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Abstract

In academia and international politics, discourses on sustainable diet approaches are becoming increasingly prominent. The debates are based on perceived limitations of the global food system due to its contribution to climate change and high incidences of malnutrition and chronic diseases. The proposed goal to transform the global food system aims to change these dynamics, but in how far does it change or maintain inherent power relations? This master thesis analyzes how planetary health diet discourses are involved in negotiating global power relations in the food system. The method used was a discourse analysis. The study is based on the assumption that meaning is discursively constructed and manifests in power relations in the social world. The aim of this study was to broaden the current knowledge on transformative dynamics in the global food system. The findings of the discourse analysis indicate that the way the discourse is currently held on the international political and scientific level considers the effects of potential interventions on those already facing structural, political and economic inequalities. However, the discourse shows that there are also dynamics in the debate that produce trends which tend to reinforce current power relations. The debate on healthy and sustainable diets does not automatically contribute to a renegotiation of current power relations, rather it risks to amplify tendencies of health and climate change inequalities.

Keywords: *Planetary health diet*, *global power relations, global food system*, *political and scientific discourses*, *transformation;*

Diese Masterarbeit beschäftigt sich mit der diskursiven Aushandlung von Machtverhältnissen im globalen Ernährungssystem durch Debatten zu Konzepten einer nachhaltigen und gesunden Ernährungsweise. Der Diskurs findet zu einem großen Anteil auf wissenschaftlicher und politischer Ebene statt und beinhaltet oft den Anspruch, das globale Ernährungssystem zu transformieren. Diese Transformation soll dazu dienen, den Herausforderungen des 21. Jahrhunderts – Klimawandel, Einfluss von Ernährung auf den Anstieg chronischer Krankheiten, und strukturelle Ungleichheiten – zu begegnen. Diskurse haben eine machtvolle Wirkung und können dazu beitragen, aktuelle Machtverhältnisse aufrecht zu erhalten oder zu verändern. Die Analyse des Planetary Health Diet Diskurses soll Aufschluss darüber geben, wie und ob globale Machtverhältnisse im Ernährungssystem neu verhandelt werden. Die Analyseergebnisse deuten darauf hin, dass der aktuelle Diskurs auf politischer und wissenschaftlicher Ebene die Effekte potenzieller Eingriffe hinsichtlich der Auswirkungen auf strukturell, politisch oder ökonomisch benachteiligte Gruppen beachtet. Die Analyse zeigt jedoch auch Dynamiken der Aufrechterhaltung von Machtverhältnissen durch Planetary Health Diet Diskurse. Die Debatten tragen also nicht automatisch zu einer Neuverhandlung der Machtverhältnisse bei, sondern riskiert diese auch zu verstärken.

Stichwörter: *Nachhaltige Ernährung, Globale Machtverhältnisse im Ernährungssystem, politische und wissenschaftliche Diskurse, Transformation;*

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1. Introduction

> "Food systems have the potential to nurture human health and support environmental sustainability; however, they are currently threatening both." (Willett et al., 2019, p. 447).

It has become a common narrative among international authorities that the current food system is not fit-for-purpose for the challenges of the 21st century and, therefore, failing us (Swinburn, 2019, p. 1). Scientists explain this with the far-reaching negative effects the global food system has on the environment and human health. Indeed, in recent centuries a conglomerate of events have shaped not only the social, political and economic realities around the world but also the physical conditions of people and the planet. Transformations in food and agriculture took place through advances in technology, and living conditions for and diets of people around the world have been changing substantially. These changes created opportunities and threats to humanity. As Myers & Frumkin (2020, p. 3) state, "[b]y many metrics, there has never been a better time to be a human being". They refer to improvements in the management of infectious diseases through scientific advancements and vaccines, as well as to the global rise in life expectancy and the relatively low number of people living in extreme poverty compared to one hundred years ago (ibid). However, humans impacted the natural world substantially alongside all the achievements in nutrition, health and energy use. Vital environmental services and systems that humans have relied on for centuries have been altered (Whitmee et al., 2015, p. 1975 f). In recent years, interest in and research on the effects of human actions on the Earth's systems (i.e. biosphere, atmosphere, geosphere, hydrosphere) has been growing (Steffen et al., 2020).

Climate change has become a pressing and broadly examined issue on the agenda of various national and international authorities. The confrontation with the topic includes considerations of potential solutions to the unsustainability of the current food system, which causes food insecurity, malnutrition and agricultural production-related environmental degradation (Searchinger et al., 2019). Also, interest in concepts of food systems has been increasing as a result of growing awareness and concerns regarding its influence on the environment, health, equity, power and trade issues (Béné, Oosterveer, et al., 2019, p. 116). Experts from various backgrounds and disciplines argue that there is a need for a global transformation of food systems and people's diets. The call to action for a food system transformation is based on two complex and interrelated issues that societies around the world are facing: the burden of non-communicable diseases (NCDs) as well as environmental problems and climate change. On the

one hand, the concerns involved relate to unsustainable agricultural practices and the food system's impacts on climate change. On the other hand, the low-quality diets many people consume contribute to the growing disease burden of diet-related diseases – especially chronic ones such as diabetes, heart diseases and cancer (Willett et al., 2019, p. 447).

Rising numbers of mortality and morbidity due to non-communicable diseases reinforce health concerns. These diseases are – to a non-negligible extent – the result of lifestyle and nutrition-related conditions (Benziger et al., 2016, p. 395). However, lifestyle and food choices are not fully individual decisions. The global food system influences people's diet-related risks to disease. Dynamics in the modern food system causes more and more people globally to overconsume food, which increases the risks for chronic diseases. NCDs have long been associated with high-income countries[1]. However, today most low- and middle-income countries (LMICs) are equally or even more affected (Kankeu et al., 2013, p. 1). Among scientists and international politics, NCDs are now acknowledged as development issues worthy of discussion at, for example, high-level meetings of the United Nations (ibid).

Similarly, climate change is high on the agenda of international politics and, therefore, also food systems are a matter of concern. According to UN Environment, the global food systems "are responsible for 70 per cent of the water extracted from nature, cause 60 per cent of biodiversity loss, and generate up to a third of human greenhouse gas emissions." (UN Environment Programme, 2020). In science and in general, more and more people acknowledge that climate change has severe outcomes for people's health around the world (Watts et al., 2018, p. 581). It may also have detrimental effects on development. Climate change aggravates social, economic, and demographic inequalities. It can undermine the social and environmental determinants that promote health, for example, through exposure to increased and more frequent heatwaves and consequent crop failures. Climate change disproportionately affects the health of people in LMICs and vulnerable populations (i.e., among others, economically disadvantaged people, ethnic minorities, refugees and displaced people) (ibid).

Concerns regarding the global burden of NCDs and the increasing awareness of the human impact on the environment has led to debates in scientific and political circles on ways to transform the global food system. These actors are debating an ideal form of nutrition for the

[1] The World Bank classified countries by income level into four income groups: low, lower-middle, upper-middle and high. The list of countries in each group can be viewed online (see, for example, World Bank, 2019).

planet and human health, which should deliver healthy and nutritious foods for people globally while being environmentally sustainable in its production. Scientific research delivers the base for policy decisions on how to influence people's nutrition worldwide and achieve a global transformation of the food system (Willett et al., 2019; World Economic Forum, 2020). The aspirations to transform the food system are backed up by the Sustainable Development Goals (Fanzo, 2019) as well as by the Paris Agreement on Climate Change (Branca et al., 2019, p. 28). However, especially in politics and science, the need for a global dietary transition towards sustainable diets is widely, and sometimes controversially, discussed (Katz-Rosene, 2020, p. 6). The two described reasons, health issues and environmental problems, are the main aspects of the ambitious goal of transforming the global food system towards a planetary health diet.

The planetary health diet, in the following referred to as PHD, is a new approach that seeks to provide a reference diet for human health and a sustainable planet. The term was coined by the EAT-Lancet Commission in 2019 with their report on *Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems* (Willett et al., 2019). In this thesis, a broader understanding of planetary health diet is used. This means that, with the term planetary health diet, I do not only refer to the EAT-Lancet Commission's report. Concepts to create a sustainable diet have already existed before 2019. They have, for example, been referred to as sustainable diets. The broad understanding of the term, therefore, also includes discussions and understandings of sustainable diets before and independent of the EAT-Lancet Commission's quantitatively described 'universal healthy reference diet'[2]. However, I frequently refer to the EAT-Lancet reference diet in this thesis because the Commission's proposed scientific targets for achieving healthy diets often appear in the discourses on sustainable diets.

Leach et al. (2020, p. 2) outline that food is a political matter and, therefore, an important issue in development and on the agenda of international policy debates. The food system is a complex web of actors, with many power relations on political, economic and social spheres. The power relations in the food system, as well as food and agriculture themselves, transformed over thousands of years with an accelerated speed in the 20th and 21st century. Agriculture and food connect and contain issues such as production, reproduction, distribution, retailing, consuming,

[2] The EAT-Lancet Commission's healthy reference diet "consists of vegetables, fruits, whole grains, legumes, nuts, and unsaturated oils, includes a low to moderate amount of seafood and poultry, and includes no or a low quantity of red meat, processed meat, added sugar, refined grains, and starchy vegetables." (Willett et al., 2019: 447).

norms and traditions, culture, identities, bodily standards, health and the environment (Leach et al., 2020, p. 2). Therefore, attempts to change a system that manifests in so many spheres necessarily causes a renegotiation of the current system, including its inherent power relations.

Over the past centuries, transformation processes such as globalization, population growth, urbanization and a *supermarket revolution* (i.e. the shift from traditional shops and markets to modern retailing stores) (Reardon et al., 2012) have created and influenced the current global food system. Big food companies increased their power by forming oligopolies (Swinburn, 2019, p. 1), and a great number of food riots pointed out political grievances and effects of food price volatility (Bohstedt, 2016; Hossain, 2017). The food system and many of its inherent power relations evolved over thousands of years. In this thesis, I ask in what way planetary health diet discourses contribute to the negotiation of the current global power relations in the food system. Of interest are especially the discourses held among scientists and political interest groups. These groups can contribute to the formation and implementation of a global food system transformation, for example, through policy creation. How participants in the discourse conceptualize different aspects in the planetary health diet debate is interpretively suggestive of how these actors consider global power relations. Therefore, it is of interest who participates in the discourse, which issues are mentioned and how problems and solutions are conceived. The interpretation of these aspects can disclose underlying power relations.

Policy creation can benefit from power analysis. It is known that policies that overlook "underlying power dynamics – no matter how practical, technical, or scalable – are unlikely to succeed." (Hossain, 2017, p. 25). Power analysis can, therefore, play an important role to understand power dynamics in politics and policies. The global food system is a complex of extensive power relations and shaped by political, economic and social forces. The aim of creating a PHD necessarily involves power on multiple levels and various actors. These relations are of interest in this thesis, especially how they shift, how they are renegotiated, who participates in the discourse of sustainable diets and what this means for global and national inequalities.

1.1. Aim and structure of the thesis

My aim in this thesis is to contribute to a better understanding of power relations within the food system by analyzing discourses of sustainable and so-called planetary health diets. As food is a political matter, the debate on a transformation of diets and food systems can either promote or lessen global inequalities. By analyzing articles on concepts of sustainable diets, I hoped to find what these discourses reveal about global power relations in the global food system and potential future developments. PHD advocates aim to transform the global food system, but a transformation on a global scale needs to consider the complex structures and dynamics of power in the system. Therefore, this thesis aims to contribute to the discussion of the sustainable diet approach.

Various scientific as well as political interest groups discuss the concept of a sustainable diet, such as the United Nations Environment Programme (UNEP), the EAT-Lancet Commission, the World Economic Forum's Food System Initiative and the Food and Agriculture Organization (FAO) (Food and Agriculture Organization, 2018; UN Environment Programme, 2020; Willett et al., 2019; World Economic Forum, 2020). Of interest in this thesis were the different narratives and discourses of these interest groups. How do international agents and organizations discuss the planetary health diet and the underlying power relations of the global food system? By addressing some aspects more than others, they may also contribute to power relations through the discourses they produce. This means that, for example, a focus on technology and innovation benefits those who are already in power, while social and economic inequalities are not addressed. Therefore, it is also of interest who participates in the discussions, and how the so-called *Global South* and *Global North*[3] are conceptualized, represented and included. Power relations between countries from the Global North and Global South have determined social realities for people in the respective places for centuries. To create a sustainable global food system, authorities need to address the inequalities that the discourse analysis can help to reveal.

[3] The North-South framing in development research is based on a geographic focus (i.e. the Northern and Southern hemisphere) and helps to refer to socio-economic, political, structural and historically grown differences and inequalities between regions. Although I use these terms in this thesis, some criticism against the concept is justified, as it is a simplistic approach to describe complex relations. Furthermore, it is important to mention that the North-South boundaries are increasingly blurring due to the global interconnectedness in the 21st century. Emerging concepts such as the global development approach reflect these developments (Horner, 2020, p. 415).

In this thesis, I focus on those discursive practices that address global power relations in the food system. This work aims to analyze how experts in different fields discuss the promoted solution of a sustainable diet and how global power relations manifest in these discourses. Policymakers often overlook the underlying power dynamics of food systems. However, these dynamics determine to a great extent the success of the interventions (Hossain, 2017, p. 25). Therefore, it is of interest in this work how the complex web of power relations in the food system is negotiated in the proposed solutions of shifting towards a planetary health diet. The approach does not include making judgements on the nutritional validities of food groups or how health and sustainability *should* be conceived.

The thesis is structured into three parts. This first chapter outlines the aim and knowledge interest of this thesis, including the relevance of the research question that this work aims to answer. In chapter two and three, I provide the context that serves a better understanding of the results and discussion of the analysis in the later chapters. The reader will be introduced to the framework and concept of planetary health, on which many considerations in sustainable diet discourses are based. Scientists describe planetary health as a new scientific field that aims to create cohesion between concepts of established disciplines such as global health and environmental studies (Seltenrich, 2018, p. 2). The planetary health approach also includes considerations of the global food system's sustainability and serves as a basis for sustainable diet discourses. Chapter two gives a short introduction to the most important historical contexts that need to be considered in order to understand the discussion in later chapters. A sustainable diet approach and also general discussions that aim to transform the global food system need to consider how this system and its inherent power relations have evolved over thousands of years and especially in recent decades.

In chapter three, the power relations that determine structures, processes and discourses in the food system will be explained in more detail. To provide a base for a common discussion, I will elaborate on definitions of food systems and concepts of food politics. This includes not just the power relations that influence dynamics in the food system, but also the discourse of the modern food system's limitations. In political and scientific circles, three aspects of the modern food system are frequently problematized: the food system's contribution to the NCD burden on human health, its contribution to climate change and environmental destruction and the food insecurity and inequalities it produces, e.g. through economic market failures. In the following chapter four, I introduce the empirical part of this thesis. In order to answer the research

question, a discourse analysis appeared to be a suitable method. In chapter four I outline the approach used as well as the methodological assumptions that are underlying the discourse analysis. Furthermore, in a reflection of the researcher positionality, my ontological and epistemological assumptions and working principles as a researcher in this work, as well as potential biases and their implications, will be addressed.

Chapter five comprises the results and findings of the discourse analysis. The chapter includes a discussion on the effects of planetary health diet discourses on global power relations in the food system. Both the discussion and the effects are determined by the participants in the discourse and the topics these actors address. Power relations are also influenced by the debates on possible solutions to the unsustainability of the current system. The solutions the participants in the discourse propose influence to what extent power relations in the food system will be changed and renegotiated. Three discourse strands evolved out of the clustering of the most frequently occurring codes in the analysis. Coding in social research methods is the process of segmenting the data and transforming raw data into categories and classifications (Bulmer, 2006, p. 30). The generated codes and the topics the codes represent are juxtaposed or intertwined. Therefore, a section on concluding interpretations follows the discussion of the three discourse strands.

Understanding the power relations within the three discourses will add to the understanding of the prevailing debates and power relations that PHD discourses produce. This, in turn, aims to contribute to an extension of the discourse and a better understanding of policies and papers regarding their underlying power relations. The last chapter six will conclude the work and will draw a resume of the study, as well as mention the limitations and potentials for further research.

1.2. Knowledge interest and research question

This work aims to understand the reports and scientific papers that discuss sustainable diets and the transformation of the global food system from a social science and qualitative research perspective. The connections, meanings and narratives of the various reports and scientific papers on this topic will be elaborated. The main question is how the complex webs of power relations in food systems are considered in the discourse on planetary health diets. Further, I question where and how the Global South and the Global North are involved in the discourse and how inequalities are amplified through the debates.

This knowledge interest has been transformed into a research question. In summary of the previous remarks, of interest in this thesis is in what way global power relations in the food system are involved and discussed in planetary health diet discourses and how the discussion itself and the participants in it create power and influence. From this and the aforementioned background, the following research question arises:

How are global power relations in the food system negotiated in planetary health diet discourses?

As already mentioned earlier, the term planetary health diet does not just refer to the scientific and quantitative rules that were developed by the EAT-Lancet Commission to give a global framework and goals towards a transformation (Willett et al., 2019, p. 447). More so, all concepts of sustainable nutrition are of interest and the discourse that preceded the launch of the EAT-Lancet report is just as relevant. Note that the reference diet of the EAT Commission rather underlines the increasing importance of the topic in the international community.

Various questions are implicated in the research question. How do researchers and politicians in the Global North and Global South discuss the goal of transforming the food system? Who participates in the discussion? How is power being thought about in these discussions? Are social and economic inequalities considered in the discourses? How do the narratives of different interest groups regarding a shift to a planetary health diet reflect their underlying values? How are problems and obstacles conceived, how are solutions thought about and who is involved in finding solutions? How did the discourse change over time?

