088/1748-9326/3/4/045017
Smith James P. Unraveling the SES: health connection. Population and development review. 2004;30:108–132.

Williams, J., Scarborough, P., Matthews, A., Cowburn, G., Foster, C., Roberts, N., & Rayner, M. (2014). A systematic review of the influence of the retail food environment around schools on obesity-related outcomes. Obesity reviews, 15(5), 359-374.

Wiggins, S, Keats, S, Han, E et al. (2015) The Rising Cost of a Healthy Diet. London: ODI.Google Scholar

---

H. Zhao, X. Hao, A. Wang, C. Li, Design and Implementation of an Intelligent Cooking Robot Based on Internet of Things, in: Proceedings of the 2015 Chinese Intelligent Automation Conference, volume 338, Springer Berlin Heidelberg, Berlin, Heidelberg, 2015, pp. 423–430. doi:10.1007/978-3-662-46466-3_42.

Chapter 9 - Appendix

Chapter description

This chapter consists of all the appendices to which is referred throughout this thesis. Appendix A contains the interview guides as drafted by both myself, the author of this work, as well as my thesis supervisor Anke Brons. Appendix B contains all of the iterative steps taken throughout the analysis of the trends and drivers, through the DESTEP + S methodology. This appendix is extensive due to it containing the step-by-step approach that was executed whilst analyzing the trends and drivers. This ultimately led to the synthesis of all the findings, which are the seven main trends put forward in the scenario narratives. The goal of this extensive documentation of the various steps taken is profoundly to enable replication of this research as well as to enable interested readers to get a better understanding of the thought process of the author of this work. Ultimately this thesis has hoped to contribute towards an improved scenario building methodology by providing a step-by-step framework. It is by no means near perfect yet it did provide for a structured approach whilst being faced with a seemingly overload of information.

Appendix A - Interview Guide

The interviews with experts were held in Dutch, this due to both the experts as well as myself being Dutch, allowing for a better expression and more fluent conversation. The interviews were semi-structured, the main questions asked during the interviews are listed below. The transcribed interviews can be accessed upon request via the author's email address: rubenfjsmolders@gmail.com.

Initial semi-structured interview setup:

Table 151 - Interview guide initial seven interviews

Korte uitleg van mijn onderzoek, input wordt gebruikt om scenario's mee te gaan ontwikkelen.

- *Om te beginnen, kunt u zich kort even voorstellen? (werkgebied)*
- *Hoe en in welke mate houdt u zich bezig met de toekomst binnen uw functie? (2050?)*
- *Welke ontwikkelingen / trends ziet u om u heen binnen uw werkveld?. (toegespitst op Amsterdam / stedelijke context)*
- *Hoe waarschijnlijk is het volgens u dat deze gerealiseerd zijn in 2050? (toegespitst op Amsterdam / stedelijke context)*
- *Ziet u mogelijke onderlinge tegenstrijdigheden of juist wellicht trends die elkaar versterken?*

Uitleg dat er in mijn onderzoek gekeken wordt naar het toe eigenen van voedsel (kopen van eten, boodschappen doen, zelf verbouwen etc.), dat is mijn theoretisch kader. Maar ook deze relatie met de levensstijl en het systeem zelf.

- *Hoe ziet de toekomst van het toe eigenen van voedsel (food acquisitioning) eruit in Amsterdam (/ stedelijke context) in 2050, op basis van uw expertisegebied? (meerdere mogelijkheden antwoorden)*
- *In wat voor omgeving (stedelijke context) gaat dit toe eigenen van voedsel plaats vinden denkt u? (systems of provision / Lifestyle Practices)*

Uitleg van conceptueel kader: dat het toekomstige dieet aan 4 aspecten moet gaan voldoen, leg FAO's definitie uit. Laat plaatje zien en bespreek wat de interviewee weet.

- *Welke rol speelt duurzaamheid in het jaar 2050 binnen het dieet en bij het toe eigenen van voedsel? Welke criteria gaan daarin belangrijk zijn?*
- *Welke rol speelt gezondheid in het jaar 2050 binnen het dieet en bij het toe eigenen van voedsel? Welke criteria gaan daarin belangrijk zijn?*
- *Welke rol speelt cultural appropriateness (culturele geschiktheid) in het jaar 2050 binnen het dieet en bij het toe eigenen van voedsel? Welke criteria gaan daarin belangrijk zijn?*

- *Welke rol speelt economische toegankelijkheid, eerlijkheid en betaalbaarheid in het jaar 2050 binnen het dieet en bij het toe eigenen van voedsel? Welke criteria gaan daarin belangrijk zijn?*

Additional semi-structured interview setup as drafted by my thesis supervisor Anke Brons:

Table 16 - Interview guide addition four interviews

Additional four interviews (conducted by Anke Brons) added towards this thesis

- *Zou u zichzelf willen voorstellen?*
- *Hoe bent u in uw huidige functie met de toekomst bezig? (welke tijdshorizon)*

Uitleggen dat we hier naar 2050 kijken

- *Welke elementen uit [uw expertise terrein] zou u willen:*
  - *a) veranderen;*
  - *b) bewaren;*
  - *c) en wie zouden daarbij uw partners zijn?*

Mogelijke toekomsten:

- *Welke mogelijke ontwikkelingen zie u op uw terrein? (sociaal, economisch, technisch,...)*
- *Hoe waarschijnlijk acht u dat die gerealiseerd zijn in 2050?*
- *Wat moet er gebeuren om die juist wel of niet te laten doorgaan? (mini-back-cast)*
- *[Ideaal van 2050: hoe ziet [uw expertise terrein] eruit in 2050? (meerdere mogelijke toekomsten)]*
- *Welke rol speelt duurzaamheid?*
- *Wat is de samenhang vanuit [uw expertisedomein] met de andere praktijken [mobiliteit, wonen, werken, voedselproductie/afval]?*
- *In hoeverre ziet u verschillen tussen stedelijke en regionale gebieden?*

Appendix B - DESTEP + S & Scenario-building

The following tables show steps 1 to 6 as described in the methodology section Futuring - DESTEP +S, Scenario Building.

Step 1

Table 17 - Listing of all individual trends and drivers

All trends and drivers

Step 2

Table 18 - Listing of all accepted and workable individual trends and drivers

All accepted and workable trends and drivers			
1	Confirmation that a part of society is less well-off, they have lower incomes and lower levels of education. They are more concerned with their livelihood (bestaanszekerheid) and are more susceptible towards and often living near unhealthy food offering locations.	2	The prediction that there will be two side-by-side realities in society between the rich and the poor. Which will translate into differences in what people of each 'camp' eat in terms of health (more overweight)/ plant-based.
3	Rise in the amount of supermarkets, however they are increasingly decorated as places to experience, with a real story behind it.	4	Timely and convenience will play a big role in acquiring food. Which translates to increase in both food delivery and take-away services. Comes from hasty society.
5	A decrease in the amount of stores selling fresh produce (specialty stores such as 'groenteboer'). Furthermore an increase in the amount of stores selling unhealthy foods such as lunchrooms and grill rooms. The latter of which will continue if the government doesn't step in.	6	An increase in the amount of places selling vegetarian options. With fast food chains but also supermarkets selling meat replacements. This is good for the environment, namely plant-based. However the products are often still rather expensive and not always very healthy (processed foods).
7	Some produce, such as corn, is very abundant. It is often cheap and therefore forms the base of what we eat. Retailers are sometimes dependable on that.	8	There is an increased focus towards eating more locally produced produce. Urban farming for example.
9	What people eat is also influenced by international trends such as bubble tea or sushi.	10	We are likely to follow what we see in the US, an increase in the amount of people being overweight. Mainly due to what and how much we eat.
11	Food pick-up and delivery from central hubs spread out throughout the city. In combination with sustainable modes of transport.	12	Sustainable modes of transport will be necessary, such as cable cars
13	Increased effects of climate change, with a bigger impact on the surroundings and biodiversity.	14	Confirms role for the government in making decisions as to what people eat, however uncertain wether they recognize and accept it as their role.
15	There is an increase in political understanding and awareness regarding 'unhealthy' products in supermarkets for example. Products with high amounts of salt and sugar. This awareness can lead to product improvement.	16	There is a conflict for space in the city. On the one hand we need to build more houses, on the other hand we like to engage with urban agriculture.
17	The rich stay rich and are less impacted by price mechanisms trying to steer what people eat.	18	There is an increase in the amount of physical supermarket stores. At the same time the online

