



# MASCULINE VEGETABLES

**Researching the options of introducing  
vegetable recipes for the barbecue in a  
convenient way**

**BELLE DE VOS  
DESIGN FOR INTERACTION  
25 MARCH 2026**



## **Masculine vegetables**

Researching the options of introducing vegetable recipes for the barbecue in a convenient way

### **Master thesis**

MSc Design for Interaction  
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# Preface

As I conclude my Master's in Design for Interaction, I am turning in the final deliverable of six years of study at TU Delft. This project has opened my eyes to a new design possibility: Food and Eating Design. My interest in this project stems from its focus on behavioural change and my curiosity about exploring this area of design. I understand that it is possible to shift eating patterns from a heavily meat-based diet to a more reduced one, but some individuals are more challenging to persuade.

In my personal journey from being a habitual meat-eater to becoming a flexitarian, the biggest influence came from the people around me. My diet began to change the moment I moved to Delft and joined a vegetarian household with my fellow students. Previously, I consumed meat frequently and believed it was impossible to have a vegetarian dish by simply removing meat. While I still think there's some truth to that, I've learned that with a bit of creativity, a dish can be transformed to remain filling, inspiring, and satisfying. My housemates introduced me to the creativity involved in cooking and the variety of recipes I now enjoy.

Nowadays, I prepare vegetarian meals almost every day, and I take pleasure in thinking outside the box to replace meat in traditional recipes. I feel proud to serve these dishes, although I sometimes feel uncertain when trying something new, especially when cooking for the men in the family, who are devoted meat lovers and often struggle to envision a meal without meat. It makes me especially proud when they enjoy the food. We even participate in small initiatives like Meatless Monday. Rethinking the BBQ is the challenge I've taken on for my graduation project, and I am excited to present the outcomes in this report.

First I want to express my gratitude to my supervisors, Rick, Hannah and Pieter. Thank you for guiding me through the project and keeping me on track. I appreciate the brainstorm sessions, the feedback and the help in moving forward with the design. Thank you for the opportunity to work with you and the attention and support in the meetings.

I also want to thank my friends and family for being there during this project. For the support, the coffee breaks, the contacts, the creativity and the motivation. Thank you for being there and studying with me, it made the project easier.

# Abstract

Climate change is one of the most pressing challenges we face, and the protein transition offers a promising solution to reduce greenhouse gas emissions. An ideal dietary shift would involve a 50/50 balance of diverse protein sources, which can improve overall health. While the number of flexitarians is rising, meat consumption remains high, showcasing a disconnect between intentions and actual behaviours. Notably, men are the largest meat consumers, and achieving a balanced diet will require substantial changes, particularly during festive occasions like Christmas and barbecues, where meat plays a central role.

This project aims to explore how vegetables can be more prominently featured in barbecue menus. It emphasises a small yet impactful change that preserves the familiar traditions of grilling. The target audience is male omnivores aged 25-35, providing them with the resources to prepare vegetable dishes that can take centre stage at their barbecues while maintaining tradition, pride, and culinary skills.

The outcome is a food kit developed under Jord Althuisen's brand, Fiery Veggies. This kit includes a recipe and the necessary ingredients to prepare a particular seasonal vegetable or fruit, enhanced by various spices. The chosen produce is selected for its texture, which is an important aspect in appealing to the target demographic. Customers can purchase these kits either in-store or online through Smokey Goodness. The recipes will be updated three times a year to reflect the seasonal availability of vegetables and the popularity of barbecuing, particularly in the summer months.

By reframing the experience of cooking with vegetables as a fun and adventurous first step, the project aims to exceed expectations regarding flavour and presentation. It also positions the food kit as a perfect gift for barbecue enthusiasts, encouraging a new perspective on grilling that celebrates both vegetables and traditional cooking techniques.

This initiative not only supports the shift towards a more plant-based diet but also aligns with the growing trend of eco-conscious eating. By integrating vegetables into classic barbecue settings, it seeks to inspire change in culinary habits while highlighting the joy of cooking and sharing meals with others.

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# 01 Introduction

In this chapter, the problem, scope, and approach of the project are introduced. It begins by providing a broader context regarding issues within the food system and highlighting the importance of transitioning from animal-based proteins to plant-based proteins. The gap between actual meat consumption and the self-identified flexitarians is discussed, as well as the opportunities this presents for the project. The scope of the project identifies the focus on men and explains why barbecues are an interesting context for our study. Finally, It outlines the project's approach, which follows the structure of the double diamond model.

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# 1.1 Background

In today's world, the challenges of climate change and food supply are prompting us to rethink our lifestyles. There is an increasing need for more plant-based diets due to the negative impacts of meat consumption on both human health and the environment. Livestock production not only contributes to greenhouse gas (GHG) emissions but also leads to water pollution, water scarcity, and a significant ecological footprint (González et al., 2020). Research by Xu et al. (2021) indicates that 57% of food-related GHG emissions originate from animal-based products, while only 29% come from plant-based foods.

In September 2015, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development. This agenda includes 17 Sustainable Development Goals (SDGs) that focus on prioritising and addressing various urgent global challenges. These challenges include food security, food sustainability, and climate change, all while striving to remain within the Earth's ecological limits (Aiking & De Boer, 2018).

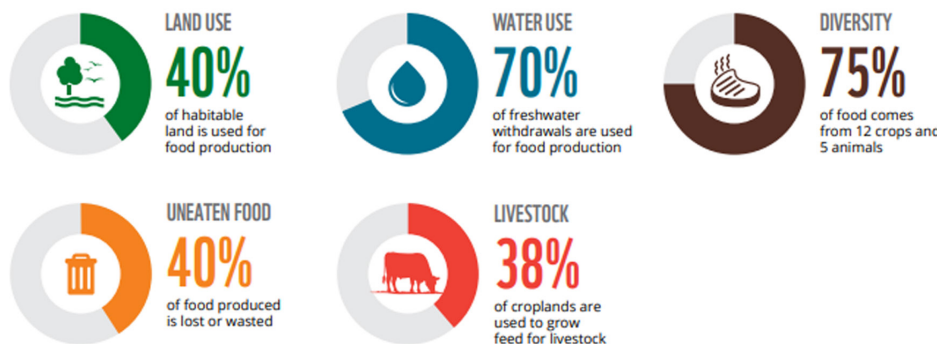
In recent years, the number of self-identified flexitarians in the Netherlands has been increasing. However, overall meat consumption has not significantly decreased. This indicates that consumers' efforts to reduce meat consumption are more reflected in their attitudes, awareness, and intentions than in their actual dietary choices. (Dagevos & Verbeke, 2022) To promote a shift towards more plant-based eating, the market has introduced a growing variety of meat substitutes designed to imitate the appearance, taste, and texture of meat. Despite this increasing interest, the actual consumption of these products remains relatively low. Factors such as dissatisfaction with taste, established eating habits, concerns about processing, and negative health perceptions often prevent consumers from incorporating these alternatives into their diets more regularly. (Weinrich, 2018)

Many habitual meat eaters who are interested in reducing their meat consumption often encounter a practical challenge: they don't know how to create satisfying meals without meat. This can leave them feeling uninspired or lacking the confidence to try new recipes. Additionally, some individuals worry that substituting meat may compromise the authenticity of traditional dishes. However, when they are introduced to appealing meat-free meals, many respond positively and begin to incorporate these options into their routines. It's worth noting that many consumers, particularly men, take pride in their established meat-cooking techniques and may feel a loss of mastery when faced with unfamiliar, meatless recipes. (Groen et al., 2025)

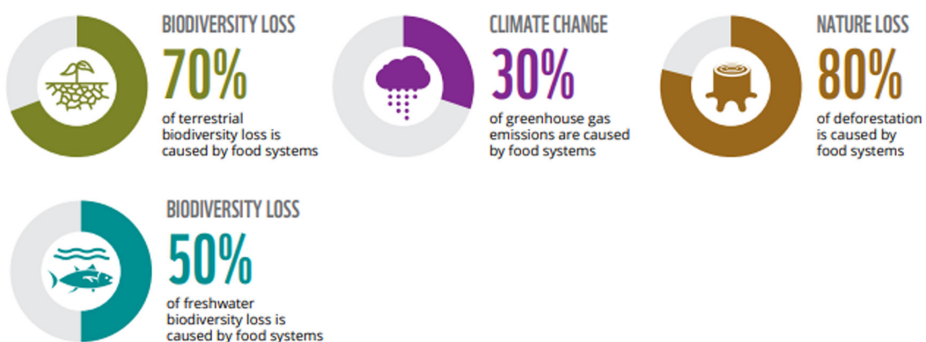


Figure 1. Protest for the climate  
William Navarro

**Food systems overexploit and inefficiently use natural resources...**



**leading to an unhealthy planet...**



**and unhealthy people.**

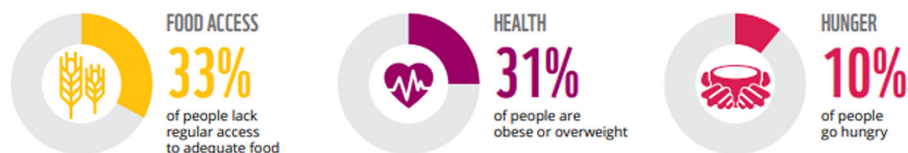


Figure 2. Foodsystems are a big threat to nature and people's health (Loken et al., 2024)

## 1.2 Project scope

The number of self-identified flexitarians in the Netherlands is on the rise; however, actual meat consumption remains high (Dagevos & Verbeke, 2022). This gap between consumer intentions and behaviour creates an opportunity for an intervention aimed at inspiring and encouraging individuals, particularly men, to incorporate meatless dishes into their regular meals. In the kitchen, women are often attempting to substitute meat or prepare dishes that traditionally do not contain meat, but men do not participate (Groen et al., 2025).

Social settings, such as barbecues, are times when meat consumption peaks, while plant-based alternatives are often underrepresented. Many men take pride in cooking and eating meat, perceiving it as a masculine activity. Social pressure within groups can reinforce the choice to consume meat. (Hillier, 2023) In the kitchen, men often cook to impress, while women tend to cook to nurture. Their focus in cooking differs as well; women consider who will be at their table and what those guests would like to eat, whereas men typically cook during special occasions to showcase their skills with complex dishes or prepare meals they personally enjoy. (Adler, 1981)

The goal of this project is to promote a shift in men's attitudes towards plant-based dishes at barbecues. We want to maintain the enjoyment and camaraderie associated with grilling while encouraging creativity and confidence in preparing these dishes. Men should feel empowered to impress their guests with delicious vegetable options and genuinely enjoy eating them as well.

# 1.3 Project approach

The project is organised based on the double diamond model, which guided the planning process. This model outlines the essential steps in the design process and consists of four phases: Discover, Define, Develop, and Deliver. The term “diamonds” is used to represent the diverging and converging stages of the project, highlighting the progression from exploration to focused execution.

## Discover

The Discover phase is the initial part of the project, focusing on research. This research is crucial for understanding the context and the consumer. In this project, a literature review is conducted to explain the food system, the protein transition, and the context of barbecuing. Additionally, qualitative research was carried out involving sixteen participants to gain further insights into barbecue interactions and the role of the pitmaster. Furthermore, a literature review was performed on the trends identified in the food industry.

## Define

In this phase, the research conducted will provide an overview of the challenge and help redefine it. By establishing a design goal, an interaction vision, and identifying design opportunities, the project will gain direction. This phase will also serve as guidelines for the next steps.

## Develop

The Develop phase encourages seeking inspiration from various sources. During this stage, techniques such as brainstorming, brainwriting, flower associations, and how-to guides are utilised to generate a wide range of design ideas. These ideas are then evaluated, and some may be combined to form new concepts. From these concepts, one will be selected for further exploration. Extra guidance in this phase came from interviews with four expert chefs.

## Deliver

This is the final phase of the project, during which I will present the final concept and prototype. The concept will be tested and evaluated by the target group. Their feedback will provide insights for improving the concept and offer recommendations for future developments.

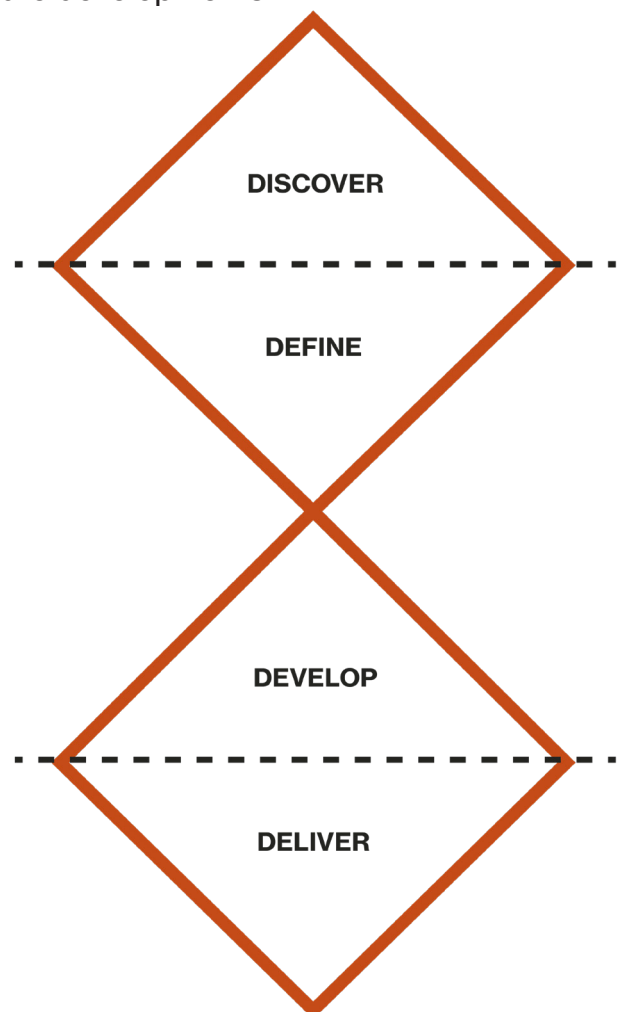


Figure 3. The double diamond

## 02 Discover

This chapter presents the research conducted on the subject, providing information about the context. It is based on desk research and interviews with the target group, serving as the foundation for the project's further development. To understand this context, the food system is explored to uncover where ideas for products originate and how information flows within it. The protein transition is examined through various factors that influence food choices. This framework helps determine the most effective level at which the concept should intervene to facilitate the protein transition in barbecuing. As the focus is on barbecuing, we analyse the interaction and context to better understand the process involved. Subsequently, consumer research is conducted, as understanding their motivations and barriers will ultimately influence the development of the concept. Gaining insights into consumer perspectives and behaviours in this context is crucial. Finally, future trends are researched to identify ongoing developments in the context that require further exploration.