These are some of the questions that are of interest in this work and which the findings of the discourse analysis give some answers to. The thesis aims to provide impulses for reflection and a base for further discussions on how to create sustainable and healthy food systems around the world. More equitable policies can be created through discussing and revealing power relations that are inherent in the global food system. With this work, I hope to draw attention to the need for an even more pluralist discussion of the food system's transformation.

2. Sustainable nutrition and planetary health: concepts and backgrounds

Discourses on sustainable diets build upon the newly emerging field of planetary health. The basis of the PHD is that diets play a critical role in both, human health and environmental sustainability. A sustainable diet approach, therefore, aims to combine the health and sustainability objectives into a common framework. The EAT-Lancet Commission's PHD approach tries to create a "common global agenda for food system transformation" (EAT-Lancet Commission, 2019, p. 7). The Commission's global reference diet seeks to contribute to achieving the UN Sustainable Development Goals (SDGs) and the Paris Agreement (ibid). In this thesis, a wider definition of planetary health diet is used, incorporating also discussions preceding the publication of the EAT-Lancet diet report in 2019 (Willett et al., 2019) as well as discussions that do not particularly refer to the EAT-Lancet diet. The broad understanding includes projects or discourses that have the same agenda of healthy food for humans *and* the planet but are less coordinated compared to the EAT-Lancet reference diet. Many projects with the same agenda are implemented in the name of planetary health. However, the point is that similar projects and discourses exist besides the ones based on the scientific targets the EAT-Lancet Commission developed in order to achieve a large-scale transformation of the global food system. Regardless of the denomination, much of all these discourses build upon the concepts of planetary health. Therefore, in the following, the concept of planetary health will be discussed. The aim is to give a profound understanding of the newly emerging scientific field that sustainable diet discourses are based on.

2.1. The concept of planetary health

Notably, the history of planetary health is quite short and extremely long at the same time. It is long in the sense that human health and disease have, for thousands of years, been strongly related to the environment. Also, efforts of influencing policy through medical activism and lobbying have a long tradition (Myers & Frumkin, 2020, p. 18). In this thesis, I focus on recent history and what is nowadays commonly known as planetary health. It concerns an understanding that grew in recent decades when only in the 1980s epidemiologists and organizations, such as the World Health Organization (WHO), started to recognize the effects of climate change on human health. In the 1990s, the term was applied to describe the health of the planet. Only since the second decade of the 21st century, the understanding of wide-ranging

climate change effects on humans from unsustainable practices became commonly adopted (Myers & Frumkin, 2020, p. 18). As planetary health is important to conceptualize for understanding planetary health diet, in the following I will give a short introduction to the emergence of the field, its goals, scientific discussions, and more.

2.1.1. The beginning of a new scientific field

In 2014, The Lancet's editor-in-chief Richard Horton coined the term planetary health in an article titled *From Public to Planetary Health: A Manifesto* (Seltenrich, 2018, p. 2). As this title suggests, the field of public health was to be transformed by merging and extending public and planetary health. Public health is concerned with the health of human populations and originally stemmed from the concern with infectious diseases (Boutayeb, 2006, p. 191). However, planetary health adds the important consideration of natural systems to the field (EAT-Lancet Commission, 2019, p. 7). In 2015, The Lancet published the report of the *Rockefeller Foundation-Lancet Commission on Planetary Health*, which contained the results of a year-long analysis and, therefore, a seminal contribution to the newly emerging field (Seltenrich, 2018, p. 2). The Commission includes professionals from diverse backgrounds, such as global experts in environmental health, medicine, biodiversity and ecology. In their report, the Commission defines three challenges that must be addressed in aiming for the enhancement of human health despite large-scale environmental problems. These challenges include governance challenges, knowledge and information challenges as well as a conceptual challenge of accounting for health and environmental distress to development and prosperity in the future (Horton & Lo, 2015, p. 1922).

Planetary health is a new scientific field that tries to create cohesion between concepts and ideas of established disciplines, such as global health or conservation medicine, as well as evolving fields regarding climate change and health (Seltenrich, 2018, p. 2). It has significant overlaps with the field of traditional environmental health, as both "examine the relationship between human health and conditions and exposures originating outside the body, be they extreme temperatures, chemicals and biological agents, vector-borne diseases, or any number of other potential factors" (Seltenrich, 2018, p. 1). The focus in the field of planetary health, however, is different. Backed up with the increasing amount of climate change research and the widely acknowledged understanding of the Anthropocene, the new epoch that - in the understanding of many scientists - we have entered, planetary health is embedded in this context and based on

the assumption that the Earth's systems have undergone significant human-caused perturbations (Seltenrich, 2018, p. 1).

2.1.2. The Anthropocene

The Rockefeller Foundation-Lancet Commission on planetary health's report is titled *Safeguarding human health in the Anthropocene epoch* (Whitmee et al., 2015, p. 1973). But what does the Anthropocene era distinguish from previous periods in history? In the report's glossary, the Commission explains the Anthropocene as:

> "The proposed name for a new geological epoch demarcated as the time when human activities began to have a substantial global effect on the Earth's systems" (Whitmee et al., 2015, p. 1975).

In the preceding geological epoch, the Holocene, most of the human development and history of major civilizations took place (Whitmee et al., 2015, p. 1975). In geological circles, scientists have identified the human impact on the planet as a considerable geological force. This concern led to the discussion of defining a new era, as the human impact on the environment is so substantial and irreversible (Chakrabarty, 2018, p. 5). Planetary health is a concept that emerged as a response to the arguments made in Anthropocene debates. Many scientists and politicians use planetary health as a framework to discuss efforts aimed at reducing or reversing the negative impact humans have on the environment.

The term Anthropocene is derived from the Greek word *anthropos* for 'human' and *cene*, which stands for 'new' or 'recent'. It has been popularized and coined by Paul Crutzen, an atmospheric chemist, meteorologist and Nobel laureate around the early 2000s. However, although stratigraphers and other geological authorities seriously consider it, the Anthropocene has not yet been officially acknowledged as a new geological epoch (Laurance, 2019, p. 953). There are many ongoing scientific discussions about whether or not the concept of an Anthropocene is geologically justifiable and how it can be characterized and defined (Zalasiewicz et al., 2014, p. 2). Other discussions revolve around the question of when the Anthropocene might be considered to have started. While some suggest more recent dates such as the industrial revolution around 1784 or the first atomic bomb tests in 1945, others propose that it started 12,000 to 15,000 years ago with the agricultural revolution or even longer, thousands of years ago, when humans first began to populate the planet (Laurance, 2019, p. 954).

Regardless of whether the term will be officially formalized or not, for the past twenty years it has been widely used in environmental circles. In the year 2018 only, the term appeared in around 200 peer-reviewed articles, and multiple books and journals discuss it (Laurance, 2019, p. 954). The essence of the idea behind the Anthropocene era is that humans, as a species, have been changing every Earth system to the extent that it will show in fossil records (Capon, 2020, p. 1325). This means that human influence has altered the planet and its biodiversity to an extent that is only comparable to the effect of ice ages, tectonic shifts and other tremendous natural events. "Even if humans were to disappear today, our geological signature in contemporary sediments would be striking" (Laurance, 2019, p. 953).

The magnitude of human influence will be seen biologically in the biodiversity of the planet, with an ever-declining abundance of wild species. For example, there is a huge amount of pollen from a few human crops, while pollen from wild plants decline. Similarly, chicken has spread from Southeast Asia to almost every inhabited place in the world, and it is estimated 60 billion of them are consumed every year (Laurance, 2019, p. 953 f). Just as striking are the geophysical and geomorphological signs and changes. Some of the activities that promote these changes include erosions linked to the construction of roads, mines, and dams, the contamination of the terrestrial and marine biosphere through garbage and microplastics, as well as elements from atomic detonations and inorganic ash from burning fossil fuels in the atmosphere (ibid).

The concept of planetary health builds upon an ecological public health model. This type of public health concept does not only focus on improved *human* health but also considers natural systems' (ecological) health as well (Whitmee et al., 2015, p. 1976 ff). Earlier, health-related disciplines and sectors did not consider the cost of the natural systems' destruction. Today, the awareness that humans depend on these natural systems increases. Consequently, planetary health emerged as a discipline that is concerned with challenges and questions of how to protect and promote both, human and environmental health (Whitmee et al., 2015, p. 1978).

2.1.3. Characteristics of planetary health research

Planetary health is a concept that unites multiple scientific subareas and disciplines. Research that aims to address complex issues such as climate change, pollution or urbanization is often conducted based on the so-called *transdisciplinary* approach. Transdisciplinary research focuses on addressing big challenges or problems instead of referring to a specific discipline (Seltenrich, 2018, p. 6). The aim of planetary health's transdisciplinary outreach is the

mitigation of environmental and climate change threats to human health (ibid). Transdisciplinarity[4] is a research methodology that originated "in a critique of the standard configuration of knowledge in disciplines in the curriculum, including moral and ethical concerns" (Bernstein, 2015, p. 1). This means that topics and approaches should not be siloed into disciplines but rather create holistic frameworks beyond disciplinary boundaries (Bernstein, 2015, p. 7). Transdisciplinarity is based on a basic understanding of universities before they have become increasingly economized and commercialized since the 1970s. In the 1990s, the idea of transdisciplinarity has again received increased prominence and became a methodology of sustainable development. This methodology aims at conducting science *for* and *with* society (Scholz, 2020, p. 1033). It is a concept that seeks to go beyond traditional, institutional and structural boundaries in order to create socially responsible science. Therefore, the movement of transdisciplinary research is highly connected with complex and global issues such as climate change and sustainability (Bernstein, 2015, p. 8).

One example of the diverse field of planetary health studies is the "investigation on ways that human-caused changes to global fisheries affect diet, nutrition, and thus human health around the planet, especially in low-income nations near the equator" (Seltenrich, 2018, p. 3). The number of marine fish is declining due to (industrial) overfishing, pollution or other reasons such as migration of species toward colder water. All this is causing risks of undernourishment to people in coastal developing nations. Various researchers are involved in this project that is devoted to studying the effects of ecosystem changes on human health. They come from academic backgrounds such as nutritional epidemiology, fisheries ecology, ecosystem services and more. Projects with holistic approaches like this, which require multiple-disciplinary research teams, are often short on funding, as their funding opportunities and infrastructures are limited (Seltenrich, 2018, p. 4). In general, scientists argue that more funding or resources, especially with an inter- and transdisciplinary focus, is needed in order to enhance social and environmental health (Horton & Lo, 2015, p. 1922).

Among the investors in planetary health research is, for example, the UK-based Wellcome Trust, which traditionally focused on funding biomedical health research (Seltenrich, 2018, p.

[4] In the literature, transdisciplinarity is increasingly used interchangeably with multi- or interdisciplinarity. Often, the terms are ambiguously defined and contribute to readers' confusion about the differences. Choi & Pak (2006, p. 351) define them as follows: "Multidisciplinarity draws on knowledge from different disciplines but stays within their boundaries. Interdisciplinarity analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole. Transdisciplinarity integrates the natural, social and health sciences in a humanities context, and transcends their traditional boundaries."

4). In 2015, the Wellcome Trust invested 75 million British Pound Sterling (around 87 million Euro) into generating new research on the health effects of climate change, environmental deterioration and global food system changes (Myers & Frumkin, 2020, p. 29). This is important to mention as the Wellcome Trust also supports the EAT-Lancet Commission financially. University programs that support planetary health research are, for example, the Stanford Center for Innovation in Global Health (Stanford Center for Innovation in Global Health, 2020) or the planetary health research funding program of the Victoria University in Melbourne, Australia (Victoria University, 2021). The former indicates the link between planetary health and global health.

2.1.4. Relations of global health to planetary health

Planetary health and global health have common elements. Myers & Frumkin (2020, p. 30) explain that the concept of global health emerged and took off in the 1990s with a clear focus on the control of specific diseases and partly as a response to perceived omissions of national and international health service providers. Today, the field of global health, as well as the field of planetary health, include a diverse range of actors with a common goal of addressing health issues around the world. Among these actors are international organizations such as the World Health Organization (WHO) and the World Bank, philanthropic organizations, governments, pharmaceutical companies, universities, non-governmental organizations and more (Biehl & Ong, 2019, p. 64). Bilateral and multilateral aid given for global health programs increases annually (IHME Institute for Health Metrics and Evaluation, 2021). Many global health projects have been successful in addressing various humanitarian or biosecurity concerns.

In contrast to global health, the historical background of planetary health is related to environmental health and systems ecology. In this framework, the ideas of development, progress and civilizing processes are viewed skeptically, especially regarding all the environmental consequences they have produced (Myers & Frumkin, 2020, p. 31). As Biehl & Ong (2019, p. 70) refer to Horton et al. (2014), planetary health "explicitly sets out to provide a counter-vision to a capitalist neoliberal world order and call into question patterns of overconsumption and unrestrained extraction." Some critics say that planetary health is just an expansion of global health, operating similarly but with a focus on ecosystem disruption instead of infectious diseases (Myers & Frumkin, 2020, p. 31).

Given the global contexts, planetary health and global health researchers both need to pay attention to potential aggravations of inequalities on a global sphere. These aggravations of inequalities can occur as unintended side-effects of attempts to improve human health and environmental sustainability. However, from a perspective that considers power relations, the criticism against the field has to be considered. Some critics argue that actors involved in global or planetary health projects act as neocolonial authorities, imposing concepts of development from the 'West' to the rest of the world, especially when projects in these contexts follow a top-down approach (Myers & Frumkin, 2020, p. 31). In order to avoid such criticism, power analysis can help to create policies that consider economic, political and social forces and are, therefore, more likely to succeed (Hossain, 2017, p. 25). This is important to mention as the planetary health diet approach is also criticized to be a 'northern construct' (Ssemugabo, 2020). However, this will be discussed in more detail in the discussion of the analysis results in chapter five. For now, I will discuss the planetary health diet approach more in detail.

2.2. Planetary health diet and other sustainable diets

As outlined at the beginning of this chapter, planetary health diet is a new term that was coined by the EAT-Lancet Commission and builds upon the concept of planetary health described previously. The example of planetary health studies in the previous chapter regarding human-caused changes to global fisheries makes clear that the concept of planetary health also includes discussions in the field of nutrition, sustainable food production or non-communicable diseases. However, the EAT-Lancet Commission focuses on the aspect of nutrition and diets and aims to create a "common global agenda for food system transformation" (EAT-Lancet Commission, 2019, p. 7). The Commission includes 19 Commissioners and 18 coauthors from 16 countries. They come from fields such as nutrition, human health, political science, environmental sustainability and agriculture and work together to develop scientific targets "for achieving healthy diets from sustainable food systems" (Willett et al., 2019, p. 447). In this thesis, as mentioned earlier, a broader understanding of planetary health diet is used. This includes discussions that are not explicitly termed planetary health diet, however share the same purpose and discourse of healthy nutrition for humans and the planet. Terms that are frequently used instead of planetary health diet are sustainable diet, sustainable food systems or food transformation (Auestad & Fulgoni, 2015; Scott, 2018; Searchinger et al., 2019).

2.2.1. Links between diet, human health and environmental sustainability

> "Food systems have the potential to nurture human health and support environmental sustainability; however, they are currently threatening both" (Willett et al., 2019, p. 447).

The current food system produces enough food to sustain the world's population 1.5 times. That is already enough food to eat for a population of ten billion people – the estimated world population peak in 2050 (Holt-Giménez et al., 2012, p. 595). Global agriculture is more productive and efficient today than ever before. For example, calorie production increased by 217 % from 1961 to 2013 (Benton & Bailey, 2019, p. 1). This focus on agricultural productivity made food more available through lower food prices (ibid) and significantly lowered the number of people affected by hunger. However, the increased agricultural activities also created so-called externalized costs on the environment. These costs are external to the market transaction and turn into costs that are imposed on the environment or the society, for example, through pollution, environmental degradation or poor health of people (Rocha, 2007, p. 9).

Benton and Bailey (2019, p. 3) refer to Bahadur et al. (2018) when they explain that globally, eating habits are now strongly influenced by "global agriculture's bias towards energy-dense commodities rather than nutrient-rich fruits and vegetables". The bias towards energy-dense commodities grew historically and is linked to powerful actors in the food system such as governments and big companies, which focused on agricultural productivity and cheap food products in their policies and business strategies respectively. Benton and Bailey (2019, p. 1) propose to focus more on efficiency than on productivity in order to achieve healthy diets and a healthy planet.

Food as a component of health is not just a matter of quantity, but first and foremost of quality. Policies that focus on caloric metrics to address food insecurity tend to overlook the actual nutritional needs of food insecure populations. However, the standard measure of poor nutrition is still caloric hunger, which overlooks that malnutrition exists in different forms, such as protein deficiency, micronutrient deficiency or hidden hunger, and obesity. Therefore, the belief that ending hunger can be achieved through increasing the quantity of food underestimates the real challenge of delivering a nutritionally sufficient diet (Ritchie et al., 2018, p. 1).

A sociocultural characteristic that seems to correlate with hunger and obesity is inequality, especially the determinants of socio-economic background, education and sex. In most OECD

countries, obesity is more prevalent among women than men. Among them, less-educated women are two to three times more likely to be overweight than highly-educated women (Steiner et al., 2019, p. 5). At the same time, conflict and extreme climate events tend to affect the people living in poverty the most through aggravating inequalities and worsening food insecurity (ibid). Therefore, political and socio-economic power relations in the food system also contribute to the global number of people who are affected by hunger, micronutrient deficiencies and obesity (UN Environment Programme, 2020). In 2020, it is estimated more than 800 million people were affected by hunger, 2 billion were micronutrient deficient and another 2 billion were overweight or obese (UN Environment, 2020). In many countries, morbidity and mortality from non-communicable diseases have been increasing, not least because of unhealthy diets (Benziger et al., 2016, p. 393).