			supermarket is growing as well. This online aspect is mainly due to the wish and demand for convenience by the consumers.
19	Sustainability is an important aspect of the business for supermarkets.	20	The supermarket consumer wants fast (convenience), fresh and healthy, in no particular order. - There is a growth in spendings by costumers on products that are consumed within 2 hours after purchasing. - There is a growth in fresh meal-boxes (vers pakketten)
21	An increase in the amount of healthy food offerings in restaurants	22	Supermarkets are gaining market share in providing breakfast and lunch to consumers.
23	There are waiting lists for community gardens, stemming from an increased demand for growing one's own crops. People want local and healthy food, people want to know exactly what they eat. Can lead to urban farming.	24	Cooking will remain but will become much easier and more convenient. - In some places the kitchen will disappear all together. Due to: - Smaller apartments - Increased tendency towards convenience foods.
25	The rise of health apps and other tech innovation in providing us with health insights. Could translate towards personal chips which can tell us what to eat and what not to eat.	26	Climate change will bring about great effects for society.
27	Supermarkets will likely transform into hubs spread out throughout the city. Hubs, at the periferie of the city where you can pick up your regular package orders and also your fresh groceries which you have ordered online. The supermarket as we know it today will disappear. It will most likely be a place that combines services as well. Docking stations which are actually quite similar to the old food markets we had in Amsterdam (near Marktkantine). - We will see a decrease in the amount of delivery vans running through the city.	28	The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.
29	Some people (mostly families) will probably leave the city and work remote. This is mostly likely also the group of people taking more time for acquiring their food.	30	The amount of people eating vegetarian food will increase. A majority will keep on eating meat business as usual but those already eating less meat than say 5 times a week will continue doing so, with a part of that group switching towards fully vegetarian.
31	The amount of times we eat per day has increased to 7. Where we traditionally had 3 moments we have now really become a snack culture. We will most likely see this reflected in what the market puts on offer. - This will lead to more waste being generated from meal-box packaging.	32	There is a dichotomy in society. With on the one hand the consumer that wants convenience (about 25%). And on the other hand the consumer that was to change the current food system, aiming for a more sustainable and healthy system, characterized by local food production (about 25%). Corona has accelerated both trends. In the middle we see the other 50% which is slowly fading away. - Rise in speedy delivery of food (flitsbezorgers). Mainly high processed foods, snacks. - Rise in meal-boxes being sold. - On the other hand more focus towards local food chains and production. Also more plant-based. - The story behind the food will become really important. Local, regional, biological foods which are transparent with their sourcing will be of added value. This will also lead to business models that can sustain themselves because of the story behind the food. These can be local and relatively short food chains. So not perse large manufacturing sites. - The middle 50% will disappear, either a tendency towards more convenience or more local food supply. It can be a combination of both, convenience throughout the week and really taking the time during the weekends. (Even though this weekday-weekend balance will most likely change as well).
33	The more sustainable option will also need to be paired with more convenience. People in this segment also want it being delivered to their homes and in meal-boxes.	34	Food will most likely become available anytime and anywhere you'd like throughout the city. This can be healthy and sustainable options. Us humans really become a grazing culture.
35	We will most likely get rid of the 5 day work week, a different work-life balance.	36	Food offerings through food banks are becoming more equipped in doing so. Even finding ways to do so is more sustainable and healthy. The low SES is still a relatively small group in the NL. It is growing but

			still rather small.
37	Past 6 months there really has seen a shift in governmental awareness regarding food intake by the population. Mainly due to Corona, which has shed light on the costs that come with an unhealthy population. Government might want to take up a more active role in influencing people's food behavior. We see this in on various governmental levels, from international to more local. Also regarding bio products and more plant-based products.	38	A rise in food stores tailored towards the needs of cultural minorities, this partly due to the fact that the income of some of these minorities is growing. For example Polish, African or Asian supermarkets. An increase in diversity in whats on offer.
39	Urbanization, population worldwide will increase to 9/10 billion with about 70% living in cities. Meaning that in the future the amount of people living in cities is the same amount as the total population living on earth right now.	40	Cities are magnets when it comes to resource attraction. Resource shortages such as phosphate (expected to deplete in 100 years) and other nutrients will require us to anticipate and create infrastructure to capture those nutrients otherwise being lost via the sewage system and put them back in the food system.
41	Having the possibility to eat anywhere at anytime, whatever you want throughout the city. This comes with an infrastructure that enables that. Can be via a delivery system but can also be through kitchens spread out throughout the city which people can make use of. Requires food to be available in different stages of preparation.	42	Individually tailored food options will also translate to less waste and less unhealthy habits such as overconsumption. - This can be done via food printers throughout the city which can 3D print your specifically requested foods. - Unilever as a software company selling food cartridges. They will develop recipes as well for the specific printers. - We will start working towards tailor made portions, fit for everyone's individual lifestyle
43	A growing demand for culturally specific foods will result in more initiatives growing the food here in the NL. Vegetables and spices from say Suriname will be grown here due to a growing market for that.	44	We will deviate from the currently very high processed food industry towards a high tech system where various high tech kitchen / cooking applications will allow us to work with unprocessed foods whilst still providing proper, healthy & nutritious meals. Resulting in much more complex cooking applications, mostly automated.
45	Water shortage will be a big issue of not addressed. We will therefore use drinkwater in different ways, not for flushing the toilet anymore. We will likely start reusing water more locally, decentralized and close the loop that way. Also allowing for nutrients to be captured.	46	Those well-off (rich, intelligent) will remain so due to partner preference.
47	An aging population, causing for big difference in demographics, with a relatively young group on the other end. Depends on influx of immigrants as well.	48	An increase in plant-based food consumption, but still relatively small compared to the amount of meat being eaten.
49	Rise in fast delivery services of food (flitsbezorgers), causing people to become unaware of how food is produced.	50	Water shortage is a big problem, will likely lead to resource efficient solutions such as vertical farming.
51	Housing prices are increasing within the city, raising the question wether we still want kitchens in our homes.	52	An increased tendency towards more tailored made food options / choises. Stemming from the drive to have a more healthy food intake, gen expression. Prevention is better than curing of diseases.
53	Our houses could become equipped with automatic filling systems that re-supply our fridges and cabinets once empty. This happens automatically without the need of human interferences. This system is than also equipped with knowledge on personal diets, info about what we need (healthy) and what we want (preference). Really comes from convenience as a trend.	54	Less and less available land, whilst we need more land for certain solutions. This partly due to climate change as some sustainable solutions require land. Building houses on the one hand or providing ways to produce food on the other.
55	There is still too big of a focus on the 5 main staple foods. Both politically and therefore economically. These 5 crops determine for a large part what it is we consume. There is a big lobby from large manufacturers to keep the this as it is.	56	There is an clear dichotomy in society between two extremes. On the one hand we this reflected in education and income level, on the other hand we see this reflected in their food habits. Where one part focuses more on sustainable and healthy food options, the other part is more focussed one being able to consume meat, often characterized by the affordable and quick option.
57	There is an increased tendency from governmental bodies to focus more on prevention in terms of healthcare. Resulting in more willingness to investigate the role of food in shaping a healthy society. The	58	We see initiatives rising that play in to the rising demand by cultural minorities to have year round access to culturally specific produce. Now even produced on Dutch soil. Kouseband from Suriname for example.