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# 2.1 The food system

The current food system is complex and involves many stakeholders. Food often travels long distances before arriving on our plates. A significant portion of what we consume is imported from other countries, while much of our domestic production is exported. It is one of the largest sectors globally and affects millions of lives. (Muilwijk et al., 2018)

Over time, many small businesses have gone out of operation because they cannot compete with larger, more scaled-up companies. Consumer habits significantly influence food production. People eat every day, shop at least once a week, and frequently follow specific diets. As a result, the choices people make are often driven by habits rather than sustainability. (Muilwijk et al., 2018)

## **Farmers**

Farmers operate on both national and international levels, with a significant portion of our food crossing borders. For instance, many crops used for animal feed are often cultivated in other countries. There are different viewpoints on how farmers can implement more sustainable practices, especially concerning farming methods and pesticide use. (Muilwijk et al., 2018)

## **Production**

Food production involves various participants throughout the supply chain. Producers collaborate closely with retailers, who are significantly influenced by consumer demand. The production sector is continually evolving, creating new products and responding to market trends. This stage of the supply chain is also where many multinational corporations exert considerable influence. (Muilwijk et al., 2018)

## **Retailers**

This category primarily includes supermarkets, restaurants, and speciality stores like butchers and bakeries. Retailers monitor consumer preferences and share these insights with producers. (Muilwijk et al., 2018)

## **Consumers**

Consumers are the end-users who purchase products made for them. Food consumption routines are typically social and influenced by one's environment, habits, and cultural meanings. (Muilwijk et al., 2018)

## **Regulators**

Food manufacturers are responsible for ensuring that their products are safe and do not pose health risks to consumers. Companies must implement food safety plans and comply with government regulations. The Netherlands Food and Consumer Product Safety Authority (NVWA) oversees compliance with these standards. In the meat sector, there are specific regulations related to animal welfare and health (To, 2026). Additionally, there is a growing emphasis on sustainability, transparency, and proper food labelling, which keeps pace with developments in the industry (Alam et al., 2025).

## **Interest groups**

A variety of organisations study the food system and offer recommendations on issues such as food safety, sustainability, nutrition, and food science. These groups also participate in policy development and advocacy.

## **Media and influencers**

This group influences consumer behaviour in various ways. They share recipe ideas, review new food products, and provide updates on developments in the food system. Since consumer choices significantly impact the food system, media and influencers play a crucial role within it. (Influences Of Social Media On Consumer Decision-Making Processes in The Food And Grocery Industry, z.d.)

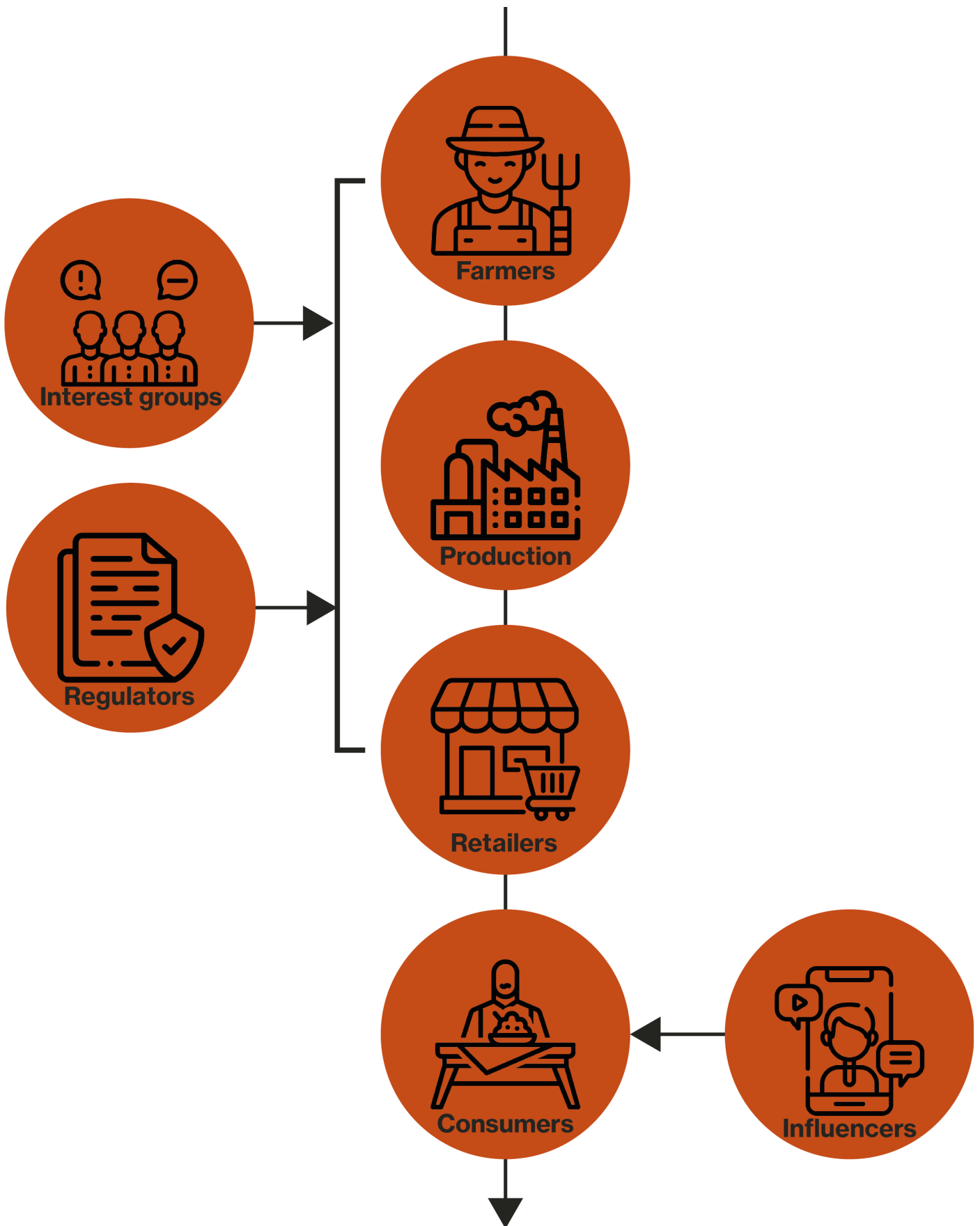


Figure 4. The stakeholders of the foodsystem

## 2.2 The protein transition

The world's population continues to grow, and with increasing urbanisation and incomes, diets are shifting towards more animal products. The FAO projects a 60% increase in food demand by 2050, while other sources suggest that demand could double. (Aiking & De Boer, 2018) The planet cannot sustain this rising demand for meat, particularly with the growing economies of China and India. Thus, a protein transition is necessary. This transition refers to a shift from a predominantly meat-based diet to one that is primarily plant-based. In Europe, this change is already occurring, but not at a sufficient pace. The number of self-identified flexitarians is increasing; however, overall meat consumption has not declined significantly. An ideal approach is to aim for a 50/50 protein balance for both health and sustainability benefits. (Verain et al., 2022)

Unprocessed lean meat can be part of a healthy diet, as it provides essential proteins, vitamins, and minerals. For a sustainable and healthy diet, it is recommended to consume no more than 500 grams of meat per week, with a maximum of 300 grams being red meat. High consumption of red meat, especially processed meat, has been associated with an increased risk of stroke, type 2 diabetes, and certain types of cancer. (Voedingscentrum, n.d.)

The transition to alternative proteins needs to occur at varying levels of detail and context, ranging from entire diets and specific dishes to individual ingredients and bites. Each level aims to achieve several goals, including making alternative protein options readily available in convenient forms, enhancing consumers' selection of hot meals that feature these alternative sources, increasing the appeal, familiarity, and taste of these options, and improving the overall sensory experience and associations with them. (Aiking & De Boer, 2018)

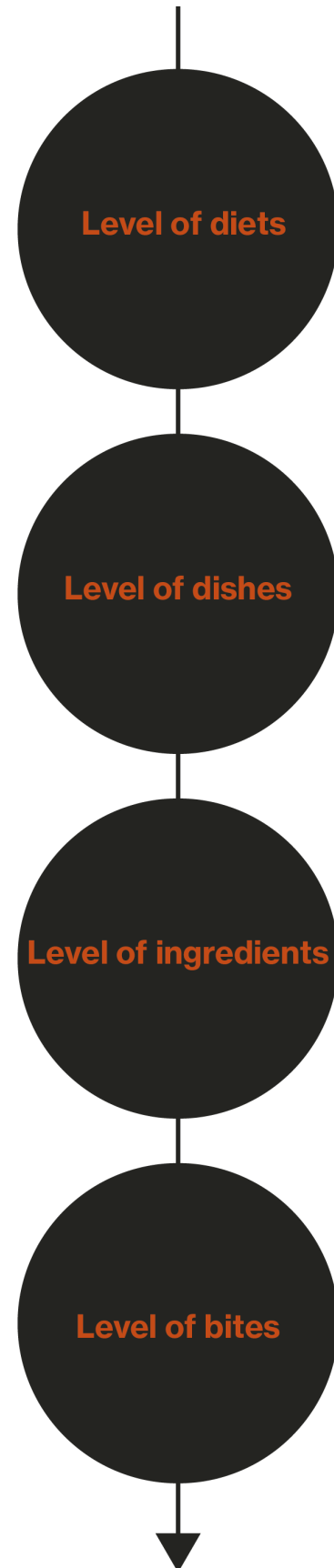


Figure 5. Protein transition on different levels

### 2.2.1 Level of diets

In society, people have various dietary preferences, which can arise from mandatory needs such as allergies or intolerances, or they may stem from voluntary choices based on different motivations. This research focuses on dietary choices related to the consumption or reduction of animal-based protein. Behavioural changes regarding dietary preferences can be challenging because individuals often view them as significant commitments, making it difficult to maintain these changes. Social support can facilitate the transition, but in our current culture, traditional cuisines heavily feature animal-based products. Therefore, introducing products that are nutritionally balanced, sustainable, and healthy while honouring culinary traditions might be an effective approach. (Aiking & De Boer, 2018) In this research, we classify these dietary preferences into four categories: omnivores, flexitarians, vegetarians, and vegans.

#### **Omnivores**

Meat eaters represent the largest dietary group in society, and consuming meat is generally regarded as the “normal” diet. On average, a person in the Netherlands consumes 76 kg of meat per year. This figure is based on carcass weight, which includes bones, fat, and skin. Of this total, approximately 36 kg is pork, 21 kg is poultry, 16 kg is beef, and 1 kg comes from sheep and goat meat. (Dagevos & Verbeke, 2022) Roughly half of the carcass weight is actually consumed as edible meat and meat products, leading to a real consumption level of about 38 kg per year, well above the recommended intake of 26 kg (Voedingscentrum, n.d.).

Meat consumption is notably highest among men aged 18 to 50, who consume an average of 116 grams per day. Overall, men eat about 85 grams of meat daily, significantly more than women, who average only 54 grams per day. (Voedingscentrum, n.d.) At barbecues, people typically eat between 400 and 600 grams of meat (Arnoud & Arnoud, 2024).

#### **Flexitarian**

The flexitarian diet is gaining popularity. While its definition may vary, it generally encompasses two main categories: vegetarians who occasionally consume meat and meat eaters who intentionally reduce their meat intake on a part-time basis and sometimes refrain from eating meat altogether. Reducing meat consumption is becoming more appealing due to its health and environmental benefits, but it is not necessary to eliminate meat. Key elements of this diet include reduction and substitution, with the extent of reduction determined by individual preference.

This dietary pattern can significantly lower the environmental impact of the food system while promoting healthier eating habits and offering nutritional advantages to consumers. Ambitious dietary changes, especially a decrease in meat and dairy consumption, are essential. The flexitarian diet may, therefore, be the most promising approach to encourage meat eaters to shift towards eating less meat, as it closely aligns with their existing habits. However, for many individuals, this still represents a significant dietary change. (Dagevos, 2021)

#### **Vegetarian**

The vegetarian category can be divided into two subgroups. The first group is composed of ovo-lacto vegetarians, who exclude meat and fish but do consume dairy products and eggs. The second group includes pescatarians, or pescovegetarians, who exclude meat but do eat fish, dairy products, and eggs. Generally, when we refer to vegetarians, we mean ovo-lacto vegetarians.

These diets are often considered restrictive because they exclude certain food groups, leading to a negative perception that they are incomplete. This can position a meat-based diet as the default or “proper” diet. However, vegetarian diets offer significant health and environmental benefits.

Vegetarianism is sometimes viewed as a more feminine dietary choice, as meat is culturally associated with masculinity, and choosing to avoid meat is often stereotyped as a feminine behavior. Common motivations for adopting a vegetarian diet include religious beliefs, health considerations, and ethical concerns. (Hargreaves et al., 2023)

### **Vegan**

Veganism goes beyond vegetarianism as it is a strictly plant-based diet that excludes all animal-derived foods, including dairy, eggs, and honey. Some vegans also extend this principle to other areas of their lives, such as personal care products and clothing. Vegans constitute only about 1 to 3% of the population. This diet is often viewed as highly restrictive and is typically motivated by strong values and beliefs, which can lead to social stigma. Some vegans may face teasing, lack support from family and friends, or be excluded from shared meals. The main motivations for adopting a vegan diet include concerns for animal welfare, the environment, and personal health. Although veganism was once considered extreme, its popularity has grown, partly due to high-profile celebrities embracing it, which has helped reduce some stigma. However, a negative perception of veganism still lingers. (Hargreaves et al., 2023)

### **2.2.2 Level of dishes**

At this level, it is essential to understand how to make dishes appealing and which pairings enhance their attractiveness. Comprehending how these combinations work can encourage substitutions between food groups, within food groups, or promote greater variety in food intake. Achieving a balance in dishes can excite people about options that contain reduced animal proteins. Meat can be replaced with more vegetables or enhanced with different spices. (Aiking & De Boer, 2018)

These changes should be communicated through new or updated recipes, which can then be shared within friends' and family circles. Dishes can be both tasty and showcase the possibilities available, but they should also align with consumers' lifestyles. Ingredients should be accessible, and the preparation of dishes should not be overly time-consuming. (Aiking & De Boer, 2018)

However, special occasions like Christmas or barbecues are different, as people often enjoy spending more time preparing food, where presentation is just as important as taste. This also applies to restaurants, where the menu and food presentation significantly contribute to the dining experience. (Groen et al., 2025)

In everyday life, promotions for complete meals or ready-to-eat meal items can encourage consumers to consider certain changes in their dishes (Aiking & De Boer, 2018). Nowadays, people are increasingly choosing dishes that are either originally meatless or have meat substitutes when meat is not the main feature of the meal (Groen et al., 2025).