Over the past decades, a global transition in people's diets took place. Globally, diets high in processed foods, refined sugars, refined fats and meat increasingly replace traditional diets. These shifts in dietary trends are driven by processes such as urbanization and rising incomes. Global dietary transitions are associated with increased incidence of NCDs, such as coronary heart diseases or type II diabetes, which lower life expectancies around the world (Tilman & Clark, 2014, p. 1). NCDs are the leading cause of deaths globally (World Health Organization, 2010, p. 3). Although for a long time considered solely a problem of wealthy high-income nations, NCDs are increasingly becoming an even bigger problem in low- and middle-income countries (Kankeu et al., 2013, p. 1). In many LMICs, the disease burden (morbidity and mortality) of NCDs is higher than in high-income countries and the majority of cardiovascular disease deaths occur in these countries (Benziger et al., 2016, p. 393).

Particularly some LMICs like Mexico, China, India, Albania, Turkey, Morocco, Jordan, Zambia, Mozambique and Burkina Faso are currently challenged with the coexistence of under- and overweight, where parts of the population develop obesity while also undernourishment is widely prevalent (Alexandratos & Bruinsma, 2012, p. 3; Steiner et al., 2019, p. 6 f). Scholars describe this phenomenon as the *triple burden of malnutrition*, which is defined by an increasing prevalence of obesity, along with people affected by undernourishment and micronutrient deficiencies (Alexandratos & Bruinsma, 2012, p. 3). However, examples of this paradox situation also exist in high-income countries like the US. In New York City, the district South Bronx does not just have higher obesity rates compared to the nation's average, but also a high proportion of people who cannot afford food. This and other data suggests that diet

quality is an important factor for the coexistence of these "two opposite states on the food security scale" (Steiner et al., 2019, p. 7).

The unsustainability of current agricultural systems

Strong scientific evidence points to the current food system as being environmentally unsustainable in many aspects besides its effects on human health. Food production is among the biggest contributors to "climate change, biodiversity loss, freshwater use, interference with the global nitrogen and phosphorus cycles, and land-system change" (Willett et al., 2019, p. 447). More than 25% of global greenhouse gas emissions come from global agriculture and food production, around half of the ice-free land area on Earth is used as cropland or pastureland and many waters are polluted with agrochemicals. Further, the increasing population and growing food demand lead to the clearing of tropical forests, savannas and grasslands, which threatens many species with extinction (Tilman & Clark, 2014, p. 1). Therefore, the food system poses a threat to the environment, but these global environmental changes themselves again pose a threat to food production in the future (A. D. Tripathi et al., 2018, p. 3). Concepts of a sustainable diet also include these considerations regarding the environment and climate change.

Agriculture and the global food system are not just linked to the prevalence of chronic diseases, but also to infectious diseases. With the COVID-19 pandemic, the discourse on the origins of virulent diseases reveals another aspect of agriculture and the food system. As Miles (2020, p. 1 f) explains:

> "It is through the rapid expansion of agriculture and human development into wild ecosystems combined with the specific ways that we produce food – as large scale industrial monocultures of plants and animals – that deadly pathogens and diseases emerge and eventually spread."

Infectious diseases often originate from germs spreading between animals and humans. Deadly pathogens that emerged from agriculture include Ebola, hepatitis E, Swine flu variants and a variety of influenza- and coronaviruses. Due to population growth and the expansion and intensification of agriculture, it is assumed that infectious diseases like these will increase in the future (Miles, 2020, p. 2). Through globalization, these diseases spread more rapidly throughout the world, as we have seen with the novel coronavirus Sars-Cov-2. This also has to do with the increased population size and higher density in urban areas (Acuto, 2020; Hamidi et al., 2020).

Population growth and sustainable diets

In the past 100 years, the world population has not just been growing rapidly, it has even quadrupled (Rosner, 2019). A common assumption is that as we look to 2050, the world's population is expected to reach ten billion people. The EAT-Lancet Commission's concept for a planetary health diet considers this and incorporates calculations on how to transform the food system in a way that provides enough food for ten billion people in 2050. As this graphic by Our World in Data suggests, the demographic transition is ending slowly and the annual world population growth rate continues to decline (see the red line). Today, the world population grows by a bit over 1% per year. However, the 7-fold increase of the global population in the past and recent century had a big impact on the environment and continues to be a challenge, as annually 82 million additional people inhabit this planet (Rosner, 2019).

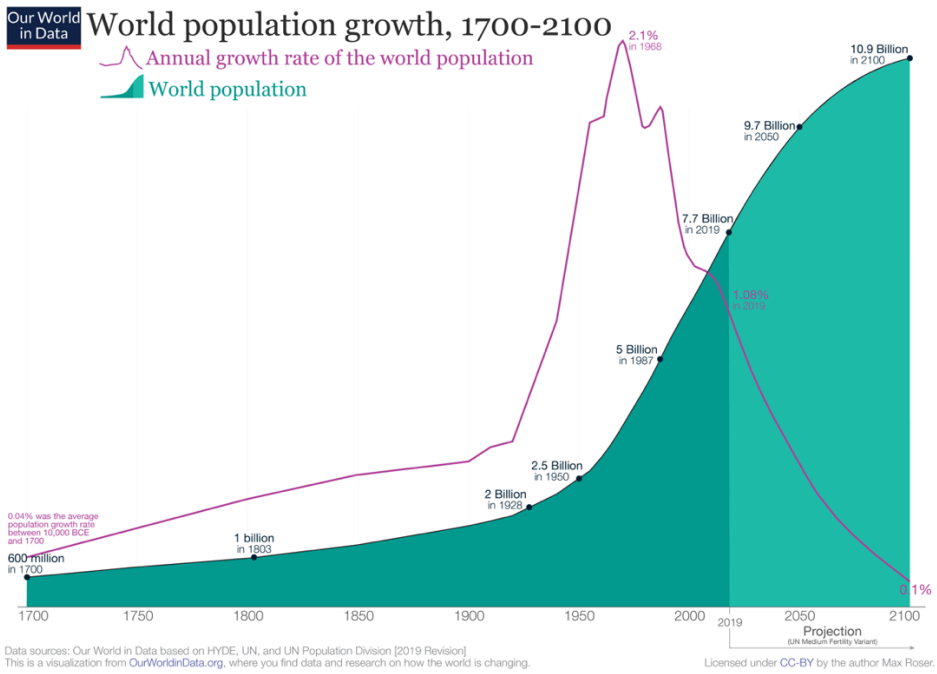

Figure 1: World Population Growth, 1700 – 2100. Source: Our World in Data, 2019. Open access under the Creative Commons BY license.

The EAT-Lancet Commission, therefore, created scientific targets that help to achieve a sustainable global food system that can provide a global population of ten billion people with an appropriate and healthy diet. However, they argue that multiple stakeholders have to be involved to achieve a more environmentally-friendly food production that, at the same time, reduces health consequences for consumers (Willett et al., 2019, p. 448).

The stakeholders that are involved in the discussion will be analyzed in the empirical part of this thesis. For now, it can be said that the topic is discussed on an international level and the actors include multiple international organizations as well as nation-states and policy frameworks. For example, the planetary health diet is conceptualized in support of global frameworks like the Sustainable Development Goals (SDGs) as well as the Paris Agreement (EAT-Lancet Commission, 2019, p. 7). In the agenda of the Sustainable Development Goals, one of its goals, SDG 2, "promises to ensure food security and nutrition within sustainable food systems" (Fanzo, 2019, p. 159). Besides this, food and nutrition are cutting across all 17 SDGs, as these topics are complex and include implications on social, economic, political, environmental and other issues (Lucas & Horton, 2019, p. 1). However, neither the Paris Agreement on Climate Change nor the 2030 Agenda of the Sustainable Development Goals will achieve its aspirations unless there will be a comprehensive shift in global nutrition patterns (Lucas & Horton, 2019, p. 1).

2.2.2. Framework and key messages of the planetary health diet

The health of both people and the planet is strongly influenced by the way food is produced, consumed and wasted. The *EAT-Lancet Commission report on food in the Anthropocene* by Willett and colleagues (2019) is the document that provides a global framework for a planetary health diet. They were the first ones who provided quantitative scientific targets for a transformation of the food system towards healthy diets and sustainable food production. The Commission points out that "feeding 10 billion people a healthy diet within safe planetary boundaries for food production by 2050 is both possible and necessary." (EAT-Lancet Commission, 2019, p. 26).

The goals of the commission are motivated by scientific papers that target the shortcomings of the current food system on human diets and health as well as the environment. As Willett et al. (2019: 448) outline, unhealthy food that is produced unsustainably causes a double threat to people and the planet. On the one hand, 820 million people are affected by hunger and insufficient food supplies, while on the other hand, many people consume unhealthy diets that often lead to increased morbidity and premature death (ibid). Non-communicable diseases are already the leading cause of deaths globally[5] (World Health Organization, 2010, p. 3).

[5] Although poor diets are not the only risk factor for NCDs, dietary risks are responsible for a high number of NCDs, including, for example, the global cardiovascular disease burden (Benziger et al., 2016, p. 395).

However, they are predicted to worsen over the next years, if current dietary trends continue and the population grows to the projected ten billion by 2050 (Willett et al., 2019, p. 448).

The report gained a lot of attention, both in the media and in scientific and political circles; it fueled the debate on planetary health diets since its launch in 2019. However, this report is not the first time sustainable diets are discussed, as this has already been the case for decades (Leroy & Hite, 2020, p. 6), with a rapid increase since around 2010. There are various ways and attempts to define a healthy diet with low environmental impact. It is necessary to consider in this context that not just food products and their production systems are very diverse, but also environmental challenges are heterogeneous and varying between different regions. Social systems, food cultures and traditions within different communities further contribute to the complexity. The claim is to provide policies and actions that are based on scientific evidence, but "despite the growth in literature on the topic, the evidence base is fragmentary, of variable quality, and offers few generalizable conclusions" (Ridoutt & Huang, 2019, p. 2948). Another aspect is that debates on sustainable diets can be strongly influenced by personal beliefs, political or ethical views and emotions, which can diminish the role of science (ibid).

However, the EAT-Lancet Commission agreed on a way to describe a healthy diet: the 2,500 kcal (10,460 kJ) daily intake should consist of "a diversity of plant-based foods, low amounts of animal source foods, unsaturated rather than saturated fats, and small amounts of refined grains, highly processed foods, and added sugars" (Willett et al., 2019, p. 448). According to the report, the preconditions for a sustainable environment are shifts towards healthier diet patterns, improvements in food production practices as well as extensive reductions in food loss and food waste (ibid). Food production is a major contributor to environmental risks globally. Sustainability in food production means that the latter operate within the scientifically specified safe operating space for food systems.

> "Therefore, sustainable food production for about 10 billion people should use no additional land, safeguard existing biodiversity, reduce consumptive water use and manage water responsibly, substantially reduce nitrogen and phosphorus pollution, produce zero carbon dioxide emissions, and cause no further increase in methane and nitrous oxide emissions" (Willett et al., 2019, p. 448).[6]

[6] How these claims are perceived in the international community and which overall discourse they relate to will be outlined in the discussion of the discourse analysis in chapter five.

The EAT-Lancet Commission's PHD approach provides scientific targets for achieving healthy diets from sustainable food systems. The proposed reference diet is intended to enable large-scale and coordinated efforts for a global transformation of the food system (Willett et al., 2019, p. 447). However, the approach is necessarily political, as the transformation goals always include an intended shift in power relations. The political background of the reference diet is a key element to understand how power relations in the food system are renegotiated through PHD discourses. Therefore, the following sub-chapter will explain the transformation goals and some criticism against the EAT-Lancet PHD approach. This provides the knowledge needed to understand the discussion in chapter five better.

2.2.3. The normativity of the PHD approach and the transformation goals

The idea of a planetary health diet contains several political, philosophical and ethical questions. Discussions on sustainable diets are mostly infused by a normative goal, and therefore held based on the normative theory, which includes "[a]ny theory that states standards, values, or concrete proposals that involve criticism of present arrangements and thus calls for change to create a better future." (Castree et al., 2013, p. 349 f). Therefore, the transformation towards a planetary health diet is a normative issue, as it promotes an active change in the system.

The EAT-Lancet Commission, for example, outlines the need for substantial dietary shifts in order to achieve a transformation towards healthy diets. Accordingly, this shift will require a greater than 50% reduction in the global consumption of unhealthy foods, for example, red meat and sugar (Willett et al., 2019, p. 448). The commissioners further advocate for a more than 100% increase in the consumption of nuts, fruits, vegetables and legumes, which are considered healthy and sustainable foods (ibid). Although they acknowledge in the report that the required changes differ among regions, we will later see in the analysis that the consideration of circumstances, especially concerning the Global South, is overlooked in the report.

Further, the report includes five strategies to promote and achieve a *great food transformation.* The Commission urges immediate action, as the likelihood of serious consequences will only increase according to the data collected (EAT-Lancet Commission, 2019, p. 20). The strategies are to:

1. "seek international and national commitment to shift toward healthy diets",

2. “reorient agricultural priorities from producing high quantities of food to producing healthy food”,
3. “sustainably intensify food production to increase high-quality output”,
4. “strong and coordinated governance of land and oceans” and
5. “at least halve food losses and waste, in line with UN Sustainable Development Goals” (EAT-Lancet Commission, 2019, pp. 21–25).

The EAT-Lancet Commission argues that food will be a defining issue for the achievement of the Sustainable Development Goals as well as the Paris Agreement on Climate Change (EAT-Lancet Commission, 2019, p. 26). All 17 UN Sustainable Development Goals are in some way relatable and intertwined with the scientific targets for sustainable nutrition. This refers to focus areas such as requirements of and for high-quality primary health care, which needs to be provided to achieve sustainable diets. Also, aspects like family planning and nutrition education are included (Willett et al., 2019, p. 448).

However, the transformation towards a planetary health diet requires political will and sufficient resources (EAT-Lancet Commission, 2019, p. 20). In the global food system, various power dynamics and relations form a complex web of possible hindrances for a global food transformation. In response to the outlined scientific targets of the EAT-Lancet Commission, several scientific papers published so far have critically scrutinized different aspects of the approach.

In terms of health targets, Zagmutt et al. (2020: 985) argue that the Commission’s proposed dietary composition may not prevent premature mortalities from NCDs. Their critique is founded on unmet quality standards of the report regarding transparency, replicability and accounting for statistical uncertainty. When the authors tried to replicate the calculations for a case study of the United States, they concluded that assumptions and methods used in the report on how much mortality can be avoided were inaccurate (F. J. Zagmutt et al., 2020, p. 985). In an earlier article, Zagmutt et al. (2019, p. 1140 f) had already criticized the EAT-Lancet report for having methodological flaws in its assumptions, documentation, data collection and modelling. Their interest in the replication of the report’s findings stemmed from the fundamental question of how the diet proposed by the EAT-Lancet Commission can differ so significantly from well-established dietary guidelines. These include the US Dietary Guideline (U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020) or

the UK Eatwell Guide (Public Health England, 2019), although all of them are based on similar health goals (F. Zagmutt et al., 2019).

Another important issue brought up and analyzed by Drewnowski (2020) is the affordability of the EAT-Lancet diet. The EAT-Commission aims to transform the food system towards healthy diets from sustainable food systems (EAT-Lancet Commission, 2019). Affordability is a key component of sustainable diets and food systems, but the production of nutrient-rich, affordable and planet-friendly foods involves some challenges. Refined grains, sugars, and vegetable oils generally have a lower carbon footprint and cost less per 1000 kcal than animal-source foods (ASFs). However, low-cost and processed foods also often have a lower nutrient density and cause obesity through excessive consumption of empty calories. Foods that deliver essential nutrients for human diets often "cost more per calorie and can have a higher carbon footprint than do the staple grain crops" (Drewnowski, 2020, p. 6). Calculating the carbon footprint and finding out the actual environmental and monetary cost of food can change depending on what the calculation is based on (ibid). The main finding in the article was that the suggested diet to 'feed' ten billion people by 2050 is not affordable for many of the world's poor (Drewnowski, 2020, p. 7) – an aspect that will be analyzed in more detail in the empirical part and discussed in the specific analysis.

The EAT-Lancet Commission launched its report in 2019 and marketed it through several international launch events as well as a social media campaign that was promoted with the hashtag *#EATLancet*. This caught the attention of scientists, international media and online communities, and a highly polarized debate emerged (Garcia et al., 2019, p. 2153). Around the time the report was launched, opponents of the report actively promoted the hashtag *#yes2meat*, which led to a digital counter-movement against the EAT-Lancet planetary health diet. Personal attacks, conspiracy theories and misinformation created a controversial debate around the EAT-Lancet Commission and their dietary recommendations. The way the report was discussed online shows how political topics are influenced by the media, and how this media landscape can be rapidly changing and causing polarization. For scientific communities, this poses some far-reaching challenges (Garcia et al., 2019, p. 2153).

The controversial debate on the EAT-Lancet planetary health diet approach and sustainable diets in general are central issues in the discourse analysis and its following discussion. The conceptual overview of planetary health and planetary health diet that I provided in this chapter

will be further discussed at a later point in this work. For now, more information on the theoretical and historical background will be provided in the next chapter.

2.3. Historical classification

Knowing some historical key points increases the understanding of the current food system and its social realities. A planetary health diet is closely linked to the idea of transforming the food system, or at least to the consideration that the prevailing food system needs to improve. That the food system changes is nothing new – it has always been evolving around societies' needs and advances (Hueston & McLeod, 2012, p. 189). Food has played a major role in human history from human evolution to the development of societies, and until today it has an enormous power to shape the present and the future. Therefore, the discourse on the food system is central to politics and discussions on the future of humanity. Debates on sustainable diets need to consider the historicity of the global food system. Economic, social and political differences between countries are often rooted in historically manifested inequalities. The discourse on a global reference diet cannot be separated from historic events that shaped the global food system of today. In this chapter, I provide the historic context that is needed to account for a better understanding of discussions on food systems and sustainable diets.