	approach is more complete with arguments being posed and put forth from different angles and perspectives. Really seeing the food system as a whole.		
59	The tendency and political will is increasing in regards to viewing the food environment as a key component and determinant for healthy food practices. Examples such as the city deal, conversations with health insurance parties show promising things for the future in that regard.	60	Plastic usage will grow from 1 to 3 megaton worldwide, this due to growing middle class who purchase packaged foods. Only 0,5% of that is sustainable.
61	Re-use instead of single use food packaging. The restriction posed by EU to ban single use plastics will have its effects. The worth of waste is increased, trend that plastic will at least need to be of recycled materials. Eventually might not throw away any packaging whatsoever. This can translate to two potential outcomes: - consumer itself is responsible for refilling and cleaning their packaging - a centralized system where people can leave their packaging which will be cleaned and distributed again.	62	Consumer finds climate very important, increased tendency towards sustainability, also in packaging.
63	More and more tech innovation to separate house waste, like PET bottles	64	Urbanisation
65	More hybrid working, no longer 9-5 jobs, different perspective on traveling to work. Being compensated for walking or biking to work instead of going by car.	66	From ownership to usage, shared economy
67	Electrification of car traffic, comes from energy transition	68	Electric bikes
69	Micro-mobility (everything smaller than a bike), really for the last mile	70	Amount of cars is still growing, although it is expected to decrease over time especially with the coming of age of now younger generations.
71	Development of smart cities with mobility as a service (MAAS), convenience plays big role here, all applications on one map for bike, bus, car etc.	72	Cities as truly residential areas, less as shopping areas. Using drones for delivery (of groceries)
73	Less mobility in general	74	Urbanization is going to continue and even increase.
75	Mostly young people moving towards the cities, families will most likely leave the city.	76	Due to hybrid working we will see more lunch places popping up in residential areas. Convenience for people to eat whilst working from home.
77	Autonomous mobility, self-driving cars and electric cars will become the standard.	78	Densification around stations / mobility hubs > biggest shift is not moving at all. Resulting in multi-layer and very high vertical cities. More densified cities. As the agenda of Amsterdam states: growth within limits. Have set boundaries to what size something can grow, make it denser within those boundaries.
79	We will start to live in smaller apartments in the future, smaller or no kitchen with fewer storage space > causing for more frequent trips to or from the supermarkets.	80	Different work-life balance, people don't perse have to live close to where they work. Will visit office less frequently to live somewhere nicer / more spacious. Also ties into aging population, people still working at the age of 77 will tend to have certain preferences when it comes to finding a job. What job do I want at the age of 20 vs at the age of 80
81	Dichotomy in society with especially the more well-off group who almost have no idea how good they actually live.	82	Platformization, people will start to work as a service. Working in terms of tasks instead of for 1 employer. We pick the tasks we like and this does not perse have to be within 1 job.
83	Robotisation, train no longer needs someone to control it. Also catering services can be automated by smart clauses that can be filled via the backdoor through machines.	84	Digital nomads: people want to work anywhere and everywhere they see fit. Comes with new infrastructures around insurances
85	Aging population	86	Companies will start to provide more services to their employees at the office, things such as coffee bars, laundry services, child care etc.

Step 3

Table 19 - Listing of identified thematic trend clusters

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
01.	Consumer convenience	19	4, **11**, 18, 20, 22, **23**, **24**, **27**, **28**, **31**, **32**, **33**, 34, 41, **42**, 49, **53**, **56**, 60, **61**	7
02.	Consumer's health	16	**2**, 5, 10, **15**, **20**, 21, **23**, 25, **31**, **37**, **42**, **44**, 52, **53**, **57**, **59**	7
03.	Mobility	14	**11**, 12, **27**, **65**, 66, 67, 68, 69, 70, 71, **72**, 73, **77**, **78**	4
04.	Degree of urbanization	13	16, **24**, **28**, **29**, 39, 51, 54, 64, **72**, 74, **75**, **78**, 79	8
05.	Work-life balance	9	**32**. 35. **65**, **75**, 76, 80, 82, 84, 86	4
06.	Consumer 'experience'	8	3, **8**, 9, **23**, **29**, **32**, **33**, **56**	5
07.	Awareness within the government regarding 'food' intake	6	14. **15**. **37**, **57**, **59**, **61**	5
08.	Dichotomy in society (well-off vs. badly-off)	6	1, **2**, 17, 36, 46, 81	5
09.	Robotization	6	**44**, **53**, 63, **72**, **77**, 83	6
10.	Plant-based consumption and offerings	4	**2**, 6, 30, 48	3
11.	Water & resources	4	**8**, 40, 45, 50	3
12.	Culturally specific foods	3	38, 43, 58	3
13.	Sustainability	2	19, 62	2
14.	Climate change & its effects	2	13, 26	2
15.	Population age	2	47, 85	2
16.	Role big five staples	2	7, 55	2

Step 4

Table 20 - Listing of identified cluster trends in DESTEP + S format (see results section)

01.	**Consumer convenience**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
01.	Consumer convenience	19	4, **11**, 18, **20**, 22, **24**, **27**, **28**, **31**, **32**, **33**, 34, 41, **42**, 49, **53**, **56**, 60, **61**	7

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
4		Increase of both food delivery & take-away services	Time & Convenience play big role in acquiring food					
11				Food pick-up and delivery from central hubs spread out throughout the city. In combination with sustainable modes of transport				Food pick-up and delivery from central hubs spread out throughout the city
18		Growing in amount of physical supermarkets + online presence						Growing in amount of physical supermarkets + online presence
20		There is a growth in spendings by costumers on products that are consumed within 2 hours after purchasing. - There is a growth in fresh meal-boxes (vers pakketten)	The supermarket consumer wants fast (convenience), fresh and healthy, in no particular order.					
22		Supermarkets are gaining market share in providing breakfast and lunch to consumers.						Supermarkets are gaining market share in providing breakfast and lunch to consumers.
24			Cooking will remain but					In some places the kitchen

			will become much easier and more convenient - Increased tendency towards convenience foods					will disappear all together. Due to smaller apartments
27				where you can pick up your regular package orders and also your fresh groceries which you have ordered online.				Supermarkets will likely transform into hubs spread out throughout the city. Hubs, at the periferie of the city - The supermarket as we know it today will disappear. It will most likely be a place that combines services as well. Docking stations which are actually quite similar to the old food markets we had in Amsterdam (near Marktkantine). - We will see a decrease in the amount of delivery vans running through the city.
28		The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.	The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.	The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.				The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.
31			The amount of times we eat per day has increased to 7. Where we traditionally had 3 moments we have now really become a snack culture. We will most likely see this reflected in what the market puts on offer.		This will lead to more waste being generated from meal-box packaging			This will lead to more waste being generated from meal-box packaging
32		Rise in speedy delivery of food (flitsbezorgers). Mainly high processed foods, snacks. - Rise in meal-boxes being sold. -	There is a dichotomy in society. With on the one hand the consumer that wants convenience (about 25%). And on the other hand the consumer that was to change the current food system, aiming for a					The story behind the food will become really important. Local, regional, biological foods which are transparent with their sourcing will be of added value. This will also lead to business models that can