### **Recipes**

Traditionally, recipes were passed down through oral traditions, observation, and personal practice. The term "traditional cuisine" reflects these practices in communities where they are still prevalent. Nowadays, many of us search for recipes in cookbooks and online. Thanks to globalisation and technology, we can easily learn about different cuisines and cooking techniques from various cultures (Muñoz-Benito et al., 2023).

In the world of barbecuing, culture significantly influences what is eaten, how it is prepared, and the types of sauces and sides that accompany the meal. Barbecue is often associated with meat as the main dish and exists in many forms across different cultures. It gained popularity in Western cultures, especially with the introduction of iconic grilling tools. Furthermore, barbecuing is often viewed as a masculine activity, leading to recipes that are typically tailored toward men (Leer, 2022).



Frontpage

Cookbooks are generally organised by cuisine and cultural context or focus on a specific chef's interest in diverse culinary traditions. Recipes for meat-based and vegetarian dishes are often presented in separate books, reflecting their distinctive graphic styles. Meat cookbooks tend to have a darker aesthetic, featuring black and smoky themes with images of both uncooked and cooked meat, which emphasise the robust atmosphere of grilling. The individuals showcased in these books often appear strong and tough. In contrast, vegetarian cookbooks generally adopt a softer, sweeter graphic style, using lighter colours and white backgrounds, and often feature individuals depicted only with their hands.



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Online, barbecue chefs, communities, and brands present their recipes, where influencer status can encourage consumers to try new dishes. Even if a consumer is initially hesitant about a recipe's flavour, the credibility of a food influencer can make the recipe seem more trustworthy and appealing. Observing food influencers often leads to the imitation of their cooking practices, tied to a sense of social belonging and the entertainment value of their behaviour. (Sokolova et al., 2024)



Dish presentation



Recipe instruction



Figure 6. Side by side comparison of the graphic style of cookbooks. The left one is the vegetable-based and the right one is meat-based.

## Meal boxes

Meal kits are rapidly gaining popularity in the food industry. These kits contain pre-portioned ingredients and recipes for preparing meals, making cooking at home more accessible. They can help overcome barriers to home cooking and encourage shared family meals by removing the mental burden of deciding what to eat. Meal kits can also positively influence health and variety in our diets. (Fraser et al., 2021)

However, in the barbecue realm, meal kits are less well-known. Most research indicates that these kits primarily include meat or fish. For example, boxes from services like HelloFresh or Albert Heijn focus on items such as burgers, chicken skewers, and sausages while providing minimal vegetable options. As a result, these boxes often lack creativity, leading to traditional Dutch barbecue experiences. Albert Heijn also offers a vegetarian box, but this primarily consists of meat substitutes, which may not be very inspiring either.

In contrast, EatSous is a website that provides a variety of meal kits associated with different restaurants or chefs. These boxes typically offer a full menu but can be quite expensive.



Figure 7. Inhoud Albert Heijn BBQ-pakket vega(n) voor 4 personen €24,52



Figure 8. EatSous Haute cuisine bio burger box voor €24,95 p.p.

### 2.2.3 Level of ingredients

People hold various beliefs and preferences regarding different protein ingredients. These protein ingredients can be whole foods or processed into other products, and they vary significantly in origin, nutritional content, and role in a dish. The context in which a protein ingredient is presented can influence whether people accept or reject it. Additionally, cultural motives and traditional beliefs play a significant role in determining the ingredients that people choose to eat. (Aiking & De Boer, 2018)

#### **Meat and Fish**

Meat is defined as the edible part of farmed or wild animals. In Western cultures, our perspective on what is considered edible is relatively narrow. Generally, we see only the muscle tissue as suitable for consumption, although certain organs are also accepted as edible (Voedingscentrum, n.d.).

There are two main categories of meat: red and white. Red meat includes beef, pork, lamb, and goat, while white meat encompasses chicken, other poultry, rabbit, and seafood. Red meat is often seen as less healthy due to its high content of heme iron and saturated fats (Zhang et al., 2025). Processed meat, which is meat that has been smoked, marinated, or otherwise treated to enhance flavour or extend shelf life, is considered even less healthy.

Despite these health concerns, meat provides essential nutrients and is included in dietary guidelines. Its flavour is unique and challenging to replicate; the combination of fat, umami, and salt found in meat is not easily matched in plant-based foods. While meat substitutes aim to mimic these qualities, many consumers feel they have not yet achieved complete success. (Dagevos, 2021)

Additionally, meat has deep cultural significance, playing a key role in food traditions and eating practices. It is viewed not only as a source of nutrition but also as something normal, necessary, natural, and enjoyable. This cultural significance is further reinforced by extensive advertising and promotion. (Dagevos, 2021)

#### **Hybrid meat**

There is a growing interest in reducing the ecological footprint within the meat category. One notable development is hybrid meat products, which replace a portion of meat, typically around half, with plant-based ingredients. This innovation allows consumers to enjoy the taste of meat more sustainably and can also introduce them to unfamiliar foods in the industry. Additionally, hybrid meat products may appeal to consumers who prefer more familiar flavours (Aiking & De Boer, 2018).

#### **Cultured meat**

Another innovation in the field of food technology is cultured meat. In 2015, researchers investigated the possibility of growing a hamburger using stem cells derived from cows. Cows are highly inefficient producers of meat, needing roughly seven times more food than the amount of meat they produce. Since meat consists of muscle tissue, which contains stem cells, a single biopsy can yield over 100 cells, with one cell having the potential to grow into 10,000 kg of meat. The animal can live on and serve as a donor again, which could help free up land and reduce water usage. Although the flavour in 2015 was not yet optimal and the production costs were extremely high, cultured meat could become a more sustainable alternative if consumers embrace the concept and sufficient investment is made. (Hoe Maak Je een Hamburger in het Laboratorium? : Universiteit van Nederland, n.d.)

## **Insects**

A third development involves increasing the social acceptance of eating insects. In many countries, insects are traditionally consumed and play an important role in the culture, gastronomy, and staple diet. Mexico, China, Thailand, and India have the highest number of edible insect species. However, in Western countries, insects often carry a negative image, as they are associated with pests and decay. Social and cultural factors such as food neophobia and a lack of familiarity are the main reasons for the low acceptance of insects as food. (Liceaga et al., 2021)

Nevertheless, this perception is slowly changing. Insects have gained attention due to their remarkable nutritional value, which is comparable to or even higher than that of conventional livestock. They provide high-quality protein, unsaturated fats, vitamins, and minerals. Additionally, insects are far more sustainable, requiring minimal land and water while producing lower greenhouse gas emissions. They also pose a lower risk of transmitting zoonotic diseases. (Liceaga et al., 2021)

## **Animal protein analogues**

The plant-based food market today includes various products, such as plant-based meat alternatives (like sausages, chicken-style products, burgers, nuggets, tenders, and cutlets), dairy substitutes (including yoghurt, cheese, and milk), egg replacements (e.g., plant-based mayonnaise), and plant-based seafood (slices, fillets, fish sticks, and fish burgers). These products are designed to replicate the appearance, taste, texture, and sensory qualities of traditional animal-based foods. (Appiani et al., 2023)

Meat alternatives are the most widely discussed approach for encouraging consumers to adopt a diet with reduced meat consumption. They aim to provide an easy, convenient, and acceptable way to replace animal protein in meals. However, consumer adoption is still limited because these products often do not meet expectations. Many people directly compare meat substitutes to real meat, which can lead to disappointment.

As a result, many consumers tend to view meat alternatives as something to try once or use occasionally rather than as staples in their everyday meals. (Groen et al., 2025)

While plant-based substitutes are generally cheaper to produce than meat, the ongoing research and development needed to enhance their appearance, taste, and texture keep prices relatively high. If consumer adoption increases, this could eventually lead to lower prices. Currently, the market is primarily driven by flexitarian consumers, who represent about 30% of Europeans, while vegetarians and vegans make up approximately 7% (Appiani et al., 2023).

## **Plant-based alternatives**

There is an increasing demand to develop alternative product strategies that do not solely focus on creating meat analogues. Some studies indicate that young adults and families often do not “replace” meat in their meals. Instead, they tend to create entirely new dishes without meat or avoid meals where meat is the main component, making direct replacement unnecessary (Groen et al., 2025). Globalisation has also introduced various new cuisines that traditionally include plant-based dishes. Certain cultures and religions, particularly those with large Hindu populations such as India, are more accustomed to cooking without meat. Traditional plant-based dishes often feature ingredients like falafel, vegetables, mushrooms, pulses, legumes, seeds, nuts, pseudocereals, and cereals.

## 2.2.4 Level of bites

The concept of “bites” focuses on the sensory experience and associations people have with food. When altering a diet or a specific dish, individuals may experience unmet needs while eating. By examining the sensory properties of a person’s eating habits, it may be possible to enhance their satisfaction when changing protein sources. (Aiking & De Boer, 2018)

There are two primary reasons why humans struggle to incorporate more plant-based foods into their diets. The first relates to the biology of plants, while the second refers to human evolution. Unprocessed plant foods generally offer little in terms of sweet and umami flavours, which are the flavours humans tend to crave. Sweetness signals the presence of sugars, which indicate caloric energy vital for survival, while umami signifies protein and good nutrition. (Mouritsen & Styrbæk, 2020)

Underappreciated vegetables, such as those in the cabbage and radish families, often lack umami flavour. These vegetables can be overly bitter, leading to an unpleasant mouthfeel, and are often culturally perceived as “poor people’s food.” Additionally, many vegetables do not provide the crunch that contributes to a satisfying eating experience. Small amounts of umami-rich animal products can significantly enhance the taste of large quantities of green vegetables, making them more appealing to a wider population daily. (Schmidt & Mouritsen, 2022)

Combining scientific knowledge about taste preferences with advancements in gastronomy could drive significant innovations in enhancing the umami flavour of vegetables. Possible approaches include processing and engineering plant materials, adding umami and kokumi substances, or utilising a hybrid of both methods, such as fermentation processes applied to plants. Innovations should emphasise improving taste and texture. Consequently, a “taste rack” was developed, featuring elements known to contribute to umami flavour and a satisfying crunch. (Mouritsen & Styrbæk, 2020)



Figure 9. Taste rack for umamification

## 2.3 The barbecue

A barbecue (BBQ) is a social gathering focused on grilling meat. Various cultures around the world have their unique styles that influence the types of meat grilled and how people interact during the event. The major barbecue countries include the United States, Australia, South Africa, and Argentina, each known for its distinct methods.

### History

Cooking has been closely linked to human evolution and survival. It makes food safer to eat by killing harmful bacteria, thereby reducing the risk of illness. The controlled use of fire for cooking is believed to have been discovered around 800,000 years ago, taking forms such as campfires, clay ovens, and pits in the ground. (From *Barbycu To Barbecue*, z.d.)

Various stories surround the origin of barbecue, and its true roots remain uncertain. Some suggest that the word “barbecue” comes from “barbacoa,” a term used by the Taíno people for a wooden framework used to cook meat. Christopher Columbus later introduced this word into European languages after he voyaged to the Americas. Today, “barbecue” refers to outdoor grilling, although its structure and meaning vary across cultures. Despite these differences, BBQ has long been associated with hospitality and a spirit of openness. In the southern United States, for example, barbecue traditions are deeply intertwined with local culture and history, reflecting aspects of identity, ritual, memory, gender roles, and a sense of place and belonging. (From *Barbycu To Barbecue*, z.d.)

For many, BBQ is more than just a cooking method; it’s a cultural practice that brings people together. There are barbecue experts, TV shows, magazines, websites, blogs, societies, and clubs dedicated entirely to it. However, in recent times, barbecue has become mass-produced and, in some ways, has lost some of its original sentiment. There is still ongoing debate about what constitutes “real” barbecue. Some believe it simply requires BBQ sauce, a fun and informal atmosphere, and good flavour, while others view it more broadly as any type of outdoor cooking involving fire. (From *Barbycu To Barbecue*, z.d.)



Figure 10. Wooden framework called the barbacoa (From *Barbycu To Barbecue*, z.d.)

## Interaction

Barbecuing in the Netherlands originally centred around a simple grill filled with various types of meat, which in the United States is considered grilling instead of a barbecue. However, today, Dutch barbecue culture is increasingly influenced by international culinary traditions. Current trends include the incorporation of global flavours, the growing popularity of plant-based proteins, and the rise of precision cooking. Traditional rubs made with brown sugar and paprika are now enhanced by more adventurous blends such as Korean gochujang, Japanese togarashi, Moroccan ras el hanout, Middle Eastern za'atar, and Ethiopian berbere, adding depth, complexity, and cultural flair.[B2.1] Cookbooks and social media influencers are showcasing these techniques and encouraging pitmasters to perfect individual cuts of meat rather than cooking many at once.

For many men, barbecuing is a source of pride. Presenting a dish they have spent hours preparing reinforces the sense of craftsmanship and masculinity associated with handling meat and fire. Because barbecuing often requires specialised and bulky equipment, most barbecues take place in the garden. The table is usually positioned next to the grill, making the pitmaster and the barbecue the focal point of the gathering. Side dishes, typically consisting of salads, bread, and sauces, are prepared in advance. Barbecuing is considered a summer tradition, often shared with friends or organised by communities, such as neighbourhood barbecues or end-of-season events at sports clubs.