2.3.1. Food as the core of history

There have always been transformations in what and how people eat. In this sub-chapter, I want to stress that power relations in the food system have manifested over thousands of years. I argue that any negotiation of the current power relations in the food system benefits from a basic understanding of the most important historic events regarding food systems, which political and scientific authorities aim to change. Two major transformations are the agricultural revolution thousands of years ago and, in the more recent past, the industrial revolution. Past decisions and power relations shape and affect our present. The change towards agriculture, for example, has forever altered the planet and the way people live together (Beardsworth & Keil, 1997, p. 17). Also, historic events like colonization, wars of conquest and eventually the development era of globalization and economic growth in the 20th century have impacted power relations in the food system and are perceived until today (ibid).

Early food systems emerged "with the dawn of civilization" (Hueston & McLeod, 2012, p. 18) when agriculture and permanent settlements created a need to manage food, e.g. by storing or

cultivating it (ibid). Food systems constantly evolve and increase in complexity. Since agriculture began, these systems have never been static. Today, the transformation to agriculture is described as the Neolithic or agricultural revolution. In terms of its time span, it was less of a revolution as we would nowadays suggest because it took place in the course of several thousands of years. It describes the change in human subsistence from hunting and gathering to agriculture (Beardsworth & Keil, 1997, p. 20).

For most of its evolutionary history, humans used the combination of hunting and gathering for their sustenance. While some assume that the emergence of agricultural practices happened in a period of around 9,000 to 12,000 years ago (Beardsworth & Keil, 1997, p. 17), others date it back to around 15,000 years ago (von Braun et al., 2020, p. 3). Historians, archaeologists and scientists of other disciplines discuss interesting theories around the question of why and how the change to a radically different approach to subsistence took place. Interestingly, dramatic climate changes took place around 14,000 years ago and led to the end of the Pleistocene. The climate changes altered the landscapes so extensively that humans had to adapt to a changing food supply (Beardsworth & Keil, 1997, p. 16 f). Of course, especially prehistoric theories are somewhat speculative and food in history is a huge scientific field in itself.

The emergence of food systems was an important prerequisite for human civilization (Hueston & McLeod, 2012, p. 189). This is due to the far-reaching social changes that took place alongside and because of the shift towards agriculture and settlements. These include the domestication of plants and animals. Domestication processes certainly had far-reaching consequences, not just in the transformation of how humans acquired their food (Rindos, 1984). Also, farmers had to commit a lot of physical labor power to agricultural practices, far more than the hunter-gatherers had to invest. Important to understand for current climate change debates is that with agricultural practices in general, the impact that humans had on the environment increased significantly in its rate and extent. Complex processes, such as domestication, already led to a reduction of biodiversity. However, even hunter-gatherers had a large impact on the areas where they stayed (Beardsworth & Keil, 1997, p. 20).

In the agricultural revolution, not just the interaction between humans and the environment intensified, but also social relationships turned out to be increasingly structured and organized (Beardsworth & Keil, 1997, p. 20). When agriculture developed enough to allow a food surplus, some people were able to build up food stocks. This created power as future shortages or

famines could be balanced. Along with the agricultural system and the new concept of ownership the approach to warfare developed. The goal was to expand and defend the territory (Beardsworth & Keil, 1997, p. 22; Harris, 1978). This historic context of global power relations within food systems shows the complexity and extent of power considerations regarding food.

With increasing population levels and the formation of complex physical and social structures, cities emerged. For the first time, the food supply came from relatively decentralized places. From this point, human history goes on with the formation of the state and the possibilities for a higher complexity in social organizations. A huge variety of domesticated plants and animals, early technologies such as ploughing, irrigation systems and natural fertilizers as well as trading of relatively non-perishable foods, leading to the establishment of tribute and taxation, are examples of these features of the first states (Beardsworth & Keil, 1997, p. 30). Economic, cultural, political and religious life started to flourish. However, also social inequalities started to form, with political, military and intellectual elites enjoying not only higher wealth but also higher nutritional standards than their subordinates (ibid, p. 21). It is important to consider that power relations have been an inherent part of food systems for thousands of years.

The shift from foraging practices of the hunter-gatherer societies to settlements, urbanization and domestication of animals and plants brought many opportunities for human civilization but also involved a high number of threats in the form of diseases and nutritional deficiencies (Porter, 1998, p. 12). The subsequent problems of diseases were attributable to reduced diversity in people's diets (more carbohydrates, less protein) and infectious and parasitic diseases due to densely populated cities in quite unsanitary conditions. Food played and plays an important part in human history and evolution. All these developments strongly determine the formation of food systems until today. Given this historic background, it becomes evident that any negotiation of global power relations in the food system needs to take place within the determinants that the historic context offers. Concepts to create a healthy and sustainable diet are necessarily determined by the historic context of the food system. Whether or not authors include considerations on these power relations in debates on healthy, sustainable and equal food systems might determine their worldview and goals. This also involves the understanding of the different formations of food systems. In the following, I will outline what authors mean when they speak about traditional or modern food systems.

2.3.2. The conceptualization of food systems: traditional to modern

For centuries, food systems were limited to the available technologies and motive power from animals and humans. However, industrialization processes altered their scale in the first industrial countries in the eighteenth century and contributed to the major transformation of the food system. This includes the creation of machines and factories, waged work and the expansion of cities (Beardsworth & Keil, 1997, pp. 31; 35; Tannahill, 1973, p. 257).

Food systems have become increasingly globalized when new technologies and techniques were invented to meet the demand for food. This led to changes in the supply chains of food through scientific and technological advances in food production, preservation, distribution, and more (Beardsworth & Keil, 1997, p. 35 ff). Food and its trade also had a big impact on international relations, such as the colonial pursuit for empires and search for overseas markets (Tannahill, 1973, p. 257). Taking Britain as an example, in the nineteenth and twentieth century they already had "grain from the Midwestern USA; dairy products from Denmark and Holland; beef from Argentina; lamb from Australia; tea from the Indian sub-continent; coffee from Brazil; cocoa from West Africa; sugar from the West Indies." (Beardsworth & Keil, 1997, p. 37). Food and its trade had a big impact on international relations, such as the colonial pursuit for empires and the search for overseas markets (Tannahill, 1973, p. 257).

In the academic literature on food systems, authors use the terms *traditional* and *modern* to describe local, small-scale and low-tech value chains with the former, and large-scale, high-tech and national or global value chains with the latter expression. This wording already reflects the rationale of the underlying conceptualization of development in this context. The terms imply a linear progression from traditional farms towards modern systems with industrial production and urbanization (Dubé et al., 2014, p. 278). The distinction is artificial and contested, but it provides a construction of two opposite poles that can be used for discussions. However, it has to be noted that neither the global nor any national food system is solely traditional or modern, but always a mixture of both with varying tendencies towards the former or the latter. Furthermore, the construction of these two terms does not mean that one is better than the other.

Beardsworth & Keil (1997, p. 31 ff) suggest a distinction between the modern and the traditional system that can be made concerning four different activities: production, distribution, consumption and beliefs. Production activities in traditional systems are rather

small-scale, locally based and a high number of the population is involved in the processes of agricultural production. On the contrary, modern systems produce on a large scale and an industrialized, de-localized and often global level. Similarly, traditional distribution activities are locally bound and executed within social networks, friends and family. On the other hand, distribution in modern systems is global and governed by money and markets. Most people have no connection to food production. As a result, consumption in traditional systems is seasonal and limited to harvests, while the availability of some foodstuff depends on one's status or the general availability of the product. In modern systems, however, food is available more independently of the season and anyone who can pay for it can purchase it. A modern food system operates on an industrial scale and without a large share of the population working in agriculture (Beardsworth & Keil, 1997, p. 31 ff).

Kledal (2009, p. 1) suggests that there are four different typologies of food systems in countries of the Global South. He argues that it is important for food security, growth, and the improvement of livelihoods of the rural people living in poverty to understand these four types, as they help to analyze which actors in a given food system are included or excluded. First, there is the traditional system with unorganized supply chains and limited market infrastructure. Then, there are a bit more structured food systems, which differ from the traditional ones due to more market infrastructure and more rules and regulations in marketplaces. The third form is the industrialized system, which is in its description similar to the modern system. High standards of food safety, complex coordination, organized retailers and a focus on exports characterizes this type. The fourth type is constructed as an alternative food system with values such as trust, community, social and environmental welfare connecting farmers, intermediaries and consumers in "semi closed circuits of exchange" (Kledal, 2009, p. 1 f).

For example, small-holder farmers are assigned to traditional systems and are facing challenges to be included in commercialized market procurement systems. Supermarkets and agribusiness companies are linked to modern food systems, and they have been on the rise globally. This increase of supermarkets and big companies combined with their conditions on the suppliers regarding quality, size and delivery, causes a discriminatory environment for small-holders when they aim to enter these food supply chains (Kledal, 2009, p. 3 f). This is important to consider when sustainable diet concepts aim to contribute to a more equal food system. Only substituting food categories (e.g. more plant-based, less animal-based foods) to create a healthy

and sustainable diet will not automatically address these power relations in the food system. This statement will be explained in detail in the discussion in chapter five.

The different typologies of food systems may also contribute to the understanding of *nutrition transition* discourses. This means that traditional diets are increasingly replaced by diets high in processed foods, refined sugars and fats and low in fiber, which contribute to increasing body mass indices (BMI) and chronic non-communicable diseases (Tilman & Clark, 2014, p. 1). The trend towards these diets are linked to rising incomes and urbanization (ibid) and, therefore, currently takes place in many LMICs. The dietary transition is accompanied by an increasing prevalence of supermarkets and agribusiness companies in many of these countries (Reardon et al., 2012). From a food system typology perspective, this means a shift towards modern food systems. While modern food systems are associated with great economic perspectives, local food and traditional food systems are considered better from a human perspective (Dubé et al., 2014, p. 281). These perceptions influence the discourses of food system transformation advocates. The discussions are held from different perspectives and with different conceptions of a healthy and sustainable food system.

2.3.3. Historical transformations in food and agriculture in the last century

Food systems are not a neutral organization of food production and distribution, but inherently political systems that can aggravate or reduce inequalities between societies (Beardsworth & Keil, 1997, p. 42). In this chapter, I will focus on some key aspects that are important to understand the power relations of today's global food system and the discourse on the need to transform it. This includes several historic events, which led to global inequalities in the food system and contributed to what is perceived as the 'unsustainable' and 'unhealthy' food system of today.

A prominent concept to analyze the food system and its inherent power relations from a historical and structural perspective is the concept of food regimes, first formulated by Harriet Friedmann in 1987. A food regime analysis explains the strategic role of agriculture and food in the construction of the global economy (McMichael, 2009, p. 139). The concept is based on world systems theory and a historical political economy perspective, which helps to understand inherent hierarchies and power dynamics in a global capitalist economy. Therefore, it analyses the power that is inherent in historically shaped political, social and value regimes (Leach et al, 2020: 3). The theoretical approach to food regime analysis is the identification of relations

between capital accumulation within structures of geopolitical power that forms and conditions agricultural production and consumption in different places. Transitions towards new regimes take place due to contradictory relations within food regimes, which produce crisis and transformation (McMichael, 2009: 139).

The food regime concept provides a framework that helps to understand food politics and inherent power in food systems (Leach et al., 2020, pp. 1; 6). As the research question asks how global relations in the food system are negotiated in planetary health diet discourses, the following explanation of the three food regimes provides the context of more recent historic developments in the food system. Interestingly, crisis and contradictory relations within food regimes make transitions towards new regimes more likely. Therefore, I argue that the planetary health diet discourses can be classified as attempts to create a transition towards a new regime.

The concept historicized the global food system and offers a structured perspective on agriculture and food's role in a capitalist economy across time and national spaces (McMichael, 2009, p.140). The *first food regime* (1870-1930s) includes the emerging European industrial class, British colonial rule and colonial tropical imports (ibid). The Industrial Revolution increased the scale of technological advances in agriculture massively. It is known that these advances have been made, to a certain extent, at the cost of those that were formerly excluded from them, especially in the Global South. On a global scale, the development of the modern food system aggravated international inequalities (Beardsworth & Keil, 1997, p. 40).

Colonization intensified global inequalities and has been a major political influence on food systems, as it created a global distribution of food system ownership. The colonial order benefitted the colonizing powers through the imports of raw materials, including food and food ingredients (Hueston & McLeod, 2012, p. 191), and foreign economies were aligned to (food) commodity production for the West (Beardsworth & Keil, 1997, p. 41).

In the *second food regime* (1950s-1970s), flows of (surplus) food from the US was shipped to postcolonial states as a strategic maneuver in the Cold War, including the *Green Revolution*[7], technologies, food aid subsidized wages and *Third World industrialization* (McMichael, 2009, p. 140 f). Increasingly industrialized and globalized food systems arose in the context of

[7] The *Green Revolution* was an initiative in the 1950s and 1960s to increase agricultural production in the Global South (Leach et al., 2020). It will be discussed in more detail in chapter 3.2. Power relations in the food system.

economic reconstruction after the Second World War (Benton & Bailey, 2019, p. 1). The United States and its foreign policies played an important role in this by providing post-war relief assistance for Europe and creating plans for international economic development projects (Macekura, 2013, p. 128). The World War has also left its traces on regions outside of Europe. The Soviet Union, North Africa and East Asia too were in the need of recovery and reconstruction aid. Many new nations were formed in the decades following the end of the war, especially in Africa, the Middle East and Asia. These newly formed states were faced with the tasks of post-war rehabilitation and nation-building, which required appropriate infrastructure in order to compete on the global market and against former colonial powers (Macekura, 2013, p. 129).

Out of this context originated the Point Four Program outlined in US-president Harry S. Truman's inaugural speech in 1949, in which he announced a new direction for US foreign policy. The program's goal was to replace exploitative imperialism with an innovative policy project, which was not as innovative as he described it to be[8]. The program should help so-called 'underdeveloped'[9] regions of the world to advance economically and establish stable political states (Macekura, 2013, p. 127). This should be achieved by raising living standards through economic growth and developing productive capabilities in the respective countries with the help of US technical knowledge (ibid). More importantly, the United States had geopolitical interests in this program, as they intended to create "an open and extensive capitalist trading bloc" (Macekura, 2013, p. 129). In their fight against communism, the US looked to form strategic allegiances not just by fostering economic growth and relatively free trade but also by assisting in democratization processes and fostering political stability (ibid).

The two World Wars in the 20th century resulted in an economic crisis, disruptions to trade, war-associated food shortages and disease spread. This created a base for negotiations on global trade agreements and organizations to promote international stability and in 1947 the General Agreement on Tariffs and Trade was created (Hueston & McLeod, 2012, p. 191). Food and

[8] The program was not as innovative because the former US-president Roosevelt already set key precedents for this policy in the late 1930s and early 1940s (Macekura, 2013, p. 127 f). Furthermore, the concept of development existed already before the middle of the 20th century. Development is a complex concept and needs to be historicized with consideration of the full extent of its involvement and investment in colonial and post-colonial states and with the awareness that "[t]he interests served, the actors involved, the communities targeted, as well as the actual effects (intended or otherwise), vary tremendously according to the 'where', 'when' and 'how' of development policy and practice." (Mackenzie & Thompson, 2014, p. x).

[9] The term 'underdeveloped' preceded the denomination 'third world' and referred to "nations that produced primary products, lacked financial capital, and governed with limited democratic institutions or had recently declared independence." (Macekura, 2013, p. 128). Today, many scholars criticize both of these terms.

health have increasingly been on the agenda of international policymakers, so four international food organizations based in Rome have been established since World War II: the Food and Agriculture Organization (FAO) in 1945, created predominantly by the USA, the UK and Canada, as the Soviet Union chose not to participate. The World Food Program (WFP, 1963) was sponsored by the USA and supported by Canada and Australia, and the - at that time - recently founded nations agreed to it with suspicion (Talbot, 1990; Talbot & Moyer, 1987, p. 350). The World Food Council (WFC), as well as the International Fund for Agricultural Development (IFAD), were created in the course of the 1974 World Food Conference in Rome. This event was determined by the concern of a worldwide food shortage, that seemed to be likely to occur (Talbot & Moyer, 1987, p. 350).

The end of the Cold War in the late 1980s possibly indicates the emergence of a third food regime, in which global production and supply chains have intensified. Despite the resistance of governments and peasants, world trade liberalization allowed global agri-food actors to extent their influence by expanding into local markets (Leach et al., 2020, p. 6; McMichael, 2009, p. 142). Changing supply and value chains have resulted in a *supermarket revolution* (Reardon et al., 2012) and a dietary transformation, which especially LMICs with increasingly affluent populations experience at the moment. The shift in food systems is expressed by value chains that are increasingly driven by multinational companies and retailers (Popkin, 2014, p. 92), which causes increased consumption of processed and ultra-processed foods and beverages among rich and poor populations (Popkin, 2014, p. 94). Also, many small-holder farmers give up their land to migrate towards cities, where they often turn out to live as slum-dwellers (McMichael, 2009: 142).

The food regime concept provides an intellectual framework that allows to analyze and historicize food and agriculture in different contexts. It is an approach that helps to understand food politics and inherent power in food systems (Leach et al, 2020: 1; 6), which makes it a useful concept for the scope of this thesis.

3. Theoretical and conceptual background

3.1. Definitions and concepts of food systems

There are various definitions of food systems, which change over time and always have to be understood from the specific historic context. As there is no shared definition of the food system, some describe it as a deliberately vague or confusing term. This manifests in debates among diverse actors, who sometimes have opposing viewpoints on the meaning of the term and its implications for the need to transform the food system:

> "While for some this means drawing on systems science, to others it has come to justify a political agenda which advocates greater appreciation of the private sector's role in delivering industrialized food, and to yet still others, thinking 'systemically' means focusing critically on the root, political and structural causes of food injustices." (Leach et al., 2020, p. 2).