		On the other hand more focus towards local food chains and production. Also more plant-based. - This will also lead to business models that can sustain themselves because of the story behind the food. These can be local and relatively short food chains. So not perse large manufacturing sites.	more sustainable and healthy system, characterized by local food production (about 25%). Corona has accelerated both trends. In the middle we see the other 50% which is slowly fading away. - The story behind the food will become really important. Local, regional, biological foods which are transparent with their sourcing will be of added value. - The middle 50% will disappear, either a tendency towards more convenience or more local food supply. It can be a combination of both, convenience throughout the week and really taking the time during the weekends. (Even though this weekday-weekend balance will most likely change as well).					sustain themselves because of the story behind the food. These can be local and relatively short food chains. So not perse large manufacturing sites.
33		The more sustainable option will also need to be paired with more convenience. People in this segment also want it being delivered to their homes and in meal-boxes.	The more sustainable option will also need to be paired with more convenience..	People in this segment also want it being delivered to their homes and in meal-boxes.				
34			This can be healthy and sustainable options. - Us humans really become a grazing culture.					Food will most likely become available anytime and anywhere you'd like throughout the city.
41		Having the possibility to eat anywhere at anytime, whatever you want throughout the city	Having the possibility to eat anywhere at anytime, whatever you want throughout the city	This comes with an infrastructure that enables that. Can be via a delivery system but can also be through kitchens spread out throughout the city which people can make use of. Requires food to be available in different				This comes with an infrastructure that enables that. Can be via a delivery system but can also be through kitchens spread out throughout the city which people can make use of. Requires food to be available in different

				stages of preparation.				stages of preparation.
42		Unilever as a software company selling food cartridges. They will develop recipes as well for the specific printers.	Individually tailored food options will also translate to less waste and less unhealthy habits such as overconsumption. - We will start working towards tailor made portions, fit for everyone's individual lifestyle	This can be done via food printers throughout the city which can 3D print your specifically requested foods. - We will start working towards tailor made portions, fit for everyone's individual lifestyle				This can be done via food printers throughout the city which can 3D print your specifically requested foods.
49		Rise in fast delivery services of food (flitsbezorgers),.	causing people to become unaware of how food is produced					
53				Our houses could become equipped with automatic filling systems that re-supply our fridges and cabinets once empty. This happens automatically without the need of human interferences. This system is than also equipped with knowledge on personal diets, info about what we need (healthy) and what we want (preference). Really comes from convenience as a trend.				Our houses could become equipped with automatic filling systems that re-supply our fridges and cabinets once empty.
56	On the one hand we see this reflected in education and income level,	Where one part focuses more on sustainable and healthy food options, the other part is more focussed one being able to consume meat, often characterized by the affordable and quick option.	There is an clear dichotomy in society between two extremes. On the one hand we see this reflected in education and income level, on the other hand we see this reflected in their food habits. Where one part focuses more on sustainable and healthy food options, the other part is more focussed one being able to consume meat, often characterized by the affordable and quick option.					

60		Plastic usage will grow from 1 to 3 megaton worldwide, this due to growing middle class who purchase packaged foods. Only 0,5% of that is sustainable.	this due to growing middle class who purchase packaged foods.					
61		The worth of waste is increased, trend that plastic will at least need to be of recycled materials.	Eventually might not throw away any packaging whatsoever. - This can translate to two potential outcomes: consumer itself is responsible for refilling and cleaning their packaging	This can translate to two potential outcomes: a centralized system where people can leave their packaging which will be cleaned and distributed again.		Re-use instead of single use food packaging. The restriction posed by EU to ban single use plastics will have its effects.		

02.	**Consumer's health**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
02.	Consumer's health	16	**2**, 5, 10, **15**, **20**, 21, **23**, 25, **31**, **37**, **42**, **44**, 52, **53**, **57**, **59**	7

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
2	The prediction that there will be two side-by-side realities in society between the rich and the poor.	Which will translate into differences in what people of each 'camp' eat in terms of health (more overweight)/ plant-based.	Which will translate into differences in what people of each 'camp' eat in terms of health (more overweight)/ plant-based.					
5		A decrease in the amount of stores selling fresh produce (specialty stores such as 'groenteboer') -. Furthermore an increase in the amount of stores selling unhealthy foods such as lunchrooms and grill rooms.				The latter of which will continue if the government doesn't step in.		A decrease in the amount of stores selling fresh produce (specialty stores such as 'groenteboer') - -. Furthermore an increase in the amount of stores selling unhealthy foods such as lunchrooms and grill rooms.

10			We are likely to follow what we see in the US, an increase in the amount of people being overweight. Mainly due to what and how much we eat.					
15		This awareness can lead to product improvement.				There is an increase in political understanding and awareness regarding 'unhealthy' products in supermarkets for example. Products with high amounts of salt and sugar.		
20		There is a growth in spendings by costumers on products that are consumed within 2 hours after purchasing. - There is a growth in fresh meal-boxes (vers pakketten)	The supermarket consumer wants fast (convenience), fresh and healthy, in no particular order.					
21		An increase in the amount of healthy food offerings in restaurants						An increase in the amount of healthy food offerings in restaurants
23			There are waiting lists for community gardens, stemming from an increased demand for growing one's own crops. People want local and healthy food, people want to know exactly what they eat.		There are waiting lists for community gardens, stemming from an increased demand for growing one's own crops. People want local and healthy food, people want to know exactly what they eat.			There are waiting lists for community gardens, stemming from an increased demand for growing one's own crops. People want local and healthy food, people want to know exactly what they eat - Can lead to urban farming.
25				The rise of health apps and other tech innovation in providing us with health insights. Could translate towards personal chips which can tell us what to eat and what not to eat.				
31			The amount of times we		This will lead to more			This will lead to more

			eat per day has increased to 7. Where we traditionally had 3 moments we have now really become a snack culture. We will most likely see this reflected in what the market puts on offer.		waste being generated from meal-box packaging			waste being generated from meal-box packaging
37		Mainly due to Corona, which has shed light on the costs that come with an unhealthy population.				Past 6 months there really has seen a shift in governmental awareness regarding food intake by the population. - Government might want to take up a more active role in influencing people's food behavior. We see this in on various governmental levels, from international to more local. Also regarding bio products and more plant-based products.		
42		Unilever as a software company selling food cartridges. They will develop recipes as well for the specific printers.	Individually tailored food options will also translate to less waste and less unhealthy habits such as overconsumption. - We will start working towards tailor made portions, fit for everyone's individual lifestyle	This can be done via food printers throughout the city which can 3D print your specifically requested foods. - We will start working towards tailor made portions, fit for everyone's individual lifestyle				This can be done via food printers throughout the city which can 3D print your specifically requested foods.
44		We will deviate from the currently very high processed food industry towards a high tech system where various high tech kitchen / cooking applications will allow us to work with unprocessed foods whilst still providing proper, healthy & nutritious meals. Resulting in much more complex cooking applications, mostly automated.		towards a high tech system where various high tech kitchen / cooking applications will allow us to work with unprocessed foods whilst still providing proper, healthy & nutritious meals. Resulting in much more complex cooking applications, mostly automated.				

52			An increased tendency towards more tailored made food options / choises. Stemming from the drive to have a more healthy food intake, gen expression. Prevention is better than curing of diseases.					
53				Our houses could become equipped with automatic filling systems that re-supply our fridges and cabinets once empty. This happens automatically without the need of human interferences. This system is than also equipped with knowledge on personal diets, info about what we need (healthy) and what we want (preference). Really comes from convenience as a trend.				Our houses could become equipped with automatic filling systems that re-supply our fridges and cabinets once empty.
57						There is an increased tendency from governmental bodies to focus more on prevention in terms of healthcare. Resulting in more willingness to investigate the role of food in shaping a healthy society. The approach is more complete with arguments being posed and put forth from different angles and perspectives. Really seeing the food system as a whole.		
59						The tendency and political will is increasing in regards to viewing the food environment as a key component and determinant for healthy food practices. Examples such as the city deal, conversations with health insurance parties show		

						promising things for the future in that regard.		

03.	**Mobility**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
03.	Mobility will change	14	**11**, 12, **27**, **65**, 66, 67, 68, 69, 70, 71, **72**, 73, **77**, **78**	4

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
11				Food pick-up and delivery from central hubs spread out throughout the city. In combination with sustainable modes of transport				Food pick-up and delivery from central hubs spread out throughout the city
12				Sustainable modes of transport will be necessary, such as cable cars				Sustainable modes of transport will be necessary, such as cable cars
27				where you can pick up your regular package orders and also your fresh groceries which you have ordered online.				Supermarkets will likely transform into hubs spread out throughout the city. Hubs, at the periferie of the city - The supermarket as we know it today will disappear. It will most likely be a place that combines services as well. Docking stations which are actually quite similar to the old food markets we had in Amsterdam (near Marktkantine). - We will see a decrease in the amount of delivery vans running through the city.