Figure 11. The traditional Dutch barbecue where a variety of food is grilled (BBQ Holland, 2025)

The Netflix series “Chef’s Table: BBQ” highlights this cultural aspect by featuring four pitmasters and their distinct traditions from Texas, South Carolina, Mexico, and Australia. In each case, barbecue is more than just a cooking technique; it is a communal event that brings people together. In a world where everyone is constantly rushing, barbecuing creates a moment to slow down and connect. It is frequently used to celebrate important or festive occasions. Barbecue culture places a strong emphasis on patience, passion, and the balance between meat, sauce, and marinade. The smoke and aroma of burning wood are unique to the barbecue experience. For some, this process feels almost spiritual: fire is alive and cannot simply be turned off, symbolising power often associated with masculinity (strong, intense, and dominant), yet it can also be soft, delicate, and subtle, producing nuanced flavours. Barbecue traditions honour heritage while simultaneously evolving. So, the question arises: how far can you go? (Leer, 2022)

Lenox Hastie, one of the pitmasters featured in the series, is known for his experimental approach. He argues that when vegetables are cooked with the same care and technique as meat, they can become even more interesting. At his restaurant, Firedoor, guests appreciate the flavour of the meat, but the true excitement often comes from the vegetables. According to Hastie, freedom in cooking is essential, and rules are meant to be challenged. Because his ideas did not always align with diners’ expectations, he had to actively work on changing their perceptions. (Leer, 2022)



Figure 12. Bigger pieces of meat on a kamado (Big Green Egg – The Original Kamado, z.d.)

## Materials

To understand the equipment used for barbecuing and the possibilities it offers, visits to cooking and barbecue shops, as well as garden centres, were made. Barbecues come in various forms, sizes, colours, and materials. They can use different fuels such as gas, charcoal, or electricity, but their basic structure remains consistent. The firebox is where the fire burns, whether fuelled by wood, charcoal, or gas flames. Above the firebox is the cooking or smoking chamber, where food is prepared. The firebox and cooking chamber are separated by a grill grate, which holds the food. (Famer, 2016)

Most barbecues also feature a lid that covers the chamber. This relatively recent addition allows for indirect grilling and smoking, thereby expanding the range of cooking techniques available. Today, countless accessories cater to every barbecue enthusiast's needs, including pizza stones, grill pans, skillets, spits, smoke boxes, and rotisserie baskets.

Traditionally, barbecues are made from metal. However, the thermal properties of metal grills may not maintain an optimal cooking temperature consistently, leading to heat loss during the cooking process. This can result in prolonged cooking times and increased fuel consumption. Additionally, metal grills are susceptible to rust, which can threaten food safety and limit their lifespan, requiring frequent maintenance. (Mensah, 2024)

In contrast, Kamado grills, inspired by traditional Japanese cooking vessels, are made from ceramic and possess excellent heat retention properties. They can reach high temperatures and are suitable for grilling, smoking, roasting, and baking. Kamado grills are known for their versatility and their ability to impart a unique flavour to food. Many barbecuers purchase a kamado-style barbecue due to this. (Mensah, 2024)

For many, the kamado barbecue has become an extension of the kitchen, offering richer flavours than conventional indoor cooking. Furthermore, smart grilling technologies are becoming more common, making the process more precise, efficient, and accessible. As a result, individuals who were previously intimidated by barbecuing can now easily participate and enjoy the experience.



Figure 13. Accessories of the Kamado barbecue for varying methods (Big Green Egg – The Original Kamado, z.d.)



## 2.4 The consumer

To gain insights into barbecue interactions and consumer behaviour, semi-structured interviews were conducted. A set of questions and statements was prepared to explore various aspects of the barbecue experience, including the context and journey of barbecuing, the necessary skills, the menu choices, and the motivations and barriers related to selecting vegetarian dishes. A total of sixteen participants, aged between 24 and 68, who regularly consume meat, were recruited. This broad age range was selected to determine which age group might be more receptive to changes in dietary habits. Participants were recruited through personal contacts.

### Perception of meat

Among the sixteen participants, eleven identified as meat eaters and five as flexitarians. Overall, they noted that their meat consumption had already decreased over the past few years. Ten expressed a desire to reduce their meat intake further, while the others did not wish to make any changes. Most participants enjoyed meat primarily for its flavour and the tradition associated with eating it, which makes reducing meat further a difficult task for them.

When presented with a simple meat dish versus a well-rounded vegetable dish, fifteen participants chose the meat option. The taste and perception of meat as a main course are difficult to replace, and it seemed to represent a habitual choice. One participant remarked, “Visually, it looks like an appealing dish, but when I think of it as a main course, I am not that enthusiastic.” Although the vegetable dish appeared attractive, it did not evoke the same excitement as a traditional barbecue.

It was challenging to articulate this feeling and the perception of the vegetable dish. For barbecues, simpler meat dishes tended to be more appealing because grilling methods add interest. Before grilling, the meat is typically treated with a rub or marinade for extra flavour. After grilling, the food is usually placed on the table, cut into portions, and may be served with a sauce, but that’s the extent of it. The men interviewed also believe meat is necessary to obtain essential vitamins and minerals. The argument that “hunter-gatherers also ate meat” was cited a few times as well.



Figure 14. The pictures presented in the interview of a simple meat dish and a complex vegetable dish

## **Menu choice**

Menus for barbecues are usually created using recipes from cookbooks or online sources, often in collaboration with guests. However, barbecues are typically not viewed as occasions for trying out new recipes. One participant explained, “I ask my guests for their preferences and if they have any recipes they would like to share, but I also have my own ideas for the food. Together, we create a menu, although most recipes tend to be similar to what people already know.” Another participant noted, “Currently, we have a few vegetarians in the family, so we need to be more creative with vegetables because nobody likes the vegetarian burger. The rest of the menu usually consists of meat, as non-vegetarians prefer it.”

When it comes to vegetarian options, participants mainly suggested grilled vegetables, typically served as simple platters. Other alternatives, such as pulses, cheese, and tofu, are less popular, and some barbecuers may not know how to prepare them. Choosing meat is often seen as the easier and more convenient option, as it is generally more familiar and appealing to a large group of people. Additionally, motivations for selecting meat often relate to taste, habit, and presentation.

## **Grocery shopping**

When purchasing meat, participants preferred to buy from local butchers, choosing products based on quality, freshness, taste, and flavour. This preference demonstrates that meat is still viewed as a premium product, leading to a more careful selection process. In contrast, vegetables were typically purchased at the supermarket, reflecting a different level of consideration for these two types of food. While meat was carefully chosen, vegetables were often an afterthought and featured less prominently at barbecues. The most common items on the menu included beef, pork, and poultry. When vegetables were included, they were usually grilled as side dishes, with meat remaining the centrepiece of the barbecue. Cooking meat on the barbecue was seen as a skill and a source of pride, requiring careful temperature control and mastery of a fuel source that is less predictable than a kitchen stove.

## **Preparations**

In most households, the men usually took on the role of pitmaster, while women typically prepared salads and side dishes. Participants reported spending anywhere from 30 minutes to 2 hours on preparation, considering it one of the most important aspects of the barbecue.

## **Barbecue interaction**

In terms of barbecue practices, most men barbecued between three and ten times per season, with four participants using the barbecue as an extension of their kitchen. One participant noted, “The meat or fish tastes much better with the smoky flavour it gets from the barbecue.” Another participant remarked, “A barbecue without brisket cannot be called a barbecue,” highlighting the importance of meat in the barbecue experience, especially since a brisket often takes around seven hours to grill. Many described barbecuing as a skill or craft: “The coals have to be at the right temperature, and you need to know how to prepare the meat for the barbecue.”

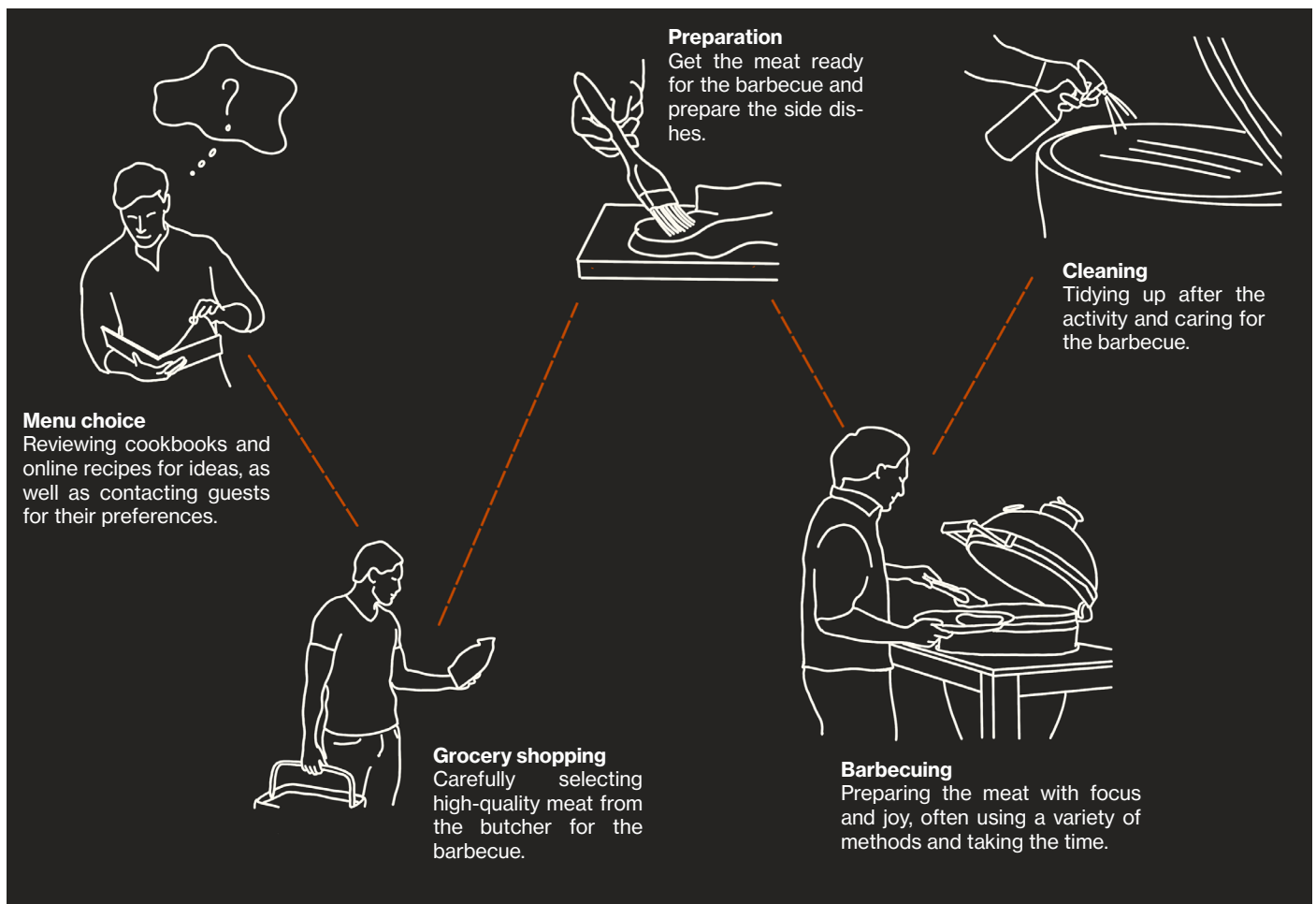
The participants’ barbecue experiences varied, but most claimed to have an average skill level. The most common grilling techniques included direct grilling, baking, and indirect cooking. Barbecues were usually held in gardens, partly due to the size and nature of the equipment. Most men owned a kamado-style barbecue, with the Green Egg being the most popular brand among participants. The men viewed barbecuing as a typical summer tradition and a social activity shared with friends.

## Motivations and barriers

Taste is the most significant factor driving the choice of meat for barbecues. Many people enjoy the flavour and feel that a barbecue is incomplete without meat, which contributes to the decision-making process. Meat has traditionally been considered an essential element of barbecues, often described as a “meat feast.” Additionally, barbecuers tend to choose meat because it is familiar and easier to prepare. Many also find meat more visually appealing than vegetables. Furthermore, meat is often associated with special occasions and carries a sense of luxury.

While environmental concerns, health benefits, and animal cruelty were mentioned as reasons to reduce meat consumption, health benefits were cited as the most important factor. Some individuals have already started to cut back on their meat intake during the week, but this reduction is not reflected during barbecues. When asked how to decrease meat consumption at barbecues, many respondents suggested that introducing more appealing recipes could encourage them to change their menus.

These insights can inspire potential interventions in the design phase to influence dietary behaviour. Emphasising the tradition of barbecuing, the skills needed to enhance vegetable dishes, and the pride that comes from presenting an appealing dish could be effective strategies.



## COM-B model

From the interviews, a brief overview of behaviour can be illustrated using the COM-B model, which describes behaviour in terms of capabilities, opportunities, and motivations. This model helps explain the underlying thoughts behind the behaviour by identifying drivers and barriers.

In this context, the observed behaviour is that men continue to eat meat for various reasons, primarily taste, habit, convenience, and visual appeal. The barbecue is a setting where meat plays a significant role in social interactions. To address environmental and health concerns, it is necessary to reduce meat consumption. Therefore, the target behaviour is to increase the consumption of vegetable-based dishes instead of animal-based ones.

Examining capabilities and opportunities, the interviewed men possess the skills and knowledge to grill meat and have the necessary tools for it. However, they find grilling vegetables less appealing. This reluctance is partly due to the belief that they lack the knowledge needed to cook vegetables and that trying new recipes feels daunting. Since they do not know where to start, they often do not attempt to cook vegetables. Grilling meat is perceived as easy, while preparing vegetables seems like a significant effort.

Additionally, the barbecue is a social setting, and the men often feel unsupported by their family and friends when considering a more plant-based menu.

Regarding motivations, the habit of preparing and eating meat at barbecues is deeply rooted in culture, where meat consumption is seen as normal behaviour. Furthermore, the taste of meat is often enjoyed, while vegetables are typically viewed only as a necessary source of vitamins. Finding ways to enhance vegetable dishes so that their taste exceeds expectations could help change this behaviour.

These insights can inform potential interventions in the design phase to influence dietary behaviour. Strategies that emphasise the tradition of barbecuing, enhance the skills needed to prepare vegetable dishes, and highlight the pride that comes from presenting appealing meals could be effective.