Also in political and scientific circles, the concept of food systems is used with different understandings. These understandings influence the discourses that are held and as a consequence, the actions taken within the system. This chapter gives some examples of the most commonly used definitions of food systems in order to create a common understanding for this thesis. For the same purpose, also the concept of food politics and selected power analysis theories will be elaborated on in more detail. Food is a political matter, but power relations in the food system often operate out of sight (Hossain, 2017, p. 25). Therefore, power analysis can contribute to debates regarding the improvement of equity in policy-creation and the overall discourse.

3.1.1. Definitions of food systems

Early literature on food systems from the 1960s mainly focused on addressing key dimensions of food systems from production to distribution issues in relation to the need to feed growing populations (Béné, Prager, et al., 2019, p. 149). In the 1970s, increasingly industrialized economies became interested in consumption and consumer-related questions (ibid). One example is Padberg (1970), who addressed the, at that time, rising concerns of consumer protection in the *American Journal of Agricultural Economics*. Nowadays, many scientists and

policymakers follow a holistic approach to food systems, which has only developed in recent years (Béné, Prager, et al., 2019, p. 149). The current perspective integrates:

> "all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the output of these activities, including socio-economic and environmental outcomes" (HLPE, 2017, p. 11).

The Food and Agriculture Organization (FAO) uses a different definition in its concept and framework paper on sustainable food systems:

> "*Food systems (FS)* encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded." (Food and Agriculture Organization, 2018, p. 1).

The FAO further points out that a sustainable food system needs to deliver food security and nutrition for all, which means that it needs to be profitable (economically sustainable), hold benefits for society (socially sustainable) and has a neutral or even a positive impact on the natural environment (environmentally sustainable) (Food and Agriculture Organization, 2018, p. 1). Further, food systems are complex and include many subsystems, such as farming or waste management, and also interact with other systems, such as the health, energy or trade system (ibid). Von Braun et al. (2020, p. 6) add that food systems' boundaries cannot just be defined by separating them from other systems. Different contexts and scales, such as urban, rural, local, national and global, need to be taken into consideration.

The definition of food systems provided by the FAO acknowledges actors from the beginning to the end of the value chains. For example, production includes not just farming, but also pre-production actors like input industries producing fertilizers or seeds. The range of actors includes science, technology and innovation, which are in some cases integral, in other cases partly embedded in the food system (e.g. life science and health research systems). Other relevant actors in food systems value chains are, for example, public and private quality and safety control organizations (von Braun et al., 2020, p. 6).

There are different types of definitions, such as broader or more narrow definitions, based on meeting the needed criteria for a specific project or purpose. The efforts of institutions, policymakers and scientists are often goal-oriented. To meet their goals these actors create working definitions, for example, for the goal to transform or change the food system. A normative approach can be inspired by international agreements such as the SDGs and the Paris Climate Agreement (United Nations, 2015; United Nations Framework Convention on Climate Change, 2015). According to von Braun et al. (2020, p. 6), widely accepted definitions of food systems include, on the one hand, a variety of actors and drivers and, on the other hand, contain the concept of sustainability.

The Scientific Group of the UN Food Systems Summit defines food systems as follows:

> "The food system includes the related resources, the inputs, production, transport, processing and manufacturing industries, retailing, and consumption of food as well as its impacts on environment, health, and society." (von Braun et al., 2020, p. 5).

In a concept paper, the scientific group suggests that for a practical definition, two criteria have to be acknowledged. Firstly, they suggest that the definition needs a normative element and objective goals such as meeting the 2030 Agenda for Sustainable Development (SDGs). More precisely, the definition should guide actions towards a positive change or even transformation in food systems, rather than just being of academic interest. The second criterion regards the issue of precision in the definition and depicting the systems' complexity in detail. The definition has to be precise enough to allow scientists, policy and other decision-makers to use it for data gathering, modelling and analysis (von Braun et al., 2020, p. 5).

Not just in discussions on sustainable food systems scholars try to create a common definition - they also aim at developing one for sustainable diets. In recent years, academics, NGOs and some governments have become increasingly interested in the idea of sustainable diets. But already in 1986 the scientists Gussow and Clancy suggested the inclusion of sustainability into dietary guidelines in the Journal of Nutrition Education (Gussow & Clancy, 1986; Scott, 2018, p. 95). However, policymakers and academic scholars have diverse understandings of sustainability, which do not always align. Regarding sustainable food systems, some focus on measures to ensure companies' compliance while others advocate for an overhaul of agricultural systems to local, small-scale agricultural production (Scott, 2018, p. 93). Advocates for either view are interested in the holistic approach of 'sustainable diets', as it also includes

food and nutrition security, land tenure and workers' rights next to sustainability considerations. However, the vague definition of sustainable diets leaves room for interpretation about what food should be consumed and how environmental impacts can be measured (ibid).

To address the fragmented understandings among policymakers, the Planetary Health Diet by Willett et al. (2019) attempts to provide a common framework and reference diet for nations around the world. But also this framework is controversially discussed and, therefore, did not achieve to create a commonly accepted reference diet. The fact that diverse versions of sustainability exist and do not always align (Scott, 2018, p. 93) is crucial for the analysis of power relations in the food system. Policies in the framework of sustainable diets can be shaped by and reflect different worldviews and ideologies of the policymakers in power. Thus, powerful actors in the international community can stress their version of a sustainable diet, while marginalizing alternative knowledge. This may cause unequal emphasis on the importance of different aspects. This will be discussed again in later chapters and the discourse analysis.

3.1.2. Food politics and power analysis in food systems

> "They [power relations, annot. B.S.] often operate out of sight and in such complex webs that even the most sophisticated and advanced solutions to hunger may fail to make long-term gains." (Hossain, 2017, p. 25).

Power manifests in different forms and on multiple levels and spaces in the food system. Not all of them are quantifiable or obvious. Therefore, it is sometimes difficult to make sense of them. Power is an abstract concept, but the effects of unequal power relations are experienced by many, e.g. through inequalities (Gaventa & Martorano, 2016). Power is an integral part of politics. Because power is multi-dimensional, it manifests as domination and resistance on the one side of the spectrum, and as collaboration and transformation on the other (VeneKlasen & Miller, 2002, p. 39). In theory, hierarchical power structures can be understood as *power over*, which is associated with repression, coercion, force and discrimination. Other forms of power, such as *power to* and *power within*, refer to empowerment and the unique potential people have to influence their life and a person's sense of self-worth. *Power with* is a form of power that creates collective strength and is based on solidarity and collaboration (VeneKlasen & Miller, 2002, p. 39).

Various actors constitute power relations in food systems in diverse ways and spaces. Economic power is held by agri-food companies that obtain this power through a concentration of capital and market shares and can, therefore, influence policies, food prices and food supply or quality. Political power, often held by government offices, international organizations, or public-private partnerships (PPPs), is exercised through influencing, implementing or blocking food policies or by shaping debates and public opinion through intellectual or organizational resources. The third form of power concerns the individual's authority, for example, to make household purchase decisions and decide over family meals (Hossain, 2017, p. 25). In political and scholarly debates on global food and nutrition, those forms of power that are utilized at high levels or are difficult to measure often remain overlooked. The focus thus often lies more on those forms concerning "the power of individuals (usually women) to feed families well, and on government commitment to food and nutrition security" (Hossain, 2017, p. 26).

Power is negotiated on global, national and local levels, through diverse actors, such as policymakers, practitioners or activists, in coalitions like farmers' unions and UN committees, as well as through a variety of methods, e.g. advertising or policymaking (Hossain, 2017, p. 28). The power struggle also influences who is participating in the spaces of dialogue. Power is highly concentrated among transnational corporations and they have a lot of influence on the decision making in global policy debates. Including alternative views or voices of those with little power in these debates is often hampered by the lacking dialogue with these groups.

International movements such as the food sovereignty and peasant movement *La Via Campesina* contributed a lot to increase awareness and foster a discourse of the human and ecological costs, which are side-products of the globalized food system. Therefore, they fight for a change in power relations, to return the control over land, markets and national policies to those who have limited power but can make good use of it in terms of ecological and nutrient outcomes. While individual civil society activists and scholars attained some influence in the space of power negotiation, many more of these movements have little access in these contexts and operate on the grassroots level (ibid).

Civil society activism itself is another powerful source of demanding change. However, in regards to nutrition and NCDs, local collective action or calls by civil society for structural change are unlikely, since these topics have a strong link to the internalization of neoliberal individualism. This means that people are preoccupied with individual responsibility when it

comes to nutrition and NCDs. Citizens often do not perceive the structural power that governments and big corporations have (Phillips et al., 2017, p. 11). Although civil society is generally in favor of policies that restrict the consumption and advertising of unhealthy foods, for the most parts this is only quiet support (Swinburn, 2019, p. 5).

On the contrary, other food-related issues do trigger active resistance and mobilize activists to protest those in power. Especially in the Global South, events such as the global food crises of 2007-2008, when food prices got out of control, regularly lead to protests and manifest in food riots[10]. The rapid changes in global commodity prices have the biggest effects on those who are facing hunger and poverty. At least in 14 countries in Africa, food riots took place around this time (Berazneva & Lee, 2013). Between 2007 and 2012, food riots occurred in more than 30 countries (Hossain, 2017, p. 29). In the Middle East and North Africa, food price protests even contributed to triggering the Arab Spring (Lagi et al., 2011).

Food riots are not just a response to price movements and economic hardship, but a political space to claim agency and demand action. However, in the poorest countries, food riots are less likely to occur, as it is known that acute deprivation demobilizes people (Bohstedt, 2016, p. 1035 f; O Gráda, 2009). Bohstedt (2016, p. 1036) state that: "[m]any different studies have found that the poorest people are too atomized, too weak, and too dependent and vulnerable socially and politically to act collectively or to take the risk of riot". Therefore, economic deprivation is not the only reason why rebellions over food prices take place. Rather, they often concern other economic injustices and inequalities as well, such as working conditions, wages or civil and political rights (Hossain & Kalita, 2014).

Food riots need to be analyzed from a political economy context, considering the affected country as well as the global food system (Bohstedt, 2016, p. 1035 f). These power struggles and outbreaks of violence have effects on the political space, especially through gaining attention and taking advantage of the power of mass media. This way, the protesters' concerns make their way to circles of political elites and on to policy agendas (Hossain, 2017, p. 29).

[10] The Merriam-Webster.com Dictionary (n.d.) defines a riot as: "a violent public disorder; specifically: a tumultuous disturbance of the public peace by three or persons assembled together and acting with a common intent". However, there is no consensus on a definition of *food riots* (World Bank, n.d., p. 1). One common understanding concerns the riots that occurred during the food price crisis between 2007 and 2012. Food riots are frequently directed against the government and may be triggered by dissatisfaction with food-related policies and subsidy programs, but also political and economic demands that are not related to food (World Bank, n.d., p. 6). For more information on food riots see, for example, Bush (2010), Newman (2020), or Patel & McMichael (2014).

These remarks on power relations clearly show that food is a political matter and an important topic for achieving sustainable and equitable development. Concepts on sustainable diets may or may not include considerations on these power relations. However, whether the actors in the discourses address the topic or not influences to what extent sustainable diets will influence current power relations in the food system.

Leach et al. (2020, p. 1) describe different theoretical approaches to understanding food politics, which are based on theoretical traditions in power analysis. These approaches are used specifically in food policies or literature concerning food and help analyze power in food politics. For example, the approach called *food interests and incentives* stems from rational choice and neoclassic economy perspectives, with the predominant assumption that changing market and behavioral incentives will result in different choices and decision of actors, e.g. what farmers decide to produce and consumers decide to buy. A contrasting approach to that is the *food institutions* approach, which is based on political economy analysis, political science and broader perspectives of economics (Leach et al., 2020, p. 2). Institutional arrangements determine power relations, be it formal or informal, visible or hidden, and a change in norms or institutional settings leads to a change in power. Approaches based on the social movement theory – *food contentions and movements approaches* – concern the power of bottom-up social mobilization and collective agency, which both can lead to changes when used to counter those in power (Leach et al., 2020, p. 2). The aforementioned food riots can be analyzed based on this theoretical perspective.

A core theory used in this thesis concerns food discourses, where power is exercised through ideas or the ability to determine the framing of narratives on a certain issue. In this concept, knowledge is rooted in ways of thinking, in everyday practices and ideologies. This includes the Foucauldian perspective, which states that power and knowledge are mutually embedded in discourses. Analyzing discourses, therefore, can "reveal power relationships in society as expressed through language and practices" (Leach et al., 2020, p. 4).

3.2. Power relations in the food system

Food systems are political and consist of hierarchical power structures. How concepts and theories of food politics manifest in the real world will be examined in this chapter. This involves aspects such as social and cultural power relations, politics of modernizing food systems and economic power relations, inequalities and socio-economic disparities in nutrition and health. These aspects are often the consequence of unequal power relations or stem from power dynamics in politics of nutrition science.

3.2.1. Politics of modernizing food systems and economic power relations

Since the 1930s, food systems of high-income countries have steadily developed to become more industrial. This means that priority has been given to achieving economies of scale, producing in large volumes and reducing the labor intensity of production (De Schutter, 2017, p. 1). In these increasingly industrial food systems, efficiency and specialization into certain types of production were encouraged. As a consequence, food diversity and self-sufficiency diminished and communities became less resilient. Trade liberalization and the growth of global supply chains only emphasized this process (ibid). However, still in the second half of the 20th century, entire regions around the world were facing food shortages and rising food prices due to population and insufficient productivity growth. In the 1960s and 1970s, policymakers reacted again with a focus on production. The general approach was to raise outputs and lower prices with a combination of technological advances and public policies such as subsidies to farmers (ibid, p. 2 f).

Initially, overproduction was limited to countries in the Global North after this production-oriented approach was implemented. However, in 1965-1966, national governments, international donors and the US government launched a program termed *Green Revolution* in countries such as India, Pakistan and the Philippines. The goal was to boost agricultural production and address hunger and rural poverty (De Schutter, 2017, p. 3). The Green Revolution policies focused on innovations in agricultural science and technology (S&T) in order to increase food production (Leach et al., 2020, p. 7). At the core of the Green Revolution was not just the aim of expanding production and increasing crop yields, but also Cold War geopolitics, nation-state building and state-capital alliances (Macekura, 2013). Countries of the Global South welcomed the foreign influence and scientific support of the US based on their own interests. India, for example, wanted to protect its sovereignty against the former British colonial power (Saha & Schmalzer, 2016).

From the 1960s to the 1980s, the systematic appliance of science-driven agricultural practices led to an intensification of production and an unparalleled rise in crop yields in these countries. Many economists and agronomists were excited about the innovations, but the developments also came with negative side-effects (Leach et al., 2020, p. 7). The Green Revolution soon showed its environmental and social costs, such as the spread of chemicals and its resulting harms on the environment and people's health. Further, the technological solutions did not benefit everyone among social groups and geographical locations equally (Niazi, 2004). Class politics have always been linked to the Green Revolution, with bureaucrats, elite scientists and affluent farmers and later big corporations exercising and growing their power (ibid). The increasingly globalized food supply chains worsened poverty and inequality in many rural areas of the Global South. Retailers, wholesalers and processing firms all have become larger and more concentrated since the 1980s. The dominance of large transnational corporations in the globalized food supply chains has weakened the position of small-scale suppliers. Small-scale farmers often face structural obstacles which make them highly dependent on buyers (De Schutter, 2017, p. 8 f). Access to seeds, for example, is restricted by patents and intellectual property rights regimes (ibid, p. 10).

Since the 1980s to early 1990s, expansion of the processing industry led to more and increasingly consolidated fast-food chains and a rise in global retailers selling processed to semi-processed foods around the world (ibid). The power of large companies to influence national food policies, local markets and individual food choices has contributed to the current nutrition transition in many LMICs and, as a result, increasing obesity (Hossain, 2017, p. 25). In global policy debates, the dimension of power relations often goes unnoticed and inequalities are perpetuated. One can visualize the power relations as an hourglass: on the top and the bottom – the two wider parts – there are millions of farmers who produce food and billions of people who need to eat every day. Centered in the middle, however, is the power of "a few large commodity distributors, suppliers, retailers, and processing and packaging firms" (Hossain, 2017, p. 26). They are in charge of mediating between those who produce and those who eat. Therefore, these actors have a central position of power.

Since the late 1980s, environmental and sustainability perspectives were increasingly included in the S&T innovation discourses. This trend continues to this day, where innovations are frequently labeled as 'climate-smart', and international organizations advocate for the need for a transition towards *climate-smart agriculture* (CSA) (FAO, 2013; Taylor, 2018). The urgent

need for a CSA transition is often based on the narrative of a neo-Malthusian crisis, suggesting that humanity will not be able to provide enough food for the estimated nine to ten billion people by 2050 (FAO, 2013; World Bank, 2015). CSA allows for more holistic approaches in agricultural and food policies, but still, is often implemented in an apolitical framework that just focuses on technical fixes. Therefore, current power relations in policies are not confronted with the CSA underlying questions of power, inequalities, and access (Taylor, 2018, p. 89).

Although many business actors advertise their commitment to sustainability, their investments are often based on considerations of brand reputation and company profits (De Schutter, 2017, p. 15; Leach et al., 2020, p. 8). The tension between the political and economic dimension becomes evident in debates on sustainability, but also on health-related issues. This shows, for example, the hidden power that industries have in the framing of breastfeeding as an individual choice, while effectively making great efforts through marketing practices towards mothers to buy breast-milk-substitutes. The power of these multibillion-dollar industries cannot be counterweight by information campaigns on the benefits of breastfeeding, especially because behavior change and information campaigns often target individuals rather than power structures (Hossain, 2017, p. 27). As governments choose different trade-related approaches, from protectionism to free trade and liberalization, it is easier for transnational companies to grow their markets and increase their power through marketing, e.g. by targeting children, in some countries more than in others (Gupta et al., 2021, p. 9; Ssemugabo, 2020). This influences not just politics and economics, but also social and cultural realities.