65		More hybrid working, no longer 9-5 jobs, different perspective on traveling to work. Being compensated for walking or biking to work instead of going by car.	More hybrid working, no longer 9-5 jobs, different perspective on traveling to work. Being compensated for walking or biking to work instead of going by car.					More hybrid working, no longer 9-5 jobs, different perspective on traveling to work. Being compensated for walking or biking to work instead of going by car.
66		From ownership to usage, shared economy		From ownership to usage, shared economy				
67				Electrification of car traffic, comes from energy transition		Electrification of car traffic, comes from energy transition		
68				Electric bikes				Electric bikes
69				Micro-mobility (everything smaller than a bike), really for the last mile				Micro-mobility (everything smaller than a bike), really for the last mile
70	Amount of cars is still growing, although it is expected to decrease over time especially with the coming of age of now younger generations.							Amount of cars is still growing, although it is expected to decrease over time especially with the coming of age of now younger generations.
71		Development of smart cities with mobility as a service (MAAS), convenience plays big role here, all applications on one map for bike, bus, car etc.		Development of smart cities with mobility as a service (MAAS), convenience plays big role here, all applications on one map for bike, bus, car etc.				
72				Cities as truly residential areas, less as shopping areas. Using drones for delivery (of groceries)				Cities as truly residential areas, less as shopping areas. Using drones for delivery (of groceries)
73								Less mobility in general
77				Autonomous mobility, self-driving cars and electric cars will become the standard.				
78						As the agenda of		Densification around

						Amsterdam states: growth within limits. Have clear boundaries to what size something can grow but make it denser within those boundaries.		stations / mobility hubs > biggest shift is not moving at all. Resulting in multi-layer and very high vertical cities. More densified cities. As the agenda of Amsterdam states: growth within limits. Have clear boundaries to what size something can grow but make it denser within those boundaries.

04.	**Degree of urbanization**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
04.	Urbanisation	13	16, **24**, **28**, **29**, 39, 51, 54, 64, **72**, 74, **75**, **78**, 79	8

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
16	There is a conflict for space in the city. On the one hand we need to build more houses, on the other hand we like to engage with urban agriculture.							There is a conflict for space in the city. On the one hand we need to build more houses, on the other hand we like to engage with urban agriculture.
24			Cooking will remain but will become much easier and more convenient - Increased tendency towards convenience foods					In some places the kitchen will disappear all together. Due to smaller apartments
28		The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.	The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.	The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.				The rise of dark-kitchens. Kitchen hubs around the city with restaurants clustered together for delivery only.

29	Some people (mostly families) will probably leave the city and work remote. This is mostly likely also the group of people taking more time for acquiring their food.		Some people (mostly families) will probably leave the city and work remote. This is mostly likely also the group of people taking more time for acquiring their food.					
39	Urbanization, population worldwide will increase to 9/10 billion with about 70% living in cities. Meaning that in the future the amount of people living in cities is the same amount as the total population living on earth right now.							Urbanization, population worldwide will increase to 9/10 billion with about 70% living in cities. Meaning that in the future the amount of people living in cities is the same amount as the total population living on earth right now.
51		Housing prices are increasing within the city, raising the question wether we still want kitchens in our homes.	raising the question wether we still want kitchens in our homes.					Housing prices are increasing within the city, raising the question wether we still want kitchens in our homes.
54					whilst we need more land for certain solutions. This partly due to climate change as some sustainable solutions require land.			Less and less available land, whilst we need more land for certain solutions. This partly due to climate change as some sustainable solutions require land. Building houses on the one hand or providing ways to produce food on the other.
64	Urbanisation							
72				Cities as truly residential areas, less as shopping areas. Using drones for delivery (of groceries)				Cities as truly residential areas, less as shopping areas. Using drones for delivery (of groceries)
74	Urbanization is going to continue and even increase.							
75	Mostly young people moving towards the cities, families will most likely leave the city.							

78						As the agenda of Amsterdam states: growth within limits. Have clear boundaries to what size something can grow but make it denser within those boundaries.		Densification around stations / mobility hubs > biggest shift is not moving at all. Resulting in multi-layer and very high vertical cities. More densified cities. As the agenda of Amsterdam states: growth within limits. Have clear boundaries to what size something can grow but make it denser within those boundaries.
79			We will start to live in smaller apartments in the future, smaller or no kitchen with fewer storage space > causing for more frequent trips to or from the supermarkets	causing for more frequent trips to or from the supermarkets				We will start to live in smaller apartments in the future, smaller or no kitchen with fewer storage space > causing for more frequent trips to or from the supermarkets

05.	**Work-life balance**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
05.	Different work-life balance	9	**32**. 35. **65**, **75**, 76, 80, 82, 84, 86	4

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
32		Rise in speedy delivery of food (flitsbezorgers). Mainly high processed foods, snacks. - Rise in meal-boxes being sold. - On the other hand more focus towards local food chains and production. Also more plant-based. - This will also lead to business models that can	There is a dichotomy in society. With on the one hand the consumer that wants convenience (about 25%). And on the other hand the consumer that was to change the current food system, aiming for a more sustainable and healthy system, characterized by local food production (about 25%). Corona has accelerated both trends. In the middle we see the other 50%					The story behind the food will become really important. Local, regional, biological foods which are transparent with their sourcing will be of added value. This will also lead to business models that can sustain themselves because of the story behind the food. These can be local and relatively short food chains. So not perse large manufacturing sites.

		sustain themselves because of the story behind the food. These can be local and relatively short food chains. So not perse large manufacturing sites.	which is slowly fading away. - The story behind the food will become really important. Local, regional, biological foods which are transparent with their sourcing will be of added value. - The middle 50% will disappear, either a tendency towards more convenience or more local food supply. It can be a combination of both, convenience throughout the week and really taking the time during the weekends. (Even though this weekday-weekend balance will most likely change as well).					
35		We will most likely get rid of the 5 day work week, a different work-life balance.	We will most likely get rid of the 5 day work week, a different work-life balance.					
65		More hybrid working, no longer 9-5 jobs, different perspective on traveling to work. Being compensated for walking or biking to work instead of going by car.	More hybrid working, no longer 9-5 jobs, different perspective on traveling to work. Being compensated for walking or biking to work instead of going by car.					More hybrid working, no longer 9-5 jobs, different perspective on traveling to work. Being compensated for walking or biking to work instead of going by car.
75	Mostly young people moving towards the cities, families will most likely leave the city.							
76								Due to hybrid working we will see more lunch places popping up in residential areas. Convenience for people to eat whilst working from home.
80	Different work-life balance, people don't perse have to live close to where they work. Will visit office less frequently to live		Different work-life balance, people don't perse have to live close to where they work. Will visit office less frequently to live					

	somewhere nicer / more spacious. Also ties into aging population, people still working at the age of 77 will tend to have certain preferences when it comes to finding a job. What job do I want at the age of 20 vs at the age of 80		somewhere nicer / more spacious. Also ties into aging population, people still working at the age of 77 will tend to have certain preferences when it comes to finding a job. What job do I want at the age of 20 vs at the age of 80					
82		Platformization, people will start to work as a service. Working in terms of tasks instead of for 1 employer. We pick the tasks we like and this does not perse have to be within 1 job.	Platformization, people will start to work as a service. Working in terms of tasks instead of for 1 employer. We pick the tasks we like and this does not perse have to be within 1 job.					
84		Digital nomads: people want to work anywhere and everywhere they see fit. Comes with new infrastructures around insurances	Digital nomads: people want to work anywhere and everywhere they see fit. Comes with new infrastructures around insurances	Digital nomads: people want to work anywhere and everywhere they see fit. Comes with new infrastructures around insurances				
86			Companies will start to provide more services to their employees at the office, things such as coffee bars, laundry services, child care etc.					Companies will start to provide more services to their employees at the office, things such as coffee bars, laundry services, child care etc.