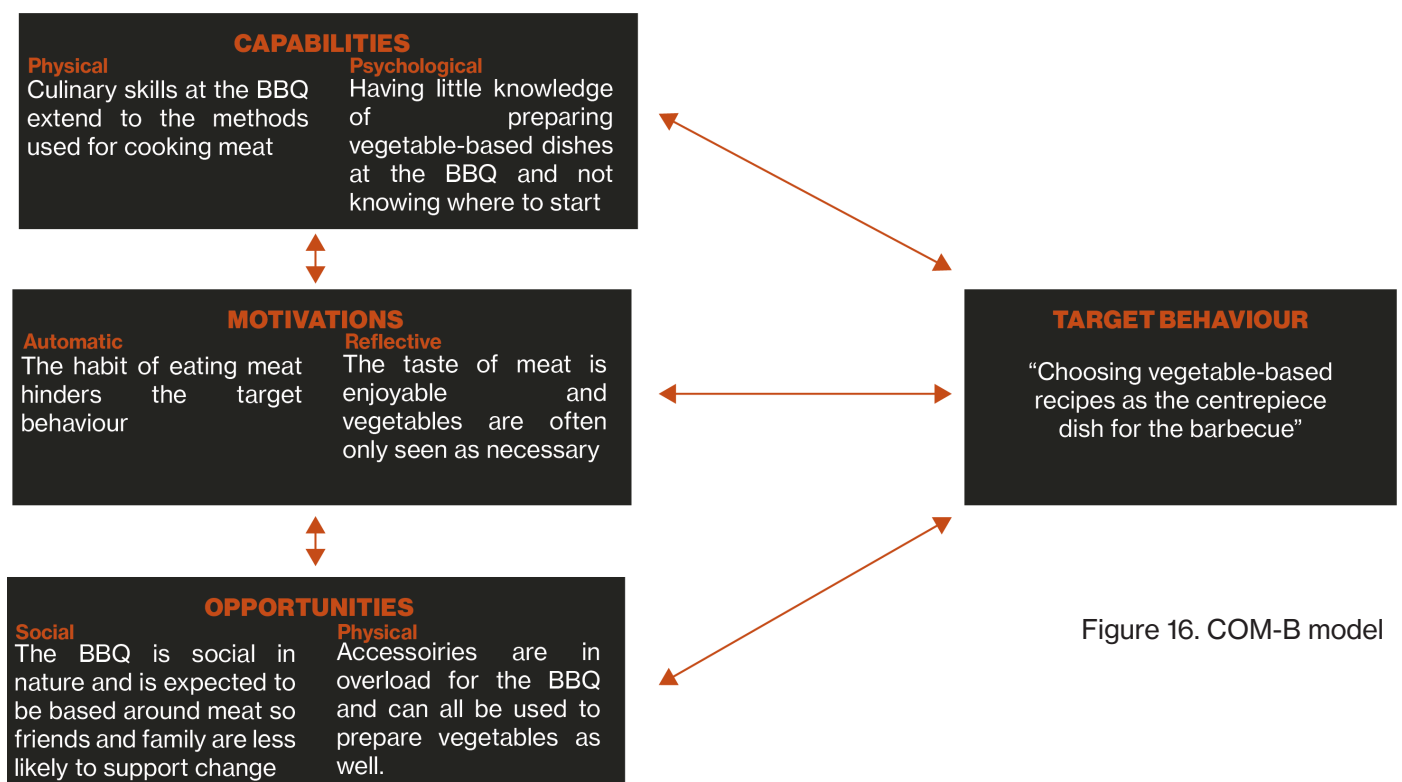


Figure 16. COM-B model

## 2.5 Food trends

The food industry is experiencing significant changes due to technological advancements, evolving consumer preferences, and increasing regulatory constraints. The entire food supply chain, from production to consumption, is being redesigned to enhance sustainability, efficiency, and safety. Several key trends are shaping today's food system and consumer behaviour, driven by ethical, environmental, health, and convenience considerations (Alam et al., 2025). These trends can influence product design to better align with consumer preferences.

### **Plant-Based Diets and Meat Alternatives**

Ethical, environmental, and health concerns are driving the shift toward plant-based diets. As a result, the market for meat substitutes is expanding rapidly, offering consumers more options to reduce their consumption of animal products without sacrificing taste or nutrition. (Alam et al., 2025)

### **Personalised Nutrition and Technology**

Personalised nutrition is gaining popularity, supported by wearable technology and mobile apps that track dietary intake and physical activity, providing tailored guidance. There is also a growing awareness of food allergies and intolerances, increasing the demand for "free-from" products that cater to individual dietary needs. (Alam et al., 2025)

### **Diet and Mental Health**

Consumers are increasingly recognising the links between diet and mental health. Many are seeking foods that can positively impact mood, cognitive function, and overall well-being. (Alam et al., 2025)

### **Sustainable Farming Practices**

Sustainable farming is becoming increasingly important as both consumers and producers strive to reduce environmental impact. Practices that prioritise animal welfare, minimise greenhouse gas emissions, and protect natural resources are gaining traction within the food industry. (Alam et al., 2025)

### **Food Waste Reduction**

Food waste remains a significant challenge in households and restaurants, often stemming from over-purchasing, poor meal planning, and large portion sizes. Educating consumers on meal planning, proper food storage, portion control, and utilising leftovers is essential to reducing waste and improving efficiency. (Alam et al., 2025)

### **Transparency and Traceability**

Consumers are demanding greater transparency in food production and sourcing. They want to know where their food comes from, how it is produced, and under what conditions. Clear labelling and traceability are becoming key expectations in the market. (Alam et al., 2025)

### **Convenience and Quality**

Convenience continues to be a major consideration for consumers, but not at the expense of quality. There is a growing demand for convenient food options that are nutritious, high-quality, and easy to prepare. (Alam et al., 2025)



## 02 KEY INSIGHTS

When it comes to cooking, many people are hesitant to break their routines. The food system is an interactive and global network influenced by both retailers and consumers. The planet cannot accommodate the growing demand for meat consumption; therefore, a dietary change is necessary, not only for the environment but also for people's health. This "protein transition" can occur at different levels, from significant dietary shifts to smaller adjustments in dishes, ingredients, and bites. Transitioning from a meat-based diet is a considerable challenge, but changing a dish or an ingredient is generally more acceptable.

Many alternatives have emerged to help people reduce their meat intake, such as meat substitutes, cultured meat, and the normalisation of eating insects. However, men often express disappointment with the taste of these options or struggle to envision making the change. A transformation could occur if vegetables were elevated in both image and flavour. By focusing on creating umami-rich dishes through specific ingredient pairings or techniques like fermentation, vegetables can become much more appealing.

Food consumption routines are often social, and barbecues tend to be male-dominated, which is why this interaction is essential to address. The essence of a barbecue involves cooking with fire and connecting with nature. In Western culture, meat has traditionally been the centrepiece of barbecues. In the Netherlands, barbecues used to feature a variety of meats, but the influence of American barbecue culture has shifted most gatherings toward choosing one large piece of meat. This focus creates a masculine dish that the chef is proud to present. Barbecuing is regarded as a craft in which patience, passion, and balance are crucial. It serves as a tradition that allows people to slow down and connect.

While amateur chefs often avoid experimenting at the barbecue, some professionals embrace this opportunity. The rise of the kamado barbecue has introduced many possibilities for trying new methods and foods, as it offers better fire control due to its materials. Most barbecue recipes are found online or in cookbooks, but those dedicated to barbecuing often focus exclusively on meat and present a tough, rugged aesthetic. Conversely, vegetarian cookbooks are typically less visually appealing, with more white space. This disparity makes it challenging for cooks to consider vegetables as the main course for the barbecue.

Men may know how to grill meat, but often lack guidance on how to begin cooking vegetables. The focus should be on their existing knowledge while teaching them how to incorporate vegetables into their barbecuing repertoire, all while keeping convenience, quality, expertise, and tradition in mind.



# 03 Define

In this chapter, the research conducted during the “discover” phase will be translated into an inspiring direction for the design phase. First, a design goal will be articulated to convey the project’s vision. Next, an analogy for the interaction vision will be identified to inspire the emotional response that the design should evoke. Finally, the design directions will be outlined. These directions represent opportunities to engage with the design and establish a clear path forward.

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# 3.1 Design goal

The design goal outlines the objectives in the context of barbecuing. It specifies the desired effect to be achieved through the design and serves as both inspiration and a clear vision for the design phase.

*“My design goal is to provide male omnivores (aged 25-35) with the tools to prepare vegetable dishes as the centrepiece of the barbecue while still maintaining a sense of tradition, pride, and skill while cooking.”*

## **Male Omnivores**

The target group for this project consists of male omnivores between the ages of 25 and 35 who primarily barbecue meat. This demographic is chosen because, while they possess the knowledge and basic skills needed to prepare meat, they often lack the same expertise for preparing vegetables on the barbecue. The chosen age group is significant because they often experience major life changes, which encourages them to re-evaluate their decisions. They tend to be flexible and open to change in their lives. Additionally, these individuals will have an influence on their children in the future and often impact their parents' lives as well. (Goss et al., 2025)

## **Centrepiece**

The centrepiece is the most prominent dish at the barbecue, where significant time and effort are invested in its preparation, leading to high anticipation. In this case, the goal is to make a vegetable dish the highlight of the barbecue.

## **Tradition**

Through analysis of interviews, the significance of the tradition surrounding barbecuing emerged as an important theme. Barbecues are social gatherings that occur most in the summertime, often centred around a menu rooted in tradition, which usually features meat as the main attraction.

## **Pride**

Men traditionally have less presence in the kitchen, but they take charge when it comes to barbecuing, working with the fire. The pride they feel when cooking the perfect steak or a low-and-slow brisket should be retained even when they are preparing vegetable-based dishes.

## **Skill**

The mastery of using fire and barbecue techniques to create a dish is a key aspect of the barbecue experience for men. The skills they apply to cooking meat should also extend to vegetable preparations, allowing them to maintain a sense of skill and accomplishment.

## 3.2 Interaction vision

The interaction vision serves as guidance for how the design should feel, defining the character of the interaction. It acts as an anchor point in the design process, making the intended feeling more concrete and assigning specific qualities to it.

Based on insights from Chapter 2, particularly the interviews, barbecuing is perceived as a craft and a learning process involving cooking with fire. The menu primarily focuses on meat and builds on previous choices. The goal of this design is to encourage the creation of new dishes while maintaining the essence of a barbecue experience.

To illustrate this design goal, consider the analogy: “It should feel like following a pottery course.” Imagine you want to try a new creative hobby, and pottery seems appealing, but you’re unsure where to begin. After some research, you discover a multi-week course and invite a friend to join you. Along with six other participants, you start the course. Initially, the instructor explains the basics, and you begin creating your own cup.

Although it may not look perfect, you take pride in having made something yourself. You can share it with those around you, and after firing, you can take your piece home and use it as you wish. With each subsequent session, you become more confident and tackle more complex projects. You might make mistakes, but you learn to correct them or improve in the future.

This analogy highlights the curiosity, creativity, and trial-and-error aspects. There’s no required knowledge; you gain skills during the course and discover how to improve at the activity. The experience is designed to be enjoyable, allowing room for mistakes. While pottery is an individual activity, it often takes place in a social environment where everyone focuses on creating something they can be proud of.

The qualities linked to this vision include skill development, discovery, creativity, and pride. These serve as criteria that the design should meet.



Figure 17. Picture of a pottery course (Class Bento, z.d.)

## 3.3 Design directions

Male omnivores often adhere to traditional barbecue practices, primarily focusing on grilling large cuts of meat. However, the introduction of kamado barbecues expands the range of culinary possibilities on the grill. Despite this, many male users continue to select big pieces of meat. While there has been a variety of meats on the grill in the past, there is now a noticeable trend towards a single, large cut of meat. Meat holds a certain status and is typically purchased from the butcher, whereas vegetables are often viewed as less important and associated with femininity. This perception presents an opportunity for design innovations that encourage men to incorporate more vegetables into their barbecue menus.

A few design directions could be explored to influence behaviour before barbecuing. One approach could enhance menu planning or inspire choices during grocery shopping. The design should focus on presentation, as people tend to eat with their eyes; if vegetables do not appear appealing, individuals are less likely to want to taste them. Additionally, the design should promote positive flavour experiences, so that if a vegetable dish is enjoyable, individuals will be more inclined to try it again in the future.

### **Status of Vegetables**

Vegetables often take a back seat in barbecue menus. Common options like bell peppers, eggplants, zucchinis, and mushrooms are typically grilled and simply placed on a plate, while corn is often wrapped in aluminium foil and considered merely a side dish. However, vegetables can offer much more; using the right recipes and selecting the appropriate varieties can elevate their presence on the grill. Additionally, the way vegetables are presented in stores can help emphasise their importance.

### **Visual Appeal of Vegetables**

Some vegetables may appear complicated to prepare or may not seem approachable. Altering the presentation of vegetables could encourage their use on the barbecue by cutting them in ways similar to how meat is presented or by focusing on their packaging.

### **Knowledge of Cooking**

Men's knowledge of barbecuing is predominantly centred around meat. They excel at marinating, grilling techniques, and allowing meat to rest. This expertise could likely be applied to vegetables as well, but fear of venturing into unfamiliar territory holds them back. A little encouragement could help bridge that gap.

### **Convenience**

For many male barbecuers, vegetables represent unknown territory, making it daunting to choose and experiment with them. Even when searching for vegetable barbecue dishes, the results often highlight simple grilled vegetables or recipes that treat vegetables merely as side dishes. There is a clear opportunity to make vegetables more accessible and less intimidating for men in a convenient manner.



## 03 KEY INSIGHTS

The research has been translated into a design goal: “My design goal is to provide male omnivores aged 25-35 with the tools to prepare vegetable dishes as the centrepiece of the barbecue while still maintaining a sense of tradition, pride, and skill in cooking.” This approach emphasises what is possible with vegetables rather than being restricted by them.

For further inspiration, the analogy of the interaction vision is likened to a pottery course, where the focus is on discovery, creativity, skill development, and pride. Participants improve with each attempt, even if they don't feel completely satisfied with the final product. There is always room for improvement in their next effort.

Additionally, design directions have been created to elevate the status of vegetables, enhance their visual appeal, improve cooking knowledge, and provide convenient access to good recipes. This will serve as the starting point for the next chapter.



# 04 Develop

In this phase, the creative process begins. Initially, ideas will be generated through brainstorming, producing a variety of concepts. These ideas will be evaluated, leading to the development of several potential concepts. From these, one final concept will be selected for further work in the delivery phase. To support the research, four chefs have been contacted to discuss vegetables, cooking methods, and recipes. Three recipes will be developed in detail, with one chosen as the foundation for the final design.