3.2.2. Politics of nutrition and diet - Social and cultural power relations

Eating habits have differed substantially around the world for almost all of human history, due to the varying availability of foods and means of subsistence. However, with the industrial revolution and ongoing processes of globalization and digitalization, what people around the world eat has been continuously changing and converging. Since the end of the 20th and especially in the 21st century, diets are becoming more and more similar around the world. These changes in diet have social as well as cultural consequences. For example, with increasing industrialization, the average time spent in the kitchen has been reduced gradually. More and more convenience food has become available as women entered the workforce, single-person households increased and population ageing proceeded (International Labour Organization, 2007, p. 7; Zahari et al., 2014). Changing gender relations and other social

changes influence nutrition and diets. Also, scholars studying the social aspects of food is itself only a recent phenomenon.

In contrary to disciplines such as history, anthropology and psychology, scientific interest in food-related issues has only become a field of interest in sociology in the late 20th century (Beardsworth & Keil, 1997, p. 3). Eating has probably long been seen as a taken-for-granted activity and sociologists did not consider the complexity of processes surrounding it. This could be because of the scholars' socio-economic surrounding; food supply was quite secure for the majority of people in the West, and among them especially for most sociologists. Also, food and food-related tasks were located in the domestic sphere, connotated with housework constructed as the traditional field of women. Therefore, it was not a very appealing issue for the historically male intellectual researchers and theorists (Beardsworth & Keil, 1997, p. 2).

There has not just been an artificial cut between the intellectual science domain and the mundane household, but also between scientific disciplines themselves.

> "Historically, sociologists have laid considerable stress on the idea of a clear dichotomy between the biological and the social, between 'nature' and 'culture', with the intellectual territory of sociology located firmly on the cultural/social side of this deep divide." (Beardsworth & Keil, 1997, p. 6).

This dichotomy came at the cost of neglecting topics such as the body, health and illness, food and eating (ibid). Around the 1990s, however, food became a topic of higher interest in sociology, especially regarding production processes and other related questions. Furthermore, the domestic sphere has attained a higher recognition by sociologists, as writers and theorists with a feminist perspective took initiatives to increase issues related to female experiences (Beardsworth & Keil, 1997, p. 4). Sociological concerns are often linked to broader political issues. Therefore, sociology's greater attention towards food reflects the higher importance of food-related topics in diverse policy areas. Interest grew among professional associations, pressure groups and the state in topics such as dietary standards, food purity and hygiene, production methods and standards, animal welfare, the links between diet and health, and the nutritional adequacy of food intake patterns of certain vulnerable groups such as low-income households, as well as environmental issues and concerns, to name but a few key examples (Beardsworth & Keil, 1997, p. 5)

The state is very involved in people's health, as public health policies make sure that the water is clean, sanitation is available, that people get mandatory vaccines, and more. Thus, governments play an important role in improving population health, as verified through rising life expectancies and, in many countries, an overall healthier population compared to 150 years ago (Hepple & Nuffield Council on Bioethics, 2007, p. v). All of these aspects include ethical questions because the state interferes with people's rights in order to improve their health. State interventions in health policies are often criticized and described as paternalistic or as a *nanny-state approach*, especially when they relate to personal behavior. People are sensitive about measures that tell them how to live (Hepple & Nuffield Council on Bioethics, 2007, p. 146). In how far a government can or should intervene in people's health and also in their nutrition requires careful consideration. However, value judgements are made with any regulation and even with the decision for no regulation (ibid). Some states decide to intervene with health policies more than others, for example through laws, taxes and regulations. Examples include taxes on sugary drinks or efforts to make school lunches healthier (Poole et al., 2020).

When individuals think they are choosing their lifestyle, they are not aware of how strongly influenced these perceived free decisions are by socio-economic disparities in health behavior (Pampel et al., 2010, p. 2) but also by government policies, various industries or inequalities in society (Hepple & Nuffield Council on Bioethics, 2007, p. v). The French sociologist Pierre Bourdieu developed the constructs of *habitus*[11] and *cultural capital*, which help to explain sociological phenomena such as social positioning or socio-economic inequalities in food choices (Costa et al., 2015, p. 3; Kamphuis et al., 2015, p. 2). Regarding nutrition and health, the question arises to what extent the government can actually influence people, especially when aiming towards the transformation of their diets and consumption patterns. Food is part of people's traditions, culture and identity. They are, therefore, quite resistant to changes in their habits.

However, besides culture and individual choices also the material and sociocultural resources a person has influences their health behavior. Bourdieu described that health- and lifestyle behaviors may be subject to class distinction, where high and low socio-economic groups

[11] "With habitus, Bourdieu tried to access internalized behaviours, perceptions, and beliefs that individuals carry with them and which, in part, are translated into the practices they transfer to and from the social spaces in which they interact. Habitus is thus more than accumulated experience; it is a complex social process in which individual and collective ever-structuring dispositions develop in practice to justify individuals' perspectives, values, actions and social position." (Costa & Murphy, 2015: 3f).

differentiate each other from the respective other group (Kamphuis et al, 2015: 2). In health behavior, the class distinction may motivate high socio-economic groups to adopt a 'healthy' lifestyle, i.e. healthy foods, tobacco avoidance (Pampel, 2006), exercise (Stempel, 2005) and thinness (McLaren, 2007). Lower socio-economic groups may distinguish themselves from this group with behavior like smoking that symbolizes toughness and independence to them (Pampel et al., 2010, p. 7).

To change one's diet and eating habits requires a lot of active effort and can hardly be imposed on people from the outside. The argument of better health attainable through different food choices is often not enough to change people's eating habits. Behavior change policies, therefore, frequently fail if they lack to account for cultural sensitivity and public acceptability against the background of structural inequality (Hepple & Nuffield Council on Bioethics, 2007, p. 41). Behavior change measures include, for example, regulations, taxation, information, incentives or the provision of services. They can lead to changes in behavior, but they can also lead to increases in health inequalities (ibid).

The analysis of power relations can thus help policymakers reflect on areas for action and possible areas of resistance before formulating nutrition policies. This increases the chances of formulating realistic interventions (Hossain, 2017, p. 27). One example is to reconsider the conceptualization of obesity as a personal responsibility issue. Not only does this assumption lead to stigmatization and blame, but also the policies based on such an assumption are less likely to succeed, as underlying power relations are not considered. This is similar to the example on breastfeeding given before: If advertising and pricing strategies tempt people to buy an ultra-processed but affordable product, how likely is it that billions of individuals choose to buy vegetables and fruits as a healthier but maybe more expensive alternative instead? (Brownell et al., 2010).

3.2.3. Inequalities and socio-economic disparities in nutrition and health

Inequalities on societal, national and regional levels are often rooted in global inequalities. As markets for goods are international in modern food systems, famines and shortages in food supply rarely occur on a big scale. However, shortages do put a strain on some groups in particular places around the world due to political or social constraints (Beardsworth & Keil, 1997, p. 34).

Health outcomes, therefore, do not just differ between nations, but also across various sub-groups in a population. Criteria such as socio-economic status, geographical location, age, gender, disabilities and racial or ethnic backgrounds need to be considered to address these inequalities (Hepple & Nuffield Council on Bioethics, 2007, p. 21). What all of these factors have in common is that they can lead to socio-economic disparities, with corresponding effects on people's health status and nutrition. These constraints, however, are political and structural, as enough food is produced already to feed the whole global population (UN Environment Programme, 2020).

In the 21st century, famines have mostly arisen in the contexts of armed power struggles, when combatants have used hunger as a weapon (Hossain, p.25). But also manifestations of inequalities in the global food system combined with environmental occurrences, such as droughts, cause food crises and famines. For example, the food crises from 2016 to 2017 in East Africa and the Middle East afflicted people who were already hungry or undernourished because of violence, displacement, high food prices or climate change (Hossain, 2017, p. 25 f). Climate justice discourses and movements draw attention to the impacts of climate change on public health as well as the circumstances of socially or economically vulnerable populations. Some groups are more vulnerable to climate change due to conditions imposed by poverty. Furthermore, "[a]dditional threats come when poverty intersects with other parameters of exclusion, such as gender, ethnicity, age, health status, caste or geographical location." (Adams & Luchsinger, 2009, p. 22).

For a long time, development discourses were held with the belief that economic development is the key to improve people's health. However, the factors are mutually dependent as improved health is necessary to attain economic development and poverty reduction (Boutayeb, 2006, p. 196). Development is not the magic key that automatically causes better health. Since the beginning of the 21st century, a wide range of evidence proofs that economic development can even accelerate the circumstances of poor and marginalized people. What is needed for sustainable development is health equity (ibid). As outlined earlier, chronic diseases are a major burden in LMICs and, therefore, drivers for health inequalities as well as poverty. Those who aim to achieve poverty alleviation need to address these conditions (Horton & Sargent, 2018, p. 1).

However, the economic dimension does play an important role in the complex relationship between diets, malnutrition and wealth in LMICs. In some settings, lower-income groups are faced with malnutrition in all its forms, while higher socio-economic groups increasingly suffer from obesity. Along with developments in countries' food environments, the increasing *obesogenic*[12] food environment causes the obesity prevalence to shift (Fanzo, 2019, p. 499). Then, lower socio-economic groups are the ones who are facing increases in obesity. Especially women in these socio-economic levels are very vulnerable to this transition. Over time wealthier and higher-income groups tend to buy healthier and more expensive foods. Lower-income groups, in turn, "will bear the burden of poor diets and obesity" (Fanzo, 2019, p. 499).

Dietary transition and higher consumption of obesogenic foods are often related to urbanization and a higher disposable income. However, increasing urbanization and the resulting food insecurity and poverty are also linked to *de-agrarianization*[13], for example, in Southern African and West African cities (Bosu, 2015; Frayne et al., 2014; Kroll et al., 2019, p. 2). Food insecurity causes reduced dietary diversity in many LMICs. Therefore, cheap foods such as starchy staples, sugar and oils are used as substitutes (Kroll et al., 2019, p. 2). An analysis of food security conducted in the Ghanaian city Accra found that, on average, households spend 54% of their income on food. Therefore, changes and fluctuations in food prices affect these households in particular (Codjoe et al., 2016, p. 203). Food insecurity causes city dwellers in Ghana to cut back on the amount of food they consume or they have to resort to lower quality and nutritionally inferior foods (Kroll et al., 2019, p. 2).

Although global sales of ultra-processed foods accumulate according to the level of urbanization, over the last decades, sales grew a lot more in LMICs than in high-income countries (Kroll et al., 2019, p. 22). Findings of the study on obesogenic food environments in South Africa and Ghana confirm that consumption and purchases of ultra-processed foods in urban settings in these two countries are high. However, the correlation of obesogenic foods with high income is less clear, and a variety of factors, e.g. the levels of poverty or the structure of the food economy, may influence the outcomes (Kroll et al., 2019, p. 23).

[12] The term *obesogenic* first appeared around 1996 and "was developed from a blend of the word *obese* and, by analogy with terms like *carcinogenic* (causing cancer), *-genic* as a suffix meaning 'tending to create'." (K. Maxwell, 2003, para. 3). Therefore, the term relates to foods and environments that are more likely to cause obesity (ibid).

[13] The term *de-agrarianization* describes the "process of economic activity reorientation, occupational adjustment and spatial realignment of human settlement away from agrarian patterns" (Bryceson, 1993, p. 5). This includes that the number of people working in agriculture declines and less people reside in rural areas (ibid).

A widely recognized aspect of nutritional inequality is gender inequality. Various forms of chronic malnutrition are common in areas where women's power in the household and society is strongly limited. These chronic forms of malnutrition are often linked to poor child and infant nutrition status and low birth weight. Gender bias, which results in assigning different values to female or male identities, lead to different outcomes in child survival in countries where they occur (UNICEF, 2011, p. 41). Due to this bias, girls who are born into a family that is forced to ration meals are more likely to face hunger than boys in these families. Boys are often favored due to their role as future breadwinners, while girls are considered as a burden to the family, as they will leave when they get married (ibid). However, efforts made regarding women's empowerment often only focus on their purchasing power, but less on their participation in higher levels of control in the food system, such as in policy debates (Hossain, 2017, p. 26).

Gender inequalities intersect with inequalities stemming from socio-economic class, family income and location. However, social status seems to be the overall larger determining factor whether or not children are stunted (i.e. low height-for-age) or wasted (i.e. low weight-for-height) (Hossain, 2017: 26). A group that is often facing poverty, as well as sociopolitical marginalization, is indigenous peoples. In Latin America, the double burden of disease affects many countries but is especially high among indigenous peoples. For example, a study conducted in Guatemala concluded that among indigenous peoples in highland regions, over a quarter of families are faced with stunting among children and obesity among the mothers (Ramirez-Zea et al., 2014). Also in high-income countries such as Australia or Canada, indigenous people often face a higher risk of obesity due to the kind of access they have to changing food markets. Marginalized people in urban settings are often living within so-called *food deserts*, where fresh and whole foods are not available or not affordable (Hossain, 2017, p. 26).

3.2.4. Politics of (nutrition) science

Academia and science play an important role in forming discourses through the power actors in these fields have. In the second half of the 20th century, a sense of professionalism began to guide political and scientific discourses, meaning that science and policies should be drafted based on facts and regardless of political considerations such as ethnicity or religion (Staples, 2006, p. 8 f). However, science is done by humans and is defined by human capabilities of making sense of, e.g., the food system. Therefore, science always has its limitations and human

influences. I will elaborate on these limitations and the political power that scientists have in this section.

The field of planetary health diet is a transdisciplinary field of science. It consists of fields such as nutrition science, environmental studies, sociology and more. Nutrition science emerged out of medicine when scientists figured out what vitamins, calories, proteins, carbohydrates and other nutrients are and how they are related to bodily functions. Although nutrition science belongs to the field of natural sciences and relies on positivist methods of research, there is still room for interpretation in study findings and the resulting reference values. Any attempt of categorizing foods as healthy or unhealthy includes societal or ethical influences. This is an important aspect that needs to be considered when talking about the concept of healthy diets. As already outlined before, also the EAT-Lancet reference diet has been criticized for various methodical and data reliability concerns (Drewnowski, 2020; F. J. Zagmutt et al., 2019, 2020).

Nutrition science contains controversial discussions, for example, the discourse juxtaposing plant-based versus animal-based food. This is partly because many people have nutritional beliefs which are not always based on science but intuition or conjecture (Brown et al., 2014, p. 563). Biases also exist in nutrition science literature itself. Although scientists are responsible to be truthful about the research, financial ties to industries or other financial conflicts as well as moral considerations can cause distortions of the reported research (Brown et al., 2014, p. 564). Supposedly simple things, such as the definition of terms, can have a big impact on policies and, in effect, on societies' health. This also pertains to the definition of 'healthy' in the sustainable diet discourses. While, for example, the FAO states that industrialized livestock production is unsustainable, it also needs to be stressed out that for many small family farms, meat consumption is important for their nutritional status (Fresán & Sabaté, 2019, p. 385).

There are still many knowledge gaps regarding sustainable diets and environmentally-friendly nutrition. More research must be done on the effects on health and sustainable dietary patterns in general. In the assessment of sustainable diets, the focus has largely been on greenhouse gas (GHG) emissions as an indicator of the environmental footprint. Greenhouse gas emissions "strongly correlate with energy inputs, water use, land use, water eutrophication, nitrogen release, and air acidification" (Fresán & Sabaté, 2019, p. 385). A sustainable diet or considerations of sustainability, in general, should not just include GHG emissions, but also other factors such as ozone layer depletion or biodiversity loss (ibid).

It is important to emphasize that a lot of research on diet sustainability has been done in high-income countries. More data from LMICs is needed on health and diseases as well as on sustainability and environmental issues (Engelgau et al., 2016, p. 2; Fresán & Sabaté, 2019, p. 385). In LMICs, not just cultures and traditions are diverse, forms of production can vary greatly, as well as disease patterns and phenotypes might diverge from those in high-income countries (Engelgau et al., 2016, p. 2). Also, environmental and economic circumstances are different among countries and regions. For example, some data indicates that food-related GHG emissions are lower in low-income countries (Fresán & Sabaté, 2019, p. 385) This has to be considered when assuming that research findings can be transferred easily into other contexts, as well as in planning a *truly* planetary health diet.

However, due to the fast-changing dynamics in food systems, quantitative data is scarce not just in low- but also in middle- and high-income countries. Béné, Prager, et al. (2019, p. 149) argue that much of the interest and concerns regarding the unsustainability of the modern food system are expressed in qualitative studies, while quantitative data availability is insufficient. Data concerning food systems sustainability are often fragmented and incomplete.

3.3. Notions of the modern food system's limitations

Our food system is failing us: this is a common narrative in the discussion on the need to transform the global food system. To understand the underlying claims and the references made, I will elaborate on some scientific arguments, data and discourses on three aspects of the food system. These aspects concern the topics of health, the environment, and food security and are also at the core of the planetary health diet and sustainable nutrition discourses. Considerations on health and the environment from previous chapters will be extended by a more detailed discussion. Food security is a political topic that involves human rights but also the economic system the food value chains operate in. Therefore, I will also discuss the social aspects of human rights and food security in the globally dominating system of commercialization and neoliberal market ideology. All these aspects – human health, the environment, and the economic, political and social system – are connected in the discourse on the modern food system's limitations.

As an introduction to this, I refer to an informational and educational video that was uploaded on YouTube by the UN Environment Programme (UNEP) in 2016. It is one of many possible ways to understand and conceptualize the modern food systems problems. The video is titled

with the question: “Why do we need to change our food system?” (UN Environment Programme, 2016) and answers with four categories of limitations. It has to be noted that the UNEP is a political organization and the video is a good example of how the discourse on limitations is formed. This is often done with a hint of urgency, as scientists and political actors refer to population growth and the question of how the estimated 2 billion additional people on this planet by 2050 can be fed healthily and within planetary boundaries (UN Environment Programme, 2016).