06.	**Consumer 'experience'**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
06.	Consumer 'experience'	8	3, **8**, 9, **23**, **29**, **32**, **33**, **56**	5

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
3		Rise in the amount of supermarkets, however	Rise in the amount of supermarkets, however					Rise in the amount of supermarkets, however

		they are increasingly decorated as places to experience, with a real story behind it.	they are increasingly decorated as places to experience, with a real story behind it.					they are increasingly decorated as places to experience, with a real story behind it.
8			There is an increased focus towards eating more locally produced produce. Urban farming for example.	Urban farming for example.				There is an increased focus towards eating more locally produced produce. Urban farming for example.
9			What people eat is also influenced by international trends such as bubble tea or sushi.					
23			There are waiting lists for community gardens, stemming from an increased demand for growing one's own crops. People want local and healthy food, people want to know exactly what they eat.		There are waiting lists for community gardens, stemming from an increased demand for growing one's own crops. People want local and healthy food, people want to know exactly what they eat.			There are waiting lists for community gardens, stemming from an increased demand for growing one's own crops. People want local and healthy food, people want to know exactly what they eat - Can lead to urban farming.
29	Some people (mostly families) will probably leave the city and work remote. This is mostly likely also the group of people taking more time for acquiring their food.		Some people (mostly families) will probably leave the city and work remote. This is mostly likely also the group of people taking more time for acquiring their food.					
32		Rise in speedy delivery of food (flitsbezorgers). Mainly high processed foods, snacks. - Rise in meal-boxes being sold. - On the other hand more focus towards local food chains and production. Also more plant-based. - This will also lead to business models that can	There is a dichotomy in society. With on the one hand the consumer that wants convenience (about 25%). And on the other hand the consumer that was to change the current food system, aiming for a more sustainable and healthy system, characterized by local food production (about 25%). Corona has accelerated both trends. In the middle we see the other 50%					The story behind the food will become really important. Local, regional, biological foods which are transparent with their sourcing will be of added value. This will also lead to business models that can sustain themselves because of the story behind the food. These can be local and relatively short food chains. So not perse large manufacturing sites.

		sustain themselves because of the story behind the food. These can be local and relatively short food chains. So not perse large manufacturing sites.	which is slowly fading away. - The story behind the food will become really important. Local, regional, biological foods which are transparent with their sourcing will be of added value. - The middle 50% will disappear, either a tendency towards more convenience or more local food supply. It can be a combination of both, convenience throughout the week and really taking the time during the weekends. (Even though this weekday-weekend balance will most likely change as well).					
33		The more sustainable option will also need to be paired with more convenience. People in this segment also want it being delivered to their homes and in meal-boxes.	The more sustainable option will also need to be paired with more convenience..	People in this segment also want it being delivered to their homes and in meal-boxes.				
56	On the one hand we see this reflected in education and income level,	Where one part focuses more on sustainable and healthy food options, the other part is more focussed one being able to consume meat, often characterized by the affordable and quick option.	There is an clear dichotomy in society between two extremes. On the one hand we see this reflected in education and income level, on the other hand we see this reflected in their food habits. Where one part focuses more on sustainable and healthy food options, the other part is more focussed one being able to consume meat, often characterized by the affordable and quick option.					

07.	**Awareness within the government regarding ‘food’ intake**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
07.	Increased 'food' awareness within the government	6	14. **15**. **37**, **57**, **59**, **61**	5

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
14						Confirms role for the government in making decisions as to what people eat, however uncertain wether they recognize and accept it as their role.		
15		This awareness can lead to product improvement.				There is an increase in political understanding and awareness regarding 'unhealthy' products in supermarkets for example. Products with high amounts of salt and sugar.		
37		Mainly due to Corona, which has shed light on the costs that come with an unhealthy population.				Past 6 months there really has seen a shift in governmental awareness regarding food intake by the population. - Government might want to take up a more active role in influencing people's food behavior. We see this in on various governmental levels, from international to more local. Also regarding bio products and more plant-based products.		
57						There is an increased tendency from governmental bodies to focus more on prevention in terms of healthcare. Resulting in more willingness to investigate the role of food in shaping a healthy society. The approach is more		

						complete with arguments being posed and put forth from different angles and perspectives. Really seeing the food system as a whole.		
59						The tendency and political will is increasing in regards to viewing the food environment as a key component and determinant for healthy food practices. Examples such as the city deal, conversations with health insurance parties show promising things for the future in that regard.		
61		The worth of waste is increased, trend that plastic will at least need to be of recycled materials.	Eventually might not throw away any packaging whatsoever. - This can translate to two potential outcomes: consumer itself is responsible for refilling and cleaning their packaging	This can translate to two potential outcomes: a centralized system where people can leave their packaging which will be cleaned and distributed again.		Re-use instead of single use food packaging. The restriction posed by EU to ban single use plastics will have its effects.		

08. Dichotomy in society (well-off vs. badly-off)

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
08.	Dichotomy in society (rich vs. poor)	6	1, **2**, 17, 36, 46, 81	5

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
1	Confirmation that a part of society is less well-off, they have lower incomes and lower levels of education.	Confirmation that a part of society is less well-off, they have lower incomes and lower levels of education. They are more concerned with their livelihood	Confirmation that a part of society is less well-off, they have lower incomes and lower levels of education. They are more concerned with their livelihood					are more susceptible towards and often living near unhealthy food offering locations.

		(bestaanszekerheid) and are more susceptible towards and often living near unhealthy food offering locations.	(bestaanszekerheid) and are more susceptible towards and often living near unhealthy food offering locations.					
2	The prediction that there will be two side-by-side realities in society between the rich and the poor.	Which will translate into differences in what people of each 'camp' eat in terms of health (more overweight)/ plant-based.	Which will translate into differences in what people of each 'camp' eat in terms of health (more overweight)/ plant-based.					
17	The rich stay rich and are less impacted by price mechanisms trying to steer what people eat.	The rich stay rich and are less impacted by price mechanisms trying to steer what people eat.				The rich stay rich and are less impacted by price mechanisms trying to steer what people eat.		
36	The low SES is still a relatively small group in the NL. It is growing but still rather small.	Food offerings through food banks are becoming more equipped in doing so. Even finding ways to do so is more sustainable and healthy. The low SES is still a relatively small group in the NL. It is growing but still rather small.		Food offerings through food banks are becoming more equipped in doing so. Even finding ways to do so is more sustainable and healthy.				
46	Those well-off (rich, intelligent) will remain so due to partner preference.	Those well-off (rich, intelligent) will remain so due to partner preference.	Those well-off (rich, intelligent) will remain so due to partner preference.					
81	Dichotomy in society with especially the more well-off group who almost have no idea how good they actually live.		Dichotomy in society with especially the more well-off group who almost have no idea how good they actually live.					

09.	**Robotization**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
09.	Robotization	6	**44**, **53**, 63, **72**, **77**, 83	6

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial

44		We will deviate from the currently very high processed food industry towards a high tech system where various high tech kitchen / cooking applications will allow us to work with unprocessed foods whilst still providing proper, healthy & nutritious meals. Resulting in much more complex cooking applications, mostly automated.		towards a high tech system where various high tech kitchen / cooking applications will allow us to work with unprocessed foods whilst still providing proper, healthy & nutritious meals. Resulting in much more complex cooking applications, mostly automated.				
53				Our houses could become equipped with automatic filling systems that re-supply our fridges and cabinets once empty. This happens automatically without the need of human interferences. This system is than also equipped with knowledge on personal diets, info about what we need (healthy) and what we want (preference). Really comes from convenience as a trend.				Our houses could become equipped with automatic filling systems that re-supply our fridges and cabinets once empty.
63				More and more tech innovation to separate house waste, like PET bottles				
72				Cities as truly residential areas, less as shopping areas. Using drones for delivery (of groceries)				Cities as truly residential areas, less as shopping areas. Using drones for delivery (of groceries)
77				Autonomous mobility, self-driving cars and electric cars will become the standard.				
83				Robotisation, train no longer needs someone to control it. Also catering services can be automated by smart clauses that can be filled via the backdoor				Also catering services can be automated by smart clauses that can be filled via the backdoor through machines.

				through machines.				