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# 4.1 Initial ideas

To initiate the ideation phase, a broad brainstorming session was conducted that included techniques such as brainwriting, how-to questions, and flower associations. The ideas generated during this session were grounded in the insights gained from the previous chapters. While some ideas are related to common themes, they vary in form. During the ideation process, some questions remained unclear. To help address these questions, four chefs were contacted for interviews. Afterwards, the initial ideas were evaluated through the design goal and the qualities of the interaction vision, and six concepts were selected.



Figure 18. Ideation ideas

## 4.2 Expert interviews

After a decision was made regarding the physical form of the final concept and the general topics to focus on, several questions arose that complicated the decision-making process. Interviewing four chefs provided insights that could assist in making these choices. In total, four chefs were interviewed. These interviews took place over online meetings. The participants were recruited through personal contacts. The chefs have different expertise: two work in the BBQ catering industry and possess extensive knowledge of cooking meat and crafting a complete menu. One specialises in BBQ fish and aims to inspire people to make more sustainable choices when consuming meat and fish. The last chef has experience as a butcher and in a Michelin-starred restaurant, but later transitioned to working as a teaching chef at a cooking school.

Firstly, BBQ cooking is unique because it involves using real fire. Cooking with fire teaches you fascinating techniques, and a BBQ offers various temperatures, zones, and cooking methods, providing a lot of variety. The experience of cooking with fire connects you to nature, returning to the basics while still offering endless possibilities. It creates a sense of authenticity, involving just you, the fire, and the ingredients. Experimenting with different methods to achieve the best results is part of the joy of grilling outside.

When it comes to cooking meat on the BBQ, the opinions among the chefs vary. The two catering chefs expressed that cooking meat was their passion. When asked about grilling vegetables and designing a menu around them, both acknowledged their greater expertise in meat. In contrast, the other two chefs were enthusiastic about the potential of vegetable dishes. One shared that he used to choose the meat first and then plan the dish around it, but now he approaches it oppositely. The other chef felt that a true cook understands how to work with vegetables. He observed that while meat is easy to

prepare, creating a well-rounded dish with a vegetable as the star is much more challenging. He noted it is unfortunate that meat holds such cultural significance, leading many people to default to it without experimenting with vegetables.

In fine dining, creativity with vegetables is encouraged. Innovating and understanding what people can eat enhances the cooking experience. The chef who now teaches discussed the “Dutch cuisine” movement, which reflects the evolving eating culture in the Netherlands. This new approach emphasises health and sustainability and is characterised by the 80/20 rule: 80% plant-based protein and 20% animal-based protein. He suggested treating vegetables with the same methods used for meat to achieve exceptional flavours. One of the other chefs also mentioned the art of sometimes omitting ingredients from the dish and not thinking too much about the flavours, just experiencing it.

The choice of vegetables is crucial regarding quality and origin. Vegetables should be selected with the same care that people typically use when choosing meat, preferably from speciality stores. For BBQ, vegetables that are firm and have a good texture are most interesting. Exploring the variety of what each vegetable can offer and experimenting with different approaches is encouraged. The chefs recommended a range of vegetables, including various types of cabbage, carrots, beans, cauliflower, beets, and celeriac root. Interestingly, they also suggested watermelon as a surprising addition.



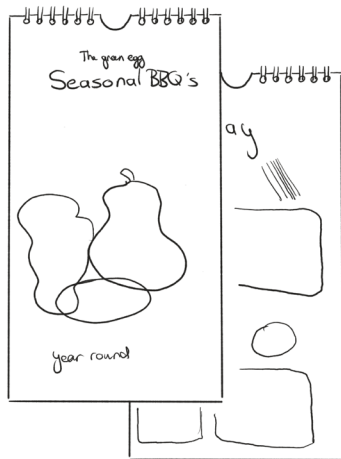
Figure 19. The principles of dutch cuisine

# 4.3 Concepts

After completing the ideation phase, six ideas were selected for further development into preliminary concepts. These concepts emphasise key elements such as pride, craftsmanship, skills, and status, while also focusing on acquiring knowledge about vegetable grilling. The introduction of new dishes was a primary consideration in the early stages of concept development.

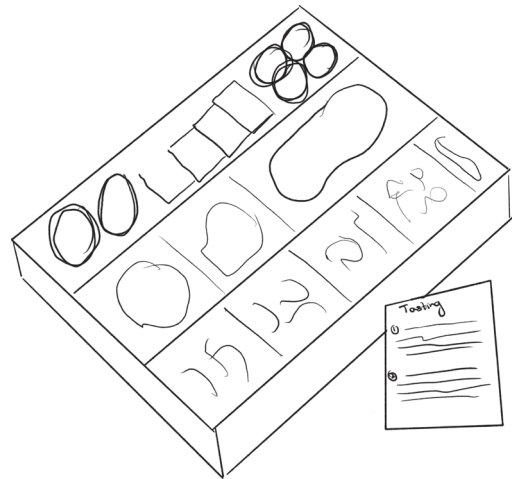
### The calendar

This concept involves creating a calendar in collaboration with a kamado brand, focusing on seasonal vegetables for grilling throughout the year. It targets individuals who view their barbecue as an extension of their kitchen, encouraging them to explore vegetable dishes on the grill. The calendar will feature several recipes linked to the highlighted vegetables.



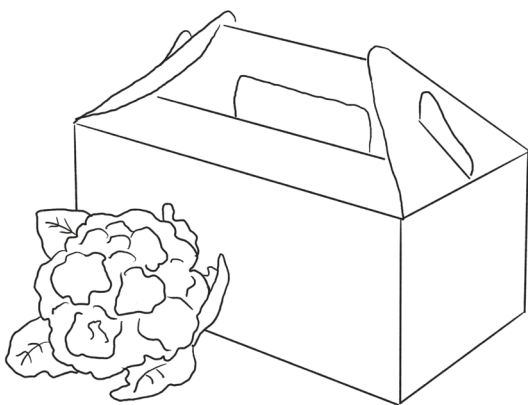
### The barbecue tasting

The tasting experience is inspired by a wine tasting or a cheese platter for dessert. A chef will prepare several dishes, and the home cook will only need to follow a few simple steps to finish the dishes. The concept is that when people enjoy a dish, they are more likely to recreate it themselves. Since cooking and pairing ingredients is somewhat of a science, an explanation of the combinations will be provided, along with the origins of the ingredients and recommended optional pairings to try at different times.



### The barbecue box

The box will present a recipe along with the necessary ingredients. The emphasis is on making recipes more accessible, with a focus on highlighting vegetables as the star of the dish. This recipe will serve as the centerpiece of the barbecue, around which other menu items can be planned. The explanation of the recipe is straightforward, and it can vary in terms of preparation and cooking time.



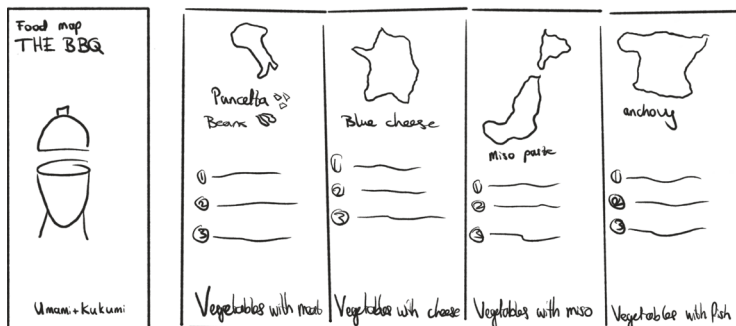
### The barbecue market

The market highlights the potential of vegetables at barbecues. It will feature stalls where chefs prepare and taste barbecue dishes made with vegetables. There will also be stalls where brands display their barbecues and accessories. Various techniques will be introduced to improve the appearance of vegetables. While the original concept is intended for the market, it can also take the form of a pop-up shop or an event held at various cooking stores.



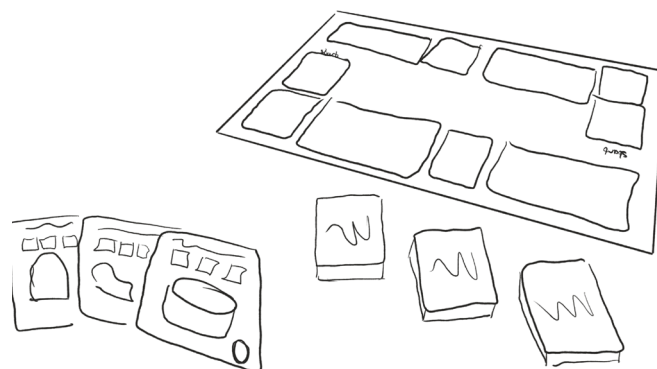
### Discover umami and kokumi

This concept introduces the user to the flavours of umami and kokumi through the use of vegetables. Typically, vegetables do not possess these tastes, but with specific pairings, their flavours can be enhanced and explored. This exploration should focus on several ingredients from the taste rack connected to the country of origin. To facilitate this exploration, a visual “map” will be provided, as most people find it helpful to have a guide when trying new flavours.



### The pairing game

Games are an informal and enjoyable way to learn something new. A game serves as a social interaction in which family and friends can participate. It focuses on introducing new methods, ingredients, and recipes while explaining interesting and complementary pairings. This can take the form of a card game or a board game. The game should include a competitive element, such as having players act as barbecue chefs who create different dishes to be served to a jury. Each dish will earn pairing points, and players can exchange cards to create the perfect dish.



## The chosen concept

The evaluation of these concepts was based on the research presented in Chapter 2 and the insights of the chefs. Considering factors of the food trends such as convenience and quality, the encouragement of dietary variety in plant-based dishes, and the hands-on experience of cooking with heat and smoke, the most promising concept identified is the barbecue box. This concept combines elements from other ideas while prioritising the ease of accessing recipes without compromising the need for cooking skills. It offers personalisation, yet the original recipes remain delicious.

Incorporating lesser-known vegetables for barbecuing can also promote a sense of pride by encouraging the use of unique ingredients. Since these vegetables are not widely associated with traditional grilling, they may initially seem less appealing when simply grilled, but the vegetables recommended by the chefs will have a tough look and feel and are firm and have an interesting texture.

Meal boxes are designed to reduce the stress associated with searching for recipes and purchasing ingredients, thus lowering the mental load involved in meal preparation. Nevertheless, the final design will also integrate aspects from other concepts. Including specific ingredient pairings and a focus on seasonal produce will further enhance the overall concept.

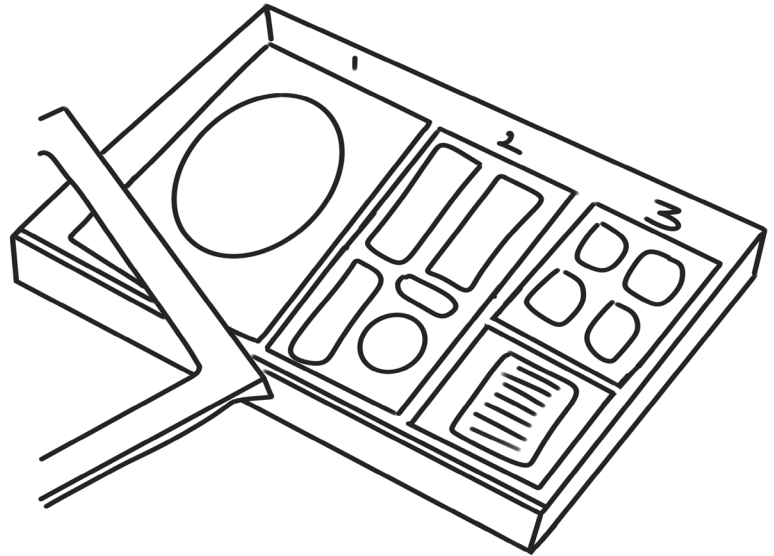


Figure 20. Food box in an abstract way

## Roasted Celeriac.

1 celery root  
4 tbsp olive oil  
2 tsp salt  
Pepper  
4 bay leaves

MARINADE  
3 cloves of garlic  
50 ml soy sauce  
50 ml white wine  
1tbsp agave sirup

FRYING  
50ml olive oil  
4 springs of thyme  
2 cloves of garlic  
1 tbsp butter

Heat the BBQ to 200 degrees.

1. Peel the celeriac and cut into four. Cut a piece from the celeriac so the pieces can lay with the big side facing you.

2. Marinade them in olive oil, salt and pepper.

3. Wrap them in aluminium foil and put on the grill for 20 minutes.

4. Blend the ingredients for the marinade.

5. Take the celeriac out of the grill and unwrap them.

6. Score the celeriac in a grid.

7. Put a bay leaf under them and brush them with the marinade.

8. Place them back on the grill.

9. Every 5 minutes brush them with the marinade. After 40 minutes they are done.

10. Take a cast iron pan and fry the celeriac in the butter, olive oil, garlic and thyme for 5 minutes.

Figure 21. Recipe that could be used

## 4.4 Recipe directions

The chefs mentioned in Chapter 4.2 shared some recipes to help explore the versatility of vegetables. These vegetables have a unique bite and interesting textures, making them excellent choices for the barbecue. When paired with an ingredient from the umami flavour profile and grilled using techniques typically reserved for meat, these vegetables become even more appealing. The vegetables highlighted include beets in a salt crust, celeriac root, cabbage, watermelon, eggplant, cauliflower, and broad beans. Among these, a closer look at celeriac, cauliflower and watermelon will be done due to their unique bite and texture and the chef's enthusiasm for them. Moreover, all vegetables represent different seasons. All recipes focus on preparing the vegetables either whole or in large pieces.

### **Celeriac root**

This vegetable, a staple of autumn and winter, belongs to the root vegetable family. To prepare it for the recipe, peel the vegetable and cut it into four pieces, then score the surfaces and marinate. Preheat the barbecue to 200 degrees Celsius.

The recipe consists of three main steps. In the first step, prepare a basic marinade using olive oil, salt, and pepper. After grilling the vegetable pieces indirectly for 20 minutes, you'll move on to the second marinade. This second marinade combines garlic, soy sauce, white wine, and agave syrup, which will enhance the vegetables' flavour. Apply this marinade every 5 minutes for a total grilling time of 40 minutes.

Overall, the recipe takes about one and a half hours to complete and requires close attention while grilling. To finish, lightly fry the pieces in a cast-iron pan with butter, thyme, and garlic for added flavour.