The food system’s limitations suggested in the video are:

1. **One out of three people ‘suffers’ from malnutrition, including hunger as well as obesity:** The UNEP states in the video that one out of three people is affected by malnutrition. It refers to people experiencing hunger or insufficient access to vitamins and minerals and, as a consequence, experience health problems. At the same time, there are more and more people who are obese and diagnosed with chronic illnesses such as type II diabetes.
2. **Our food is too rich in fat, sugar, salt and meat:** This has impacts on health and the environment, such as heart disease or high GHG emissions from meat production. Further, the food is less diverse, as 75% of food only comes from twelve plants (e.g. rice, corn, wheat) and five animal species (e.g. cows, chicken, pigs).
3. **One-third of food is wasted:** Globally, one-third of all food produced is not eaten but thrown away at some point in the value chain.
4. **Natural resources are under pressure:** Water pollution, scarce freshwater resources, soil degradation and threats to biodiversity are problems that climate change intensifies.

The UNEP concludes in the video that these limitations clearly show why the food system needs to be transformed, and why each step of the value chain – from production to processing, distribution and consumption – needs to be adjusted to provide healthy food for a growing population under the current environmental constraints (UN Environment Programme, 2016).

This example was chosen because it outlines the most common argumentation of international organizations that are working towards global sustainable diets: The issues of malnutrition, unhealthy foods, food waste and the intensification of environmental problems through climate change are framed as the main obstacles that need to be transformed for a food system that promotes sustainability and human health. The UNEP did not provide a solution to these issues

in its video. However, these arguments need to be kept in mind to understand the power relations in the discourse that became evident in the discourse analysis and will be presented in a later chapter. For now, we will go more into detail on the scientific considerations of the different limitations. The first section focuses on the health aspect of nutrition and the second on the environmental limitations that the food system has. The third combines these two aspects with considerations on human rights and the neoliberal market ideology the global food system is operating in and the effects this has on both of the former limitations.

3.3.1. The modern food system's burden on human health

The modern food system's effects on human health usually refer to the high number of chronic diseases in the category of non-communicable diseases, which are the leading cause of deaths globally. The term NCDs includes chronic and non-infectious diseases such as diabetes, heart diseases, chronic respiratory diseases, stroke and cancer (World Health Organization, 2010, p. 2 f). For a long time, these diseases have been considered to be problems of high-income nations (Kankeu et al., 2013, p. 1). However, by now, the disease burden (morbidity and mortality) of NCDs is higher in many LMICs than in high-income countries, with the majority of cardiovascular disease deaths occurring in LMICs (Benziger et al., 2016, p. 393).

Public health and international organizations have become interested in NCDs only towards the end of the 20th century (McQueen, 2013, p. 337). Originally, public health developed out of concerns with infectious diseases and their effects at the population level. Living conditions in industrialized countries improved after World War II, when medical research achievements like vaccinations and antibiotics were made. Chronic diseases have become the major disease burden in those countries (Boutayeb, 2006, p. 191) as well as globally.

In the last four decades, researchers found out a lot about the causes of non-communicable diseases (World Health Organization, 2010, p. 2). Those insights led to declining death rates in high-income countries. At the same time, death rates among young adults and poor populations are rising in many LMICs. According to the WHO, nine million people die from NCDs globally before the age of 60 years (ibid, p. 3). Out of all premature deaths, over 85% are occurring in LMICs (World Health Organization, 2018). Furthermore, the WHO estimated that 5.3 million deaths are due to unhealthy diets combined with a lack of physical activity, 7 million are caused by high blood pressure, 4.4 million deaths are due to high cholesterol and 5.4 million occur because of tobacco consumption (World Health Organization, 2010, p. 3). However, it has to

be noted that the evaluation of disease or death causes is complicated because different conditions are often overlapping and linked (Boutayeb, 2006, p. 195).

"What the world eats is now considered a major risk factor of multiple forms of malnutrition and health outcomes." (Fanzo, 2019, p. 497). NCDs are often linked to suboptimal diets and reasons that are suggested to be valid across all world regions are dietary risks, high blood pressure and tobacco smoking (Benziger et al., 2016, p. 393). Many public health researchers and practitioners consider a broader approach that includes contextual factors such as mental illnesses or environmental factors (McQueen, 2013, p. 338). In the *Global Burden of Disease Study* (GBD), the authors identify demographic changes stemming from an ageing world population an additional reason for increasing NCD deaths. The focus on nutrition in NCD discourses is justified because malnutrition in all its forms exceeds other causes, such as tobacco smoking, in the share of life-years lost or lived in 'disability'[14] in the meaning of poor health (Fanzo, 2019, p. 497). Nonetheless, it is important that researchers and practitioners also consider the contextual factors.

A 'suboptimal' diet is defined by the consumption of unhealthy foods, but also by which food is not eaten. The composition and patterns of diets influence the level of risk one has towards disease and death (Fanzo, 2019, p. 498). A recent study published in the medical journal The Lancet shows that the top four dietary risk factors for countries at all income levels (except low income-countries) are diets low in whole grains, fruits, vegetables, nuts, and seeds, as well as foods containing a large amount of sodium (ibid). In this study, a comparative risk assessment approach was used to provide an evaluation of the dietary impact on human health (GBD 2017 Diet Collaborators, 2019). Interestingly, the study finds that

> "[o]f the countries with high populations, high consumption of red meat, processed meat, and sugar-sweetened beverages as well as foods with high levels of trans fats were ranked lower as dietary risks for increased death and DALYs. These estimates suggest that not eating healthy foods is more detrimental to health status than eating unhealthy foods" (Fanzo, p.498).

[14] A common measure used for considering nonfatal outcomes alongside mortality in public health contexts is termed *disability-adjusted life year* (DALYs). The understanding of disability in the context of this measurement differs from contemporary understandings and refers to "functional or structural impairments, limitations in personal activities, and restrictions on social participation within the context of environmental factors." (Grosse et al., 2009: 198). The paper "Disability and Disability-Adjusted Life Years: Not the Same" by Grosse et al. (2009) discusses the differences more in depths. DALYs reflect the effects of NCDs on population health. These effects include cardiovascular diseases, diabetes and cancer, which can be caused by or correlate with certain diets (Fanzo, 2019, p. 498).

This assumption is noteworthy, however, it may need some further investigation and should be used with caution when it comes to dietary recommendations. Considering that healthy food includes nutrients that unhealthy food does not or to a much lower extent, the findings of the study are intuitive in the sense that eating healthy food and ensuring the provision of nutrients is detrimental to one's health status. It might be problematic to assume that the high consumption of processed meat and foods with high levels of trans-fats are not considerable influences on one's health status.

In most regions of the world, individuals consume more food items classified as unhealthy compared to those classified as healthy. Scholars often use the term *nutrition transition* to describe this phenomenon. More and more diets consist of a "significant share of packaged, processed foods, such as sugar-sweetened beverages, baked goods, dairy products, processed meats, chips and crackers, cake mixes, pies, pastries and sweets. Generally, packaged foods are industrially processed and high in salt, sugar, and saturated and trans fats" (Fanzo, 2019, p. 497). These dietary shifts and increasingly obesogenic food environments are linked to increasing global incidences of NCDs. The changing diets often result in rising body mass indices (BMI) in the population and cause more and more people to become overweight or obese (Tilman & Clark, 2014, p. 1). The consumer preferences towards more unhealthy, cheap and convenient diets are explained with the transitions of globalization and urbanization, accompanied by the increasing interconnectedness of places and people (Fanzo, 2019, p. 497).

One example of this transition is China, where growing incomes and changing diets led to an increase in type II diabetes from <1% to 10% between 1980 and 2008. Tilman & Clark (2014, p. 1) refer to Hu (2011) when they state that this is "partly because type II diabetes occurs at lower BMI levels and earlier in an individual's life in Asian than in western populations". Varying dietary risks factors are prevalent in different regions: the consumption of highly cured foods across East Asia, the low consumption of fruits and vegetables in sub-Saharan Africa, and the low consumption of nuts and seeds in Latin America (Fanzo, 2019, p. 498). This needs to be considered in the attempt to conceptualize a planetary health diet.

3.3.2. Climate change and environmental destruction

There are plenty of discourses and studies on climate change and other environmental issues, one the one hand from a natural science perspective and, on the other hand, from a social and equity perspective. Some aspects of climate change have already been discussed in the previous chapter on the Anthropocene, as well as in the discussion and definition of sustainable food systems. In this chapter, I will elaborate on the problems of climate change, especially for the food system, such as eutrophication, deforestation, overfishing and effects of agricultural practices on the environment. In climate change research, various concepts have been developed as part of a framework for working against the "destabilization of the Earth's ecosystem" (Bozeman et al., 2020, p. 160). Among them are the concept of planetary boundaries or the theory of tipping points (ibid).

The *Intergovernmental Panel on Climate Change* (IPCC) introduced the concept of so-called tipping points. This refers to

> "critical thresholds in a system that, when exceeded, can lead to a significant change in the state of the system, often with an understanding that the change is irreversible. An understanding of the sensitivities of tipping points in the physical climate system, as well as in ecosystems and human systems, is essential for understanding the risks associated with different degrees of global warming." (Hoegh-Guldberg et al., 2018, p. 262).

This concept is linked to the Paris Agreement of 2015, which 195 nations adopted. Through the *United Nations Framework Convention on Climate Change* (UNFCCC), most governments agreed on the goal of limiting global warming to below 2°C and working towards limiting temperature rise to 1.5°C above pre-industrial levels (IPCC, n.d.). The IPCC provided a *Special Report*, covering research that explains what happens if global warming exceeds 1.5°C above pre-industrial levels. It also focused on climate change threats related to the aspects of sustainable development and poverty eradication (ibid).

The production of food and other food system-related activities are major contributors to GHG emissions as well as biodiversity loss and terrestrial and marine ecosystem transformations (Willett et al., 2019, p. 467). Figure 2 illustrates the share of global GHG emissions from food in the year 2015. The *IPCC Summary report on climate change and land* states that 69-76% of the global ice-free land is directly affected by humans. Researchers assume that around a quarter of this ice-free surface is affected by human-induced degradation, such as soil erosion or

desertification caused by climate change (IPCC, 2020, p. 7). Furthermore, the aquaculture sector is expanding, and more and more terrestrial, coastal and offshore space is used (Lester et al., 2018; L. M. Pereira et al., 2020, p. 2).

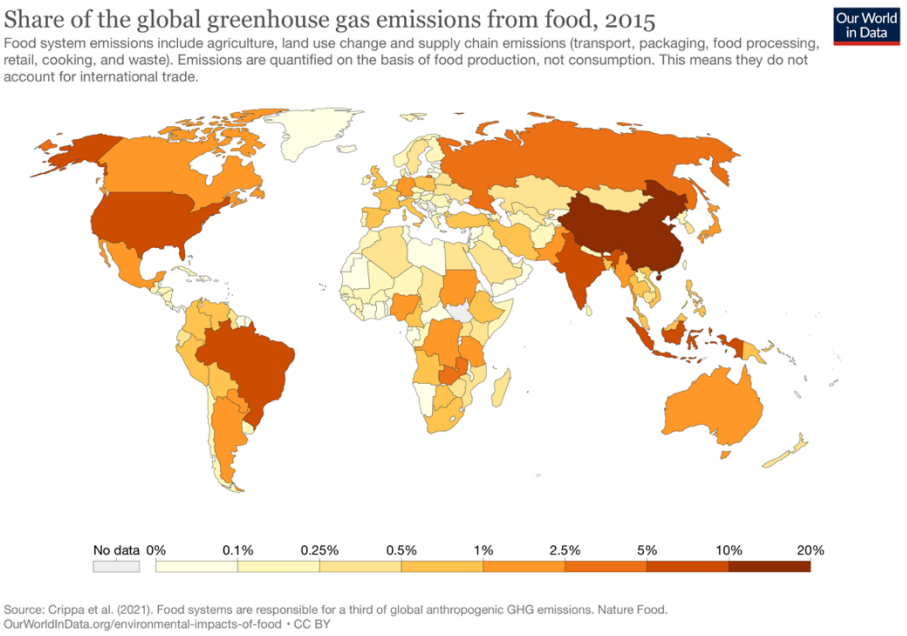

Figure 2: Share of global greenhouse gas emissions from food, 2015. Source: Our World in Data, 2021. Open access under the Creative Commons BY license.

According to calculations, 88% of global fish stocks would be overfished in 2050 if the current fishery management will not be reformed (Worm, 2016, p. 4895). Industrialized agriculture also correlates with chemical pollution and water eutrophication from changing nitrogen and phosphorus cycles through synthetic fertilizers (L. Pereira et al., 2018, p. 4). The emissions from agriculture, forestry and fisheries are almost twice as high compared to 50 years ago and are likely to increase further, to an estimated additional 30% by 2050, if no reduction measures are put into place (A. Tripathi & Mishra, 2017, p. 196).

As pictured in Figure 3, different food products have a strong influence on GHG emissions. The dietary composition can cause high numbers of GHG emissions, tendentially when a high amount of animal-based food is consumed. Ruminant meats such as beef and lamb, therefore, have around 250 times more emission per gram of protein than legumes, and also eggs, dairy, poultry and pork have lower emissions per gram of protein (Tilman & Clark, 2014, p. 1). These numbers, however, depend on the calculation method and the data used, as well as on the production methods for a given food. If ruminants graze on lands that are otherwise unsuitable for crops, the production is not just sustainable because it provides environmental benefits for

nutrient cycling, but also benefits the dietary quality and increases food security (Tilman & Clark, 2014, p. 1).

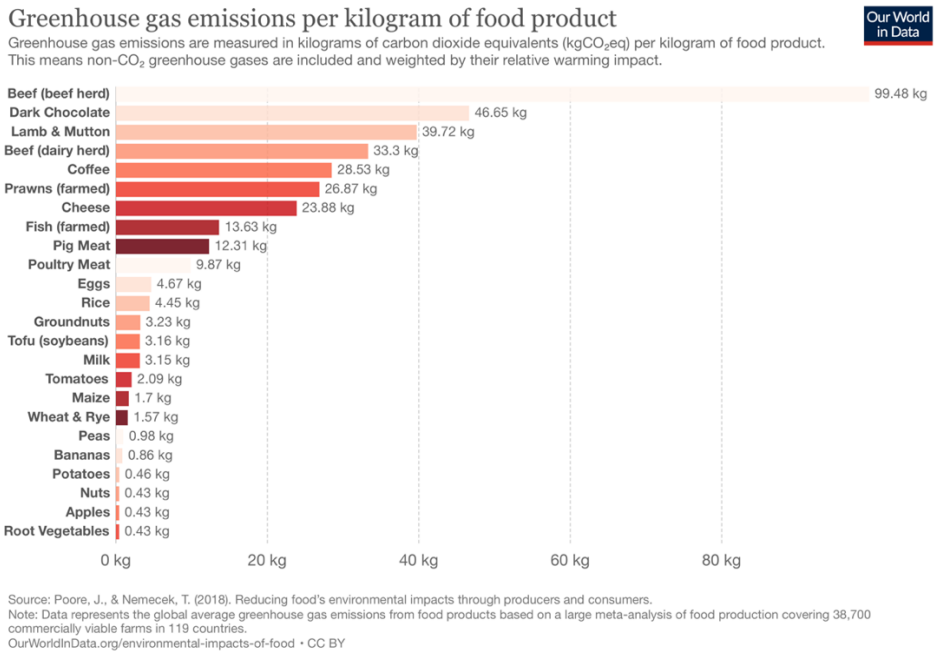

Figure 3: Greenhouse gas emissions per kilogram of food product. Source: Our World in Data, 2018. Open access under the Creative Commons BY license.

The environment also has an important effect on human health. More and more studies find a correlation between chronic, non-communicable diseases and environmental factors such as air pollution (World Health Organization, 2017). Further, the *World Resource Report* states that protein consumption and demand for animal-based foods are growing globally. However, many people believe common protein and meat myths such as, for example, that meat provides essential amino acids that cannot be acquired from plant-based foods or that more protein is always better (which is only true for individuals who are malnourished) and as a result, many individuals consume more protein than necessary (Searchinger et al., 2019, p. 67).

Effects of climate change do not impact poor and rich countries alike. Rather, low-income countries experience the most detrimental effects from climate change-related damages. Many of the wealthiest nations experience no net impact and in terms of agriculture, might even benefit from a limited climate change in some places (Mendelsohn et al., 2006; A. Tripathi & Mishra, 2017, p. 196 f). The main reasons are the geographical location of low latitudes and already hot climates. Economic factors might also strongly contribute, such as GDP in agriculture, technology, wealth and climate change adaptation, but to a lesser extent

(Mendelsohn et al., 2006). Hertel & Lobell (2014, pp. 562; 573) concluded in their study that climate impacts are most extensive in countries located in tropical regions, where low-income communities are often dependent on the agricultural systems and have little adaptive capacity to deal with the climate change effects.

Countries like Bangladesh or Pakistan are highly vulnerable and susceptible to extreme weather conditions, such as droughts in western Bangladeshi villages (Kabir et al., 2017, p. 212) and floods and droughts in Pakistan (Fahad & Wang, 2018, p. 301). A study conducted in four districts in rural Pakistan finds that "soil fertility loss, water scarcity, changes in crop yields and crop diseases were the main determinants of climate variability" (Fahad & Wang, 2018, p. 301). Although farmers make use of adaptation techniques, such as farm diversification or changes in fertilizer or crop type, their efforts are often constrained by the effects of unequal political and structural power. These structures may cause a lack of market access, governmental support or credit sources as well as poverty and insecure land tenure systems (ibid). Similarly, farmers in Bangladesh make use of a wide range of adaptation measures. However, these farmers face constraints in the access to agricultural adaptation technologies, such as for stress-tolerant crop varieties. Modern technologies are often inaccessible because of high production costs and volatile prices for agricultural outputs (Kabir et al., 2017, p. 223).