10.	**Plant-based consumption and offerings**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
10.	Increase in plant-based consumption and offerings	4	**2**, 6, 30, 48	3

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
2	The prediction that there will be two side-by-side realities in society between the rich and the poor.	Which will translate into differences in what people of each 'camp' eat in terms of health (more overweight)/ plant-based.	Which will translate into differences in what people of each 'camp' eat in terms of health (more overweight)/ plant-based.					
6		An increase in the amount of places selling vegetarian options. With fast food chains but also supermarkets selling meat replacements	. However the products are often still rather expensive and not always very healthy (processed foods).		This is good for the environment, namely plant-based.			An increase in the amount of places selling vegetarian options
30		The amount of people eating vegetarian food will increase. A majority will keep on eating meat business as usual but those already eating less meat than say 5 times a week will continue doing so, with a part of that group switching towards fully vegetarian	The amount of people eating vegetarian food will increase. A majority will keep on eating meat business as usual but those already eating less meat than say 5 times a week will continue doing so, with a part of that group switching towards fully vegetarian.					
48		An increase in plant-based food consumption, but still relatively small compared to the amount of meat being eaten.	An increase in plant-based food consumption, but still relatively small compared to the amount of meat being eaten.					

11.	**Water & resources**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
11.	Water & resource shortage	4	**8**, 40, 45, 50	3

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
8			There is an increased focus towards eating more locally produced produce. Urban farming for example.	Urban farming for example.				There is an increased focus towards eating more locally produced produce. Urban farming for example.
40				Cities are magnets when it comes to resource attraction. Resource shortages such as phosphate (expected to deplete in 100 years) and other nutrients will require us to anticipate and create infrastructure to capture those nutrients otherwise being lost via the sewage system and put them back in the food system.	Cities are magnets when it comes to resource attraction. Resource shortages such as phosphate (expected to deplete in 100 years) and other nutrients will require us to anticipate and create infrastructure to capture those nutrients otherwise being lost via the sewage system and put them back in the food system.			
45				Water shortage will be a big issue of not addressed. We will therefore use drinkwater in different ways, not for flushing the toilet anymore. We will likely start reusing water more locally, decentralized and close the loop that way. Also allowing for nutrients to be captured.	Water shortage will be a big issue of not addressed. We will therefore use drinkwater in different ways, not for flushing the toilet anymore. We will likely start reusing water more locally, decentralized and close the loop that way. Also allowing for nutrients to be captured.			We will likely start reusing water more locally, decentralized and close the loop that way.
50				Water shortage is a big problem, will likely lead to resource efficient solutions such as vertical farming	Water shortage is a big problem, will likely lead to resource efficient solutions such as vertical farming			lead to resource efficient solutions such as vertical farming

12.	**Culturally specific foods**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
12.	Growing demand culturally specific foods	3	38, 43, 58	3

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
38		A rise in food stores tailored towards the needs of cultural minorities, this partly due to the fact that the income of some of these minorities is growing. For example Polish, African or Asian supermarkets. An increase in diversity in whats on offer.						A rise in food stores tailored towards the needs of cultural minorities, this partly due to the fact that the income of some of these minorities is growing. For example Polish, African or Asian supermarkets. An increase in diversity in whats on offer.
43		A growing demand for culturally specific foods will result in more initiatives growing the food here in the NL. Vegetables and spices from say Suriname will be grown here due to a growing market for that.	A growing demand for culturally specific foods will result in more initiatives growing the food here in the NL. Vegetables and spices from say Suriname will be grown here due to a growing market for that.					A growing demand for culturally specific foods will result in more initiatives growing the food here in the NL. Vegetables and spices from say Suriname will be grown here due to a growing market for that.
58		We see initiatives rising that play in to the rising demand by cultural minorities to have year round access to culturally specific produce. Now even produced on Dutch soil. Kouseband from Suriname for example	We see initiatives rising that play in to the rising demand by cultural minorities to have year round access to culturally specific produce. Now even produced on Dutch soil. Kouseband from Suriname for example					We see initiatives rising that play in to the rising demand by cultural minorities to have year round access to culturally specific produce. Now even produced on Dutch soil. Kouseband from Suriname for example

13.	**Sustainability**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews

13.	Sustainability on the agenda of both consumer and retailer	2	19, 62	2

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
19		Sustainability is an important aspect of the business for supermarkets						
62			Consumer finds climate very important, increased tendency towards sustainability, also in packaging.					

14.	**Climate change & its effects**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
14.	Climate change & increased effects	2	13, 26	2

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
13					Increased effects of climate change, with a bigger impact on the surroundings and biodiversity.			with a bigger impact on the surroundings and biodiversity.
26			Climate change will bring about great effects for society.		Climate change will bring about great effects for society.			

15.	**Population age**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews

15.	Aging population	2	47, 85	2

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
47	An aging population, causing for big difference in demographics, with a relatively young group on the other end. Depends on influx of immigrants as well.							
85	Aging population							

16.	**Role big five staples**

Number	Thematic cluster	Number of trends	Trends	Mentioned in __ interviews
16.	Large role big 5 staples remains	2	7, 55	2

Nr.	Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
7		Some produce, such as corn, is very abundant. It is often cheap and therefore forms the base of what we eat. Retailers are sometimes dependable on that				Some produce, such as corn, is very abundant. It is often cheap and therefore forms the base of what we eat. Retailers are sometimes dependable on that		
55		There is still too big of a focus on the 5 main staple foods. Both politically and therefore economically. These 5 crops determine for a large part what it is we consume. There is a big lobby from large manufacturers to keep the this as it is				There is still too big of a focus on the 5 main staple foods. Both politically and therefore economically. These 5 crops determine for a large part what it is we consume. There is a big lobby from large manufacturers to keep the this as it is		

Step 5A

Table 21 - Overview of how the seven main trends relate to both the theoretical framework and the conceptual framework

Table 21A - Overview of elements of the theoretical framework

Theoretical Framework (TF)					
Lifestyle practices	TF-1	Food acquisitioning practice	TF-2	Systems of provision	TF-3
Work	TF-1A	Market-based	TF-2A	Food provisioning	TF-3A
Dwelling	TF-1B	Own production	TF-2B	Food waste management	TF-3B
Mobility	TF-1C	Wild harvested	TF-2C		
		Transferred	TF-2D		

Table 21B - Overview of how each of the seven main trends is deemed relevant based on elements of the theoretical framework

Theoretical Framework			
Trend	Lifestyle practices	Food acquisitioning practice	Systems of provision
Dichotomy in society (badly-off vs. well-off)	*TF-1A* *TF-1B* *TF-1C:* *Socio-economic standing greatly affects the balance of work, dwelling and mobility. Those well-off potentially have more means to secure dwellings and mobility capabilities allowing for different lifestyle practices.*	*TF-2A* *TF-2B* *TF-2C* *TF-2D* *Market-based food acquisitioning unbalanced. Transferring (voedselbank?)*	*TF-3A* *Access to certain types of food provisioning services (healthier, faster, local) might not be available to everyone.*
Increased plant-based food consumption	*No immediate effect*	*TF-2A* *TF-2B* *Market-based acquisitioning changes with more plant-based food offerings. Potentially residents*	*TF-3A* *TF-3B* *Food provisioning changes. Food waste management might alter due to plant-based*

		might also start their own crop production.	*orientation.*
Dichotomy in society (convenience vs. context)	*TF-1A* *TF-1B* *TF-1C* *Consumer orientation towards either convenience or context is oftentimes a product of lifestyle practices. With demanding jobs potentially causing more people seeking convenience. In addition, residents with larger homes might also tend to have more space to cook extensively. Lastly, making use of certain modes of transport also affects how and what types of food is being acquired.*	*TF-2A* *TF-2B* *Those seeking context might take more time and start to provide for themselves, shifting the balance from market-based to own production.*	*TF-3A* *TF-3B* *Food provisioning services are tailored towards consumer orientation. Along with this orientation also comes a food waste management infrastructure.*
Robotization	*TF-1A* *TF-1C* *Certain jobs might become redundant or allow for remote work. Autonomous mobility would have a large effect.*	*TF-2A* *TF-2B* *Has an effect on how consumers can acquire their food.*	*TF-3A* *TF-3B* *Becomes more automated.*
Water & nutrient scarcity	*No immediate effect*	*No immediate effect*	*TF-3A* *TF-3B* *Lends itself well for more resource efficient food provisioning services (urban farming). Also food waste management infrastructure focussed on circularity.*
Increased awareness by government as to what people eat	*No immediate effect*	*TF-2A* *TF-2B* *TF-2C* *Market offerings might change, food environment might change all together (fruit trees throughout the city)*	*TF-3A* *TF-3B* *Food provisioning services and food waste management in line with rules and regulations from the government.*
Increased conflicting battles for space within the city	*TF-1A* *TF-1B* *TF-1C* *How close people live to their office might change due to higher prices. Also affects dwelling size as priorities might shift whether a kitchen is worth it or not.*	*TF-2B* *Might jeopardize the own production due to limiting space. Could potentially also cause for more efficient use of space, meaning more own production.*	*No immediate effect*