### **Cauliflower**

This vegetable is at its best during the spring months. For this recipe, preheat the barbecue to 180 degrees. The cauliflower takes about 40 minutes to cook and requires attentive grilling. Start by removing the leaves from the cauliflower and trimming the stem. Next, prepare the marinade, which consists of turmeric, red chilli flakes, cumin, coriander, garlic, and salt mixed with olive oil. Brush the marinade evenly over the cauliflower, repeating this every 10 minutes. The cauliflower should be grilled indirectly in a cast-iron tray. When it's done, it will be crispy on the outside and tender on the inside. The chef recommends serving the cauliflower with a yoghurt sauce made from coriander, garlic, red pepper, lime zest, and a pinch of salt.

### **Watermelon**

This recipe requires a bit more time and preparation, but it focuses on a typical summer fruit that is transformed in both taste and texture through brining and roasting. The process consists of three main steps for the best results.

First, peel the watermelon and brine it by mixing water, sea salt, oregano, and coriander. Let the watermelon rest in the brine for 24 hours in a cool place.

Next, prepare a rub using mild paprika, smoked paprika, coriander, onion powder, chilli powder, oregano, and garlic powder. Preheat your barbecue to 135 degrees Celsius. Grill the watermelon for about 8 hours. This lower temperature, combined with the extended grilling time, makes it part of the low-and-slow cooking method.

Once the watermelon is cooked, cut a grid pattern into its surface. For the final step, fry the watermelon in a cast-iron pan with olive oil, thyme, rosemary, and garlic. It can be served in slices, and for added flavour, you can include some burrata cheese.

## Testing the recipes

The recipes were created by chefs, which adds to their credibility. However, to evaluate the clarity of the instructions and gather insights on how a 30-year-old omnivore perceived the recipe, as well as how satisfying both the process and the taste were, a small test was conducted. Since it was winter at the time, only the celeriac recipe was tested. One person, who is a close contact and enjoys cooking, was given the instructions and ingredients to follow the recipe. It's worth noting that he does not frequently barbecue; he engages in it more for social reasons than for culinary experiences.

While cooking the celeriac recipe, the participant was asked to think aloud, which provided better insight into his thoughts. He found the directions a bit unclear and would have preferred them to be simpler and more visual. Although he was familiar with the vegetable, he rarely cooked it, and when he did, it was typically in a soup. After cutting the celeriac, he felt uncertain about whether the cooking time would be sufficient for the size of the pieces.

He attempted to customise the recipe, adjusting the marinade to his taste by adding a bit more garlic and checking the balance of the other ingredients. The smell was pleasant, and the dish looked appealing. He did not like the long waiting period, especially since he was not barbecuing with others. He also wondered if other dishes could be prepared alongside it.

When tasting the dish, he found it enjoyable. He noted that the thicker pieces had less flavour, while the thinner ones were very good. Although he perceived the dish as a side, he struggled to articulate why. He mentioned, "It feels like I won't get all the necessary nutrition, or maybe it's because I normally eat a lot of meat." While the dish tasted good and was filling, it felt like something was missing. Towards the end of the conversation, he suggested that adding a barbecue sauce or something similar could enhance the dish or presenting the dish in a special way.



Testing one of the recipes



# 04 KEY INSIGHTS

This chapter begins with a broad ideation process that generated numerous ideas. Conversations with four chefs clarified that grilling techniques used for meat can easily be adapted for vegetables. Additionally, a movement known as Dutch cuisine was introduced, which follows the 80/20 rule concerning sustainability and health, and it could serve as inspiration.

After evaluating these concepts, six were explored in greater detail. Among these, the barbecue box was selected for further research, as it aims to reduce the mental load associated with choosing recipes that highlight vegetables. This concept focuses on convenience while encouraging men to engage in the cooking process and showcase their skills. Elements such as seasonal vegetables and exploring taste options from the other concepts were combined with this idea.

Several recipes were discussed and shared, with the celeriac root, cauliflower, and watermelon highlighted for further exploration.

In deciding which recipe to develop, the focus was on seasonal vegetables. The celeriac root was tested, and while the taste was pleasant, the experience of cooking would likely be more enjoyable in the company of others. However, the idea of it serving as a main course was not entirely convincing. Even though it was perceived as fulfilling, something essential felt lacking.



# 05 Deliver

This is the final chapter of the project, which will discuss the final design, including its physical form, qualities, recipe, and ingredients. The design consists of a food box intended for a dish featuring a vegetable as the main ingredient and centrepiece. It is designed for the average barbecuer who enjoys different cooking methods such as hot-and-fast or low-and-slow cooking on a kamado grill. In the end, the box will be tested with four men around the age of 30 to gather insights for further research and improvement of the design.



# 5.1 The final design

Based on the insights gathered from the chefs, the received recipes, and the testing of one of the recipes, the recipe box was further developed. This chapter will explain the final design and the decisions made during the process. The outcomes are discussed across various themes.

## The story

The recipe box is designed to make vegetables more appealing to men. The main idea is to elevate the status of vegetables by showcasing their potential on the barbecue. While men typically use familiar low-and-slow cooking techniques for meat, this focus on a different type of ingredient will bring both excitement and familiarity. The box targets men with average barbecue skills who have a solid understanding of cooking methods, but may lack experience in experimenting with vegetables.

The concept features a curated recipe box that simplifies the process of grilling vegetables. The goal is to make grilling vegetables something to take pride in, presenting it as a skilled activity. While meat often takes centre stage, this box aims to make vegetables the highlight of the barbecue, deserving of time and attention.

The focus of the box is on grilling large cuts or whole vegetables, which helps them feel less fragile. This approach manipulates the texture and taste, making them unrecognisable and enhancing their appeal.



Figure 22. The food box with its vegetables

## **Target group**

The food box is designed for 25- to 35-year-olds who are going through significant life changes. This age group often consists of individuals who have recently completed college or university and are starting their professional careers. With their first salary, they may pursue long-held desires, such as owning a kamado barbecue. Many in this demographic are also looking for housing and contemplating starting a family. These transitions present natural opportunities to reassess and modify dietary habits. Considering a healthier or more sustainable lifestyle becomes relevant, even in the context of barbecuing. The food box conveniently provides the necessary tools to facilitate these changes, including recipes that offer valuable knowledge and ingredients for first-time preparation.

While the box still targets men who enjoy cooking, the pride associated with cooking remains significant. These men will follow recipes while exploring various cooking methods on the barbecue. The recipes encourage them to experiment with vegetables, transforming their perception of these ingredients and opening up a new culinary world.

## **Seasonal veggies**

To promote sustainability and variety, the boxes will change with the seasons. While there are four seasons in nature, the harvest patterns of fruits and vegetables show that autumn and winter offer fewer options. Additionally, barbecues are more commonly associated with summer and are less frequent in winter. For this reason, we will have three seasonal offerings.

The first season, running from November to February, will feature cabbage and root vegetables. The second season, from March to June, will highlight peas, cauliflower, and asparagus. The final season, from June to October, will include a broader range of vegetables and fruits. In the first year, the featured vegetables and fruits will be celeriac, cauliflower, and watermelon.

## Jord Althuisen

The recipe box is presented by Jord Althuisen, a barbecue chef and the owner of the brand Smokey Goodness. He travels the world in search of the best recipes, which he documents in his cookbooks. Jord also owns the restaurant Black Smoke in Rotterdam, known for its excellent barbecue dishes. Smokey Goodness includes a store where customers can purchase barbecues, rubs, sauces, and flammables. This space is also utilised for barbecue workshops. Additionally, they offer catering services for various events, ranging from small, intimate gatherings to larger, busier occasions.

Barbecuing requires time and focus; only then can a dish truly shine. Jord does not promote meat indiscriminately but advocates for careful meat selection, providing recommendations on where to source quality options. This approach extends to vegetables, emphasising sourcing directly from farmers or integrating food forests – ecosystems where a variety of plants can thrive, and fresh ingredients can be gathered. By introducing the food boxes with Jord Althuisen, the credibility of the offering is enhanced; a well-known chef or brand can significantly influence consumer choices, fostering enough trust to encourage people to try new recipes, even if they are initially hesitant.

Typically, Jord Althuisen is depicted with large cuts of meat, projecting a tough image. However, he believes the barbecue community is increasingly embracing vegetables. To support this shift, he launched his own vegetable brand, Fiery Veggies. The goal of Fiery Veggies is to make meat-eaters envious of vegetarian dishes. This concept was first introduced at the Dutch festival Lowlands and continues to be part of the catering menu. The recipe box aims to introduce Fiery Veggies to home barbecuers, expanding awareness and appreciation for these flavorful vegetable options.



Figure 23. Jord Althuisen



Figure 24. Fiery Veggies at Lowlands

## Box Components

Each box contains the following items:

- Outside packaging
- Inside packaging
- Recipe
- Vegetable
- Rub or marinade
- Sauce

The ingredients included in the box are essential and often sufficient for creating the recipe, although you are encouraged to personalise it as you see fit. This serves as a delicious and inspiring starting point for enhancing vegetables.

### Outside packaging

The physical design of the box is both masculine and straightforward, drawing inspiration from the traditional look and feel of barbecues. This design aligns to provide nutritious meals for families, allowing men to take pride in what they grill.

The product packaging features a simple yet rugged exterior, inspired by barbecue elements such as coal and fire. The box is cubical and has open sides that enable customers to see the vegetables inside, helping them assess freshness.

The box consists of a sturdy bottom part that supports the vegetables and keeps everything together. The top part can be easily removed for convenient access during cooking. The exterior of the top side encourages customers to try the included recipes.

As the box is associated with the Jord Althuisen brand, there are distinct colours for different seasons, and the logo is prominently displayed.

The front of the box showcases the featured vegetable. It should grab the attention of the customer.

On the back of the box, there is a brief and inspiring text that clarifies the type of barbecue to use, the necessary gear, the cooking time, the number of servings and the ingredients that people are expected to have at home.



Figure 25. Outside packaging

## Inside packaging

When opening the box, the entire top can be removed, creating a long sheet that presents the instructions and the ingredients for the various steps. This design encourages easier interaction for the user while cooking.

The first section outlines the preparations necessary to begin the recipe and provides clear instructions. The layout is straightforward and descriptive, enhanced with visual elements that attract attention and make it easier to follow.

The second section lists the ingredients, explaining what each one is and which step of the recipe it corresponds to. The ingredients are prepackaged in different bags, similar to how people typically purchase their rubs.

## Recipe

A barbecue is typically not considered a venue for trying new recipes. However, this new design introduces a fresh recipe that supports the protein transition at barbecues. Although the recipe focuses on a specific dish, which may limit variety, it allows for a small change; it can initially be enjoyed as a partly substituted dish for meat, bringing the barbecue closer to a 50/50 protein balance. While this recipe can first be tested in the kitchen, preparing it on the barbecue enhances its flavour. By introducing this food box, the social aspect of barbecuing remains intact. Cooking still requires time and careful interaction with the vegetables, employing the same methods used for meat.

# DIRECTIONS

**01** CUT AND PEEL THE CELERIAC, THEN DIVIDE IT INTO FOUR EQUAL PIECES.

**02** MARINATE THE PIECES IN 60 ML OF OLIVE OIL, ALONG WITH 2 TEASPOONS OF SALT AND PEPPER TO TASTE.

**03** WRAP THE PIECES IN BUTCHER PAPER AND GRILL THEM INDIRECTLY FOR 20 MINUTES.

**04** ONCE GRILLED, LET THE CELERIAC REST AND COOL, THEN SCORE THE TOP IN A GRID PATTERN.

**05** PLACE A BAY LEAF UNDER EACH PIECE AND BRUSH THEM WITH THE ULTRA UMAMI MARINADE PROVIDED.

**06** RETURN THE CELERIAC TO THE BARBECUE FOR ANOTHER ROUND OF INDIRECT GRILLING FOR 40 MINUTES. BE SURE TO BRUSH THE PIECES WITH THE ULTRA UMAMI MARINADE EVERY 5 MINUTES.

**07** IN A CAST-IRON PAN, HEAT 50 ML OF OLIVE OIL ALONG WITH 1 TABLESPOON OF BUTTER, THYME, AND GARLIC. FRY THE CELERIAC IN THIS MIXTURE, ALLOWING THE PIECES TO BATHE IN THE SAUCE.

**ULTRA UMAMI MARINADE**  
50 ml soy sauce  
50 ml white wine  
1 tbsp agave syrup  
3 cloves of garlic

**ADDED FLAVOUR**  
4 bay leaves

**THYME SAUCE**  
2 cloves garlic  
4 sprigs of thyme

Figure 26. Inside packaging

## Vegetables

The food box features a larger fruit or vegetable each season, focusing on interesting textures or a firm bite. The taste is enhanced by skillfully manipulating the vegetable and carefully selecting spices. The autumn and winter recipes take between 1 and 2 hours to prepare, making it easier to try new dishes. This also aligns with the season, as barbecues become less about social interaction and more about enhancing the flavours of dinner, acting as an extension of the kitchen.

In summer, people tend to have more time to experiment with barbecuing, and the pleasant weather encourages them to spend longer outdoors. During this season, barbecues are often more social, as friends and family gather around the grill to enjoy each other's company. Consequently, summer recipes are usually more extensive and elaborate.

## Rub or Marinade

The rub or marinade focuses on spices that create a new experience for vegetables. The spices aim to add umami and sweet flavors, making the vegetables more enjoyable for people.

## Sauce

A sauce is often considered a key component of barbecue dishes. In this food box, a sauce is included. For the celeriac and watermelon, the sauce is incorporated by frying the fruit or vegetable in the mix as the final step. However, for the cauliflower, the spices for a yoghurt-based sauce are added instead.



Figure 27. Packaging spices

## Presentation in-store and online

The box is associated with the brand of Jord Althuisen, who owns a barbecue shop in Delft. In addition to selling products, he also offers workshops that attract people eager to learn and try new things. The plan is to display the box prominently in the store to catch the attention of both workshop participants and regular visitors, encouraging them to consider trying the box. The box's exterior is visually appealing, making it a great gift for enthusiastic barbecue lovers. Additionally, the boxes will be available for sale online. The online option aims to make the product more accessible to those who cannot visit the shop in Delft.