Other concerns exist regarding the need for appropriate policy measures that provide better price stability for "agricultural products, quality of inputs and access to credit" (Kabir et al., 2017, p. 223). A study on climate engineering discourses reflects this. The research shows that countries of the Global South, although often being most affected by climate change, are marginalized in the discussion about these new technologies (Biermann & Möller, 2019, p. 151). Knowledge production and discourses on climate engineering are located dominantly in big research institutions in Europe and North America (ibid).

3.3.3. Human rights, food security and market failure in the food system

The modern food system is predominantly based on technology and innovation. Large food corporations and industries, the financial market, stock exchanges and World Bank loans and policies are powerful actors in the food system. In critical discourses, especially World Bank policies are suspected to have contributed more to impoverishment in many cases, instead of to economic development these policies had promised (Havnevik et al., 2007). However, global power relations are changing. Trade among developing nations, referred to as South-South

trade, is rising. From 2004 to 2011, it has more than doubled (Meng et al., 2018, p. 1). Although many countries in the Global South experience high rates of economic development, there is still a significant number of vulnerable and marginalized people "who are considerably poor to concern themselves with issues such as climate change" (Mukherjee & Mustafa, 2019, p. 1). To address this problem, *The Right to Development* is linking climate change and human rights in international human rights law (ibid).

The international community also discusses ethical questions about the moral obligation to compensate vulnerable people who suffer from climate change impacts. This foregrounds the responsibility of the Global North as the main contributor to the unsustainability we are facing today. With the *Polluter Pays Principle*, the responsibility is assigned to emitters of high quantities of GHG, who should compensate those negatively affected by climate change (Baatz, 2013, p. 95). The principle is recognized internationally as a legal principle and plays an important role in national and international environmental policy (Grossman, 2006, p. 3). The Polluter Pays Principle is a principle of justice and, therefore, must be implemented fairly (Zahar, 2020, p. 129). However, what is *fair* in terms of climate change compensation is a matter of discussion and needs clear justification (Baatz, 2013, p. 95).

Another important legal framework is the human right to food. Food security is a concept that involves four components, which must be fulfilled to address this human right. These four components are *availability*, *accessibility*, *adequacy* and *acceptability* (Rocha, 2007, p. 7). Countries that are food insecure due to extensive crop failure or wars and conflicts often do not have enough quantity of foods available to provide for the whole population. In other cases, enough food is available for a region or a country, but people cannot access this food due to a lack of economic means. People experiencing this kind of food insecurity can also be found in the richest countries of the world. Poverty hinders those individuals from participating in markets where food is sold. This hindrance leads to health insecurities such as malnutrition or hunger (Rocha, 2007, p. 8). Studies and discourses on food deserts, places where healthy food is just not available, are linked to this kind of food insecurity (Frayne & McCordic, 2018; Wagner et al., 2019).

Food adequacy refers to the quality of diets and the nutritional content of foods. This type of food insecurity is related to the so-called obesity crisis, as well as the dietary transition in the Global South. Food acceptability is an indicator of the adequacy of food production and access

regarding people's dignity and self-respect. Food aid and the inhumane working conditions of food workers around the world are indicators of food insecurity. In market economies, people access food through markets. However, when markets fail people's dignity and human rights are undermined (Rocha, 2007, p. 8 f).

Market failure is an economic theory. Important concepts that explain its causation are the concept of externalities and the concept of public goods. "Market failure is a traditional argument used for the necessity of public policies and government interventions in the areas of health, education, public safety and national defense" (Rocha, 2007, p. 9). It occurs when free markets fail to bring more social benefits than costs to societies. This becomes evident in the case of external costs. External costs describe the circumstance when the costs society pays exceed the social benefits a given activity brings. For example, pollution or environmental degradation caused by economic activities are costs that are neither paid by the producer nor by the consumer. Therefore, these costs are external to the market transaction and turn into social costs (i.e. costs imposed on the environment or the society). This happens, for example, also in industrialized meat production, where food products are cheap due to the externalized costs on the environment or human health (ibid, p. 10).

The problem with such externalized costs is that it is difficult to assign a price to them. Therefore, a lot of ethical and causality considerations are included in these discussions as well. Governance interference through policies and laws are important measures for public health and environmental protection. For example, wastewater policies for factories are often necessary to protect the environment and people's health. Moral and ethical questions also challenge the influence of lobbying. Policies that would have negative effects on company profits are hampered by the influence powerful industries have on politicians. This includes industries that lobby against better labeling of products, more nutrition education, etc. (Julia & Hercberg, 2016). Consumers get the feeling of being free to choose whatever they want to buy and eat, not being aware of the underlying power relations in the food system of what food even makes it to their supermarket, or if there is a supermarket at all.

4. Methods and methodological discussion

In this chapter, I outline the methodological assumptions made in this thesis, both for the contextual part and regarding the empirical work of the discourse analysis. This includes the methodological embedding of the work, as well as the ontological and epistemological assumptions and working principles. In the researcher positionality statement, I debate potential influences on the research and efforts to minimize bias. As the second part of this chapter, I explain discourse analysis as a method in general and the discursive approach chosen in this work. This is followed by the elaboration on the sampling methods used, from the selection of the units of analysis to the classification of codes. In the end, I explain the approach that was used for the data evaluation, analysis and interpretation.

Food systems research consists of a mix of different methodological approaches. While nutrition science and many nutrition initiatives are located in the paradigm of quantitative research and positivism, societal and contextual aspects of food system research rather follow a qualitative, social science approach. In positivist theory, researchers try to remain detached from what they are studying. When implemented, this includes for example studies on quantifiable causes of obesity. Environmental and individual factors, however, are often overlooked with this methodological approach and the respective methods chosen (Schroeder et al., 2015, p. 3). The interdisciplinarity of different theories is inherent in the research topic and represented by the documents here. As this thesis is based on an interdisciplinary approach, it aims to dissolve boundaries between disciplines. The method used in the analysis, therefore, is based on interpretivism. Interpretivist approaches are regularly used by critical scholars as a means to call attention towards discourses that are marginalized in positivist or postpositivist approaches (Andrzejewski et al., 2019, p. 242).

4.1. Methodology

Any research is based on and informed by an underlying worldview and philosophical assumptions of the researcher. This is what methodology, as the philosophy of methods, refers to (Sapsford, 2006, p. 175). It comprises epistemology and ontology. In the following, the ontological and epistemological assumptions and working principles this work is based on will be discussed in more detail, as well as my reflections on my positionality as a researcher. Further, I will elaborate on the Sociology of Knowledge Approach to Discourse from Keller

(2011), which is an approach I chose to orient myself on because its understanding of knowledge is suitable for this work.

4.1.1. Ontological and epistemological assumptions and working principles

Epistemology refers to *rules of truth* and concerns the efforts made by the researcher to warrant the validity of conclusions. In this research – as in most research – the epistemology is *rules of science*. Consequently, all the conclusions made need to be based on arguments or information "that has been collected 'transparently' by known, and in principle, testable and reproducible means." (Sapsford, 2006, p. 175). This means that another researcher who conducted the research in the same settings comes to the same or similar conclusions and results. I follow an interpretivist approach but it has to be considered that people interpret given texts differently. Therefore, transparency is of specific importance.

Epistemology concerns questions such as what is knowledge and what is belief, what is truth and how can this be justified (Sumner, 2006, p. 92). In this thesis, rationalist epistemology gives the frame for the assumptions made on knowledge. Therefore, it is assumed that "knowledge is not limited to observable phenomena but encompasses a deeper reality which underpins observable appearances." (Sumner, 2006, p. 93). In terms of the discourses analyzed, it is assumed that each participant has a different reality, which is constructed by their perceptions and assumptions. Consequently, this manifests in power relations that become evident through discourses. This can be categorized as the epistemology of constructivism (Sumner, 2006, p. 93). The epistemology in this thesis centers around meanings and how they are discursively constructed.

The ontologies of research, in contrast, reflect the worldview of the researcher and give the frame for the possible questions that can validly be asked as well as the conclusions that can be drawn from it (Sapsford, 2006, p. 175). For example, ontological positions and philosophers of science can be distinguished into so-called realists and antirealists. Realists, such as Descartes or Newton, "believe that, using methodological rules, scientists can learn the truth about both the unobservable and the observable world." (Achinstein, 2004, p. 3). Antirealism is common among positivistic and instrumentalist philosophers and scientists and holds the belief that "scientific knowledge is possible only with respect to the observable world." (Achinstein, 2004, p. 3).

Ontological assumptions concern “the existence of, and relationship between different aspects of society, such as social actors, cultural norms and social structures” (Barron, 2006, p. 202). The relation between social actors and the social world needs to be investigated through the discourses that they form. Therefore, an interpretative approach is used. Planetary health diet and sustainable nutrition are both constructed through discourse, as their underlying meanings and narratives about health and nutrition only have the power that is associated with them. These discourses are embedded in a historically constructed reality. Societies are shaped by historical events and discourses, as are the global food system and global power relations within it.

Social sciences are the research setting for investigations on society as a social reality. Social reality is distinct from nature, but also intrinsically connected to it, as it has evolved from nature as a specific form of existence. A society is, therefore, interconnected with nature as societies live in certain geographic environments and affect their surrounding through their activities, but are also surrounded by it (Ochrana, 2015, p. 9). The difference between a social system and a non-living natural system or a living non-social system is the ability of rational thinking that a social individual has. In this methodological approach, a society is a relatively independent social system, but it cannot be fully separated from nature. Just as nature follows certain rules, so do social systems (Ochrana, 2015, p. 10). In this thesis, I follow the assumptions of the Sociology of Knowledge Approach to Discourse, which is based on the premise that social reality is discursively constructed (Bormann, 2011, p. 59).

4.1.2. The Sociology of Knowledge Approach to Discourse (SKAD)

This section discusses the basic assumptions of science theory regarding the discourse analysis. Discourse analysis do not have a fixed methodical approach that has to be fulfilled. Therefore, it is at the discretion of the researcher how to best achieve the required results to answer the research question (Keller, 2011, p. 75). Of course, there are some elaborated approaches, as a certain degree of consistency and replicability is necessary for the validity of the data and the quality of the research. In this thesis, I oriented myself especially on the Sociology of Knowledge Approach to Discourse (*Wissenssoziologische Diskursanalyse*) from Keller (2011).

As already outlined before, the assumption is that knowledge “is not traceable to an innate, cognitive system of categories, but rather socially constructed with symbolic systems and orders which are produced in and through discourses” (Keller, 2011, p. 59, translated B.S.). The

Sociology of Knowledge Approach to Discourse (SKAD) aims to understand the processes and practices that produce knowledge or make it circulate on the institutional level of present-time societies (ibid). This involves fields such as science or the public sphere, which are also of interest in this study. Discourses manifest in laws, techniques, classifications or practices, which in turn create new discourses. The SKAD inspects the social practices, the processes and consequences of the construction, stabilization and transformation of these symbolic systems and orders through communication. It uses different ways of reconstructing the production of meaning, practices, institutional/structural and material contexts, and social consequences. "*Actors* formulate the communicated contributions from which discourses are built; in doing so, they orient their *(discursive) practices* to the available resources as well as the rules of the respective fields of discourse." (Keller, 2011, p. 59, translated B.S.).

The thesis is conceptualized on a meta-level, meaning that it involves considerations from a perspective where the focus lies on discourses and their manifestation in power structures. Therefore, both the philosophy of science and the sociology of science are good points of reference for the framework of the thesis. The philosophy of science is concerned with how different issues in science are thought about, such as the constitution of nature or society and the underlying question what it means to be natural or social (Jasanoff, 2004, p. 19). The sociology of science discusses the relationship science has, for example, to politics, the media, society, and technology (Weingart, 2010, p. 92 ff). Important questions for the conceptualization of this work included how science is instrumentalized and how scientists or philosophers reflect upon scientific theories. As most articles I analyzed in the discourse analysis come from the scientific community, it is important to think about the power that comes from scientific discourses, as they are widely received in politics and society.

The SKAD is linked to the discourse theories of Foucault. Both of them are identified as a reconstructive qualitative methodology (Diaz-Bone, 2006, p. 243; Keller, 2011, p. 83). In this work, the understanding of discourse is based on the concepts of Foucault. He determines a discourse as a socio-historically specific knowledge practice that can be encountered in a social domain. A discursive practice, according to Foucault, emphasizes that a discourse is not explicit knowledge but an individual practice that reflects the way of thinking and expressing. A discourse is, therefore, the system of statements regarding a specific topic. These statements do not refer just to the simple sentence, but to occurring acts of speaking. This is what makes a discourse have effects, such as constituting power relations (Diaz-Bone, 2006, p. 251). The

assumption thus drawn for this thesis is that current and popular discourses on PHD and sustainable diets contain power in themselves through the effects they have on shaping the perceived realities of the society. This, in turn, influences current global power relations in the food system. Many different actors and interest groups are involved in this, be it in the political, economic or private sphere.

Methodologically, the following question is of importance for the empirical part of this work: What can we learn about the food system and its power relations by analyzing scientific and non-scientific articles? I seek to examine how ways of speaking influence understandings of nutrition and sustainability and the power structures in which they are embedded, to discover how power relations are changed or maintained as a result. The way to tell whether a power discourse has changed is by analyzing and interpreting the issues it is associated with. The way things are explained and discussed, whether issues are mentioned at all and how problems and solutions are conceived tells a lot about the underlying power structures. Another aspect that allows conclusions to be drawn about power relations is, who is involved in the discussion as well as who is involved in finding solutions, such as the PHD approach. Is one certain class of the West transferring what they conceive as the right solution, or are other arguments heard too, e.g. from the Global South? How different aspects are conceptualized in PHD discourses is interpretively suggestive of how global power relations are considered.

4.1.3. Researcher positionality statement

Qualitative work involves the need for ongoing reflection of the researcher in order to provide context and understanding for readers about the researcher's background, as their position

> "will affect what they choose to investigate, the angle of investigation, the methods judged most adequate for this purpose, the findings considered most appropriate, and the framing and communication of conclusions" (Malterud, 2001, p. 483 f).

In other words, the researcher needs to reflect and discuss the filters that influenced which questions were asked in the research process, which data was gathered and analyzed and what the findings - that were chosen to be reported - are. This requires researchers to elaborate on their position and subjectivities, such as biases, perspectives and world views. The lenses through which the research was conducted must be transparently communicated (Sutton & Austin, 2015, p. 226).

The requirement for self-reflexivity in the research process comes from the social constructivist methodology, according to which knowledge is described as constructed and situated (Burck, 2005, p. 158). Qualitative data collection, therefore, comes along with ethical issues and the need to position oneself as a researcher. Qualitative methods are conducted with a heightened personal nature, more than it is the case in quantitative research (Mertens, 2018, p. 33). These methodological challenges include designing and conducting research and considerations that involve issues such as the accuracy of data collection, the amount spent or the criteria for consent (ibid, p. 40). Throughout the process, ethical considerations have to be taken into account and evaluated.

The decision to conduct this research shows that I have an interest in topics of health, diet and nutrition and sustainability. From my personal experience I consider these topics of great importance globally. In this thesis, I describe the discourses of scientists and political interest groups regarding PHD. Furthermore, I analyze global power relations. This requires the consideration of my positioning within these systems. As a consumer I have realistically only very little influence, if any, on the power relations within the food system. As a scientist my chances of influence are bigger, although still quite limited. Therefore, I would describe my position as a researcher in this work as a curious observer. Scientific quality criteria need to be incorporated to assure that my narratives and beliefs will not influence the analysis of this project, and this is done through a detailed description of the procedure as well as constant considerations and reflections of my position during the research process. My role as a researcher is to analyze the discourse as it is manifested, using tools that help me to reduce the risk of creating distortions.

I constantly reflected on my position in the research as well as my personal beliefs and perspectives in the course of the research. Personal and often unconscious lenses, through which one views the research process, can influence the research and create potential biases. For example, I realized that at the beginning of the research I was not aware of my normative approach to the topic, as I was strongly influenced by the ‘save the planet’ narratives and the plant-based diet discourse. Through including articles from the whole spectrum of the debate and also covering those against my primary beliefs, I tried to minimize normative influences and reflected on my world view regarding the need for a sustainable diet transformation. This changed and opened my perspective. As a vegetarian myself, the analysis and reflection on the discourse regarding the animal-plant binary helped me see the bigger picture of this discourse.

Having grown up in a rural area in Austria, where eating meat is very incorporated in the culture and traditions, the research made me realize how the plant-based diet approach is impracticable for various groups of people and how it depends on the specific context whether meat can have negative or positive health effects. I was surrounded by farms in this small 2,500 people village and got to learn a bit about the realities farmers in Austria are facing. In researching for and writing this work I reflected upon how their circumstances fit into the bigger, global picture. Since my teenage years I have been very interested in nutrition. This is why I have attended a nutrition trainer class from 2017 to 2018. In the course of this training, I realized not just how different people's perceptions of healthy food and nutrition are, but also that dietary recommendations are influenced by political, economic, and social factors (Bero, 2017, p. 1) and not *objective* facts based on nutrition science and medicine.

In the empirical part of this study, the aim is to contribute to a better understanding of the current discourse, without making normative judgements of right and wrong, or good and bad strategies. My own vegan/vegetarian lifestyle should not interfere with the results. Rather, I learned more about how I created my own identity as an urban, vegetarian millennial and got a chance to reflect on it. Many media articles describe how eating plant-based food became a big trend among millennials (Hancox, 2018; Shirvell, 2019). These cited articles were published by an English and American writer respectively. They are, therefore, referring to the millennials