Table 21C - Overview of elements of the conceptual framework

Conceptual Framework (CF)											
Well-being, health	CF-1	Biodiversity, environment, climate	CF-2	Equity, fair trade	CF-3	Eco-friendly, local, seasonal foods	CF-4	Cultural heritage, skills	CF-5	Food and nutrient needs, food security, accessibility	CF-6
Disease burden of population	CF-1A	GHG Emissions	CF-2A	Income levels: (1) population; (2) national	CF-3A	Water use for irrigation	CF-4A	Food / menu traditions	CF-5A	Quantities of food produced and consumed	CF-6A
Lifestyle	CF-1B	Ecosystem services	CF-2B	Food affordability	CF-3B	Land use	CF-4B	Religion	CF-5B	Amount of nutrients / vitamins consumed	CF-6B
Consumption / eating pattern	CF-1C	Urban vs. Rural households	CF-2C	Globalization & Trade	CF-3C	Materials for packaging	CF-4C	Diet diversity	CF-5C	Quantities of calories, sugars, saturated fats consumed	CF-6C
Age	CF-1D	Use of fossil fuels for cultivation, processing & transport	CF-2D	Government food policies, including subsidies	CF-3D	Soil	CF-4D	Consumption / eating patterns	CF-5D		
		Food marketing	CF-2E			Crop diversity	CF-4E	Gender	CF-5E		
								Class / status	CF-5F		
								Knowledge, education	CF-5G		

Table 21D - Overview of how each of the seven main trends is deemed relevant based on elements of the conceptual framework

Conceptual Framework						
Trend	Well-being, health	Biodiversity, environment, climate	Equity, fair trade	Eco-friendly, local, seasonal foods	Cultural heritage, skills	Food and nutrient needs, food security, accessibility
Dichotomy in society (badly-off vs. well-off)	*CF-1A* *CF-1B*	*CF-2A* *CF-2B*	*CF-3A* *CF-3B*	*CF-4A* *CF-4B*	*CF-5A* *CF-5B*	*CF-6A* *CF-6B*

	CF-1C *Consuming too much food or too little (nutritious) food can lead to health issues. Also has an effect on the lifestyle.*	*CF-2C* ***CF-2D*** *CF-2E* *Those well-off might eat more (luxurious) meat causing more GHG Emissions. Having a negative effect on ecosystem services due to lower biodiversity. Those living in cities might have better or worse access to food than those in rural areas.*	*CF-3C*	*CF-4C* *CF-4D* *CF-4E*	*CF-5C* *CF-5D* *CF-5E* *CF-5F* *CF-5G*	*CF-6C*
Increased plant-based food consumption	*CF-1A* *CF-1B* *CF-1C* *Plant-based food offerings in potential are healthier, however many meat alternatives are not perse. Eating plant-based can be considered a lifestyle.*	*CF-2A* *CF-2B* *CF-2D* *CF-2E* *Plant-based diets have a positive effect on GHG Emissions and ecosystem services.*	*CF-3A* *CF-3B* *CF-3C*	*CF-4A* *CF-4B* *CF-4C* *CF-4D* *CF-4E*	*CF-5A* *CF-5B* *CF-5C* *CF-5D* *CF-5E* *CF-5F* *CF-5G*	*CF-6A* *CF-6B* *CF-6C*
Dichotomy in society (convenience vs. context)	*CF-1B* *CF-1C* *Is translation of a lifestyle.*	*CF-2A* *CF-2B* *CF-2D* *CF-2E* *Convenience orientation might lead to more emissions whereas context might reduce it. More local food production could benefit ecosystem services in urban areas.*	*CF-3A* *CF-3B* *CF-3C*	*CF-4A* *CF-4B* *CF-4C* *CF-4D* *CF-4E*	*CF-5A* *CF-5B* *CF-5C* *CF-5D* *CF-5E* *CF-5F* *CF-5G*	*CF-6A* *CF-6B* *CF-6C*
Robotization	*No immediate effect*	*CF-2A* *CF-2D* *CF-2E* *Has potential in reducing or increasing amount of mobility (thus increasing GHG Emissions)*	*CF-3A* *CF-3B* *CF-3C*	*CF-4A* *CF-4B* *CF-4C* *CF-4D* *CF-4E*	*CF-5A* *CF-5B* *CF-5C* *CF-5D* *CF-5E* *CF-5F* *CF-5G*	*CF-6A* *CF-6B* *CF-6C*
Water & nutrient scarcity	*No immediate effect*	*CF-2B* *CF-2D* *CF-2E*	*CF-3A* *CF-3B* *CF-3C*	*CF-4A* *CF-4B* *CF-4C* *CF-4D* *CF-4E*	*CF-5A* *CF-5B* *CF-5C* *CF-5D*	*CF-6A* *CF-6B* *CF-6C*

		Could benefit resource and nutrient management resulting in fewer ecosystems having to deal with nutrient abundance or shortage.			*CF-5E* *CF-5F* *CF-5G*	
Increased awareness by government as to what people eat	*CF-1A* *CF-1B* *CF-1C* *With an increased governmental awareness healthier food practices might be stimulated, as well as healthier lifestyles.*	*CF-2A* *CF-2B* *CF-2D* *CF-2E* *Governmental intervention regarding what people eat could also be focussed on environmental externalities.*	*CF-3A* *CF-3B* *CF-3C*	*CF-4A* *CF-4B* *CF-4C* *CF-4D* *CF-4E*	*CF-5A* *CF-5B* *CF-5C* *CF-5D* *CF-5E* *CF-5F* *CF-5G*	*CF-6A* *CF-6B* *CF-6C*
Increased conflicting battles for space within the city	*No immediate effect*	*CF-2C* *CF-2D* *CF-2E* *Causing for different demographics between urban and rural,.*	*CF-3A* *CF-3B* *CF-3C*	*CF-4A* *CF-4B* *CF-4C* *CF-4D* *CF-4E*	*CF-5A* *CF-5B* *CF-5C* *CF-5D* *CF-5E* *CF-5F* *CF-5G*	*CF-6A* *CF-6B* *CF-6C*

Step 5

Table 22 - Listing of 7 main trends in DESTEP + S format, used for scenario building (see results section)

Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
Dichotomy in society (badly-off vs. well-off)	Increased plant-based food consumption	Dichotomy in society (convenience vs. context)	Robotization	Water & nutrient scarcity	Increased awareness by government as to what people eat		Increased conflicting battles for space within the city

Step 6

Table 23 - Listing of 7 main trends in DESTEP + S format, with highlighted x and y-axis (see results section)

Demographic	Economic	Social	Technological	Ecological	Political	+	Spatial
Dichotomy in society (badly-off vs. well-off)	Increased plant-based food consumption	Dichotomy in society (convenience vs. context)	Robotization	Water & nutrient scarcity	Increased awareness by government as to what people eat		Increased conflicting battles for space within the city