Figure 28. The box in-store

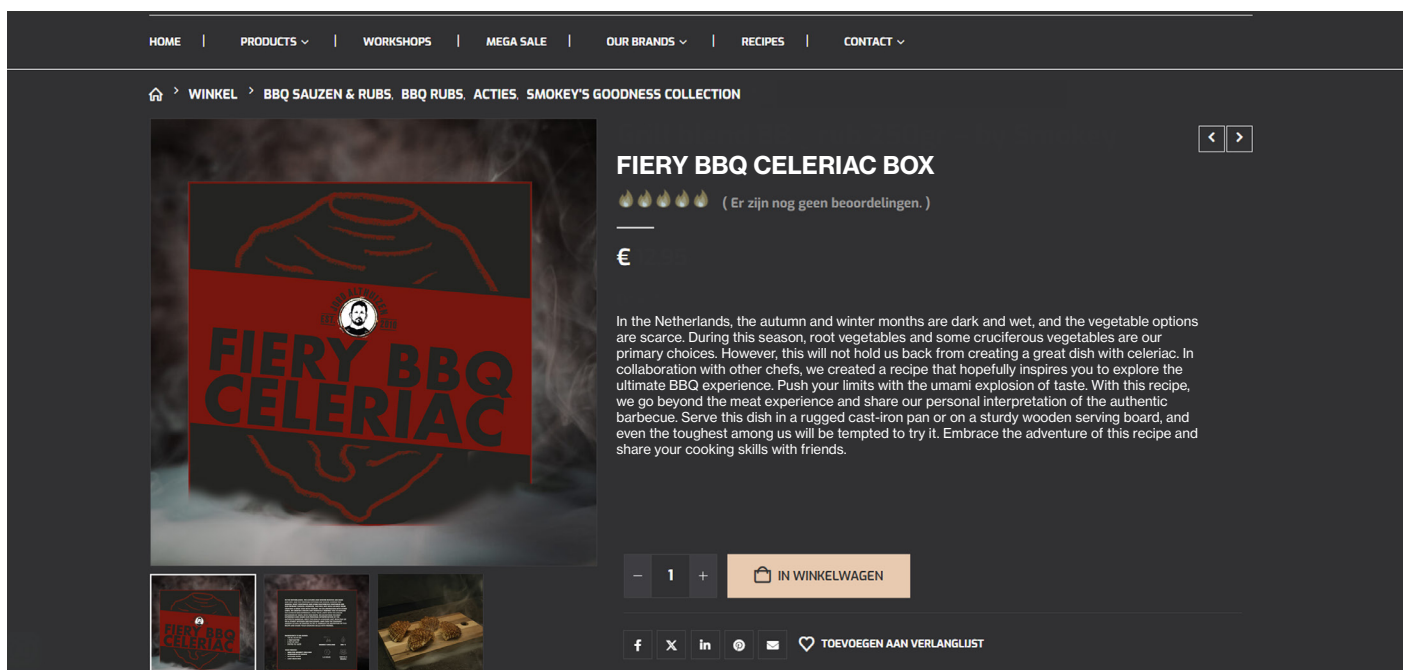


Figure 29. Online page



## 5.2 Evaluation

After finalising the design, a prototype was printed and tested with three participants recruited through personal contacts. The participants were aged 26, 29, and 48. Each participant was asked to follow the recipe and prepare the dish while thinking out loud. After cooking, the dish was tasted, and follow-up questions were asked.

Overall, the initial reactions to the dish were positive. Although the participants did not frequently prepare vegetables, they expressed interest in trying this box. If the dish tasted good, they would consider purchasing it again. However, they noted that the celeriac didn't look very inviting, despite their willingness to try it.

One issue highlighted was that the box was too large for the vegetables, making them seem out of proportion, which in turn made the recipe directions clumsy to use. A suggestion was made to consider an origami-style design so that the box could stand on its own.

Participants also raised a question about how to store the recipe afterwards, as the current design did not provide an effective solution. They suggested the possibility of an app connected to the box. Additionally, the material used for the box was described as bendable, giving it a cheap feel. One participant suggested incorporating a handle to facilitate transport.

One participant mentioned liking to have an instructional video for the recipe and noted that they missed having one available in this case. Another participant expressed a desire for more information about the overall mission, such as promoting more vegetable use during barbecues or highlighting the sensations and balance of the spices used in the dish.

Feedback on the instructions was generally positive, with participants finding them clear and easy to follow. However, one unclear aspect was how long the celeriac should cool. While the accompanying visuals were helpful, one participant mentioned that the second and last visuals were somewhat unclear and could be improved. Nevertheless, they appreciated the style of the visuals, commenting that it felt like someone's authentic notes while creating a recipe.

One participant suggested including a menu recommendation or ideas for complementary dishes, something to inspire users beyond what's included in the box.

When it came time to taste the dish, one participant expressed enthusiasm and stated they would definitely try the recipe again. Another participant mentioned that the cooking time should be extended since maintaining a temperature of 200 degrees in the Kamado grill was challenging when opening it every five minutes. They recommended grilling for a longer duration, allowing for more time in between brushing the marinade as well.



# 05 KEY INSIGHTS

This chapter highlights the final design and its evaluation. The final design is a food box that includes a recipe and ingredients. The goal is to inspire men to take pride in grilling vegetables. The recipes focus on larger vegetables with an interesting bite. The ingredients are pre-measured for each step. As a single recipe, it is a small change that is easier to adopt. The box is designed for men aged 25 to 35, as they often experience life changes that lead to a shift in lifestyle. The box is linked to the brand of Jord Althuisen, a Dutch pitmaster who explores different cultures through food. This line features his catering fiery veggies, aiming to make vegetables more desirable. It is available at Smokey Goodness, both in-store and online. The box can also serve as a gift for a real barbecue enthusiast.



# 06 Discussion

This chapter presents recommendations based on the testing of the recipe box. It focuses on potential opportunities for redesign or system development. Additionally, it highlights research that may be useful for future users and outlines the limitations encountered during the study. Following this, a conclusion summarizes the project, reflecting on the work accomplished. Finally, a personal reflection is provided, offering insights into the learning curve experienced throughout the project.



# 6.1 Recommendations

After testing, a few recommendations were considered.

First, Smokey Goodness offers an app that provides a variety of recipes. The box can be paired with this app, allowing consumers to easily access recipes again.

The second recommendation involves creating a system around the box to encourage buyers. This could include connecting it to a workshop or offering a loyalty card with prizes or discounts.

It is also important to evaluate the price of the box. It is needed to determine what customers believe it is worth and what the production costs are.

From a design perspective, it should be reexamine the materials used to make the box more durable. Additionally, it should be explored whether an origami-style design could enhance usability and make it easier to store.

## 6.2 Limitations

Several limitations should be acknowledged in this research. The tests were conducted with only three participants due to a cancellation, making the group unrepresentative of the overall target population. Individual differences are more pronounced in such a small group size.

Additionally, due to the time of year and the project's limited duration, not all recipes were tested. This means that the remaining recipes are presented solely based on the chefs' validation.

Finally, the study did not include long-term testing. As a result, the impact of the design cannot be assessed, and its implementation in subsequent barbecues remains unknown. Therefore, any real behavioural changes have not been measured.

## 6.3 Conclusion

This project aims to shift men's attitudes towards plant-based dishes at barbecues while preserving the fundamental values that barbecuing offers. Through our research, we discovered that focusing on a small change in the barbecue menu could be more engaging. The design goal was to provide male omnivores aged 25-35 with the tools to prepare vegetable dishes as the centrepiece of the barbecue, all while maintaining a sense of tradition, pride, and skill in cooking.

We concentrated on keeping the interaction the same while encouraging a more open attitude towards trying new recipes at the barbecue. This approach is intended to be a small, manageable change that can be incorporated throughout the year.

Our research involved desk studies on protein transition, context visits, qualitative interviews with consumers and experts, as well as iterative prototyping and testing. This process led to the development of the recipe box, which combines the aesthetic of barbecuing with convenience. The result is a must-try box that can also be gifted. By aligning the box with seasonal ingredients, we promote sustainability while offering a variety of recipes.

The kit is associated with chef Jord Althuisen to enhance credibility and raise awareness within the barbecue community. It is available both in-store and online for anyone interested in trying it.

By providing clear instructions and the necessary ingredients, we create an easier starting point for users. This low-risk option builds on the existing knowledge that grillers have from cooking meat, translating those methods to vegetable dishes while keeping the core techniques the same.

## 6.4 Personal reflection

The end of the graduation project has arrived, and it's essential to engage in some personal reflection. This project took place in a design context that was less familiar to me, focusing on the protein transition and barbecuing, topics that required considerable exploration.

Throughout the project, I experienced many ups and downs, largely influenced by my motivation and the clarity of my focus. Initially, I struggled to establish a clear direction due to the vast amount of interesting research. Often, this led me into niche topics, causing me to lose sight of the bigger picture. I needed to step back and reassess how each piece of research fit into the overall project. At times, certain studies felt unproductive, which was frustrating, but I learned to accept that not all efforts have immediate results.

Since this project was an individual assignment, I frequently felt uncertain about the quality of my work. However, discussing my ideas with others proved to be beneficial.

I often felt uncomfortable and lacked confidence in conducting quality research. Although I conducted interviews with barbecue experts, which were enlightening, I initially approached these conversations with the same apprehension. Yet, each interview left me with new ideas and renewed energy.

Exploring various solutions and thinking outside the box was my favourite aspect of this project. This freedom allowed me to truly discover the design possibilities.

Transitioning from concepts to a final design was particularly challenging for me. I found myself stuck on a vague idea of what the design should be, and making it concrete proved difficult. Eventually, I connected the graphics to the barbecue aesthetic, but even that connection felt inadequate. However, when I researched the brand of “smoky goodness,” the design process became much clearer.

I learned that seeking help is valuable, and I realised I don't have to tackle everything alone. Additionally, finding experts or participants can often be accomplished through networking.

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# Appendix A. Project brief



## Personal Project Brief – IDE Master Graduation Project

Name student Belle de Vos

Student number 5,099,234

### PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT

Complete all fields, keep information clear, specific and concise

Project title BBQ with a meatless diet

*Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.*

#### Introduction

*Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)*

In recent years, the number of self-proclaimed flexitarians in the Netherlands has been growing. However, overall meat consumption has not decreased significantly. This suggests that most consumers' "reduction efforts" are expressed more in terms of attitudes, awareness, and intentions rather than in actual dietary behaviour (Dagevos & Verbeke, 2022). Meaningful behavioural change is still needed, particularly given the negative effects of meat consumption on both human health and the environment. Livestock production contributes not only to greenhouse gas (GHG) emissions but also to water pollution, water scarcity, and a high water footprint (González et al., 2020). Research by Xu et al. (2021) shows that 57% of food-related GHG emissions come from animal-based products, compared to 29% from plant-based foods.

To support a shift toward more plant-based eating, the market has introduced an increasing number of meat substitutes designed to mimic the appearance, taste, and texture of meat. Yet, despite growing interest, actual consumption of these products remains relatively low. Dissatisfaction with taste, ingrained habits, concerns about processing, and negative health perceptions often prevent consumers from adopting them more regularly (Weinrich, 2018).

Habitual meat eaters who are open to reducing their meat intake often face a practical challenge: they do not know where to start when creating a satisfying meal without meat. Many feel uninspired or lack the confidence to experiment. Additionally, some believe that replacing meat compromises the authenticity of dishes and traditions. Nonetheless, when introduced to appealing meat-free meals, some respond positively and integrate them into their routines. Many consumers, particularly men, also take pride in their established methods of cooking meat, and may lose this sense of mastery when preparing unfamiliar dishes (Groen et al., 2025).

→ space available for images / figures on next page

## Personal Project Brief – IDE Master Graduation Project

### Problem Definition

*What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice.*

*(max 200 words)*

Although the number of self-proclaimed flexitarians in the Netherlands is increasing, actual meat consumption remains high. This gap between intention and behaviour presents an opportunity for an intervention that inspires and encourages consumers, particularly men, to create and integrate meatless dishes into their regular routines. Such an intervention should emphasise creativity, convenience, and confidence for the cook.

Social settings, such as barbecues, are moments where meat consumption peaks and plant-based alternatives are often underrepresented. Many men take pride in cooking and eating meat, viewing it as a masculine activity, and social pressure within groups can reinforce the choice to consume meat (Hillier, 2023).

The goal of this project is to encourage behaviour change and foster a positive shift in attitudes towards meatless meals at barbecues. Drawing inspiration from diverse cultures to craft authentic, meat-free dishes, the intervention will be based on research and designed to be appealing, practical, and desirable to consumers.

### Assignment

*This is the most important part of the project brief because it will give a clear direction of what you are heading for.*

*Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence)*

*As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:*

Design an intervention to encourage a meatless or meat-free diet for male habitual meat-eaters in an inspiring and accessible way during the BBQ.

*Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)*

At the beginning of the project, I will conduct a literature review on the behaviour of meat eaters. This will be followed by mapping the stakeholders and the market within this sector. Next, I plan to conduct my own research, which will include a questionnaire, interviews with meat-eaters and individuals who conduct BBQ workshops, and possibly some observations to analyse cooking methods. This will help scope and redefine the problem statement.

After that, I will start the ideation process. I will begin by generating ideas on my own, but I also intend to organise a co-creation workshop to broaden my perspective and gather diverse ideas. Once I evaluate which ideas show potential, I will develop low-fidelity prototypes for user testing. The results of the tests will help me create the final design.

## Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a **kick-off meeting, mid-term evaluation meeting, green light meeting and graduation ceremony**. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).

Make sure to attach the full plan to this project brief.  
The four key moment dates must be filled in below

Kick off meeting	24 sept 2025
Mid-term evaluation	25 nov 2025
Green light meeting	17 feb 2026
Graduation ceremony	17 mrt 2026

*In exceptional cases (part of) the Graduation Project may need to be scheduled part-time. Indicate here if such applies to your project*

Part of project scheduled part-time	<input type="checkbox"/>
For how many project weeks	<input type="text"/>
Number of project days per week	<input type="text"/>

Comments:

## Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five.  
(200 words max)

During my master's program, I have explored various topics within the curriculum, as well as through my elective courses. A common theme throughout my studies is my interest in human behaviour; how it can be influenced and how small changes can shift mindsets or actions. Although I have not yet explored this topic in the context of food design, I have personally observed shifts in attitudes toward reducing meat consumption or adopting meat-free diets. This has sparked my curiosity, as I believe that with the right tools, even the most resistant individuals can change their perspectives.

For this project, I aim to enhance my research skills, as this helps broaden my knowledge. I plan to conduct initial research to explore the subject in more depth and also to test how my ideas function in the context. The project will also serve as a test of my planning skills, as the project is open-ended and allows for flexibility in how to approach it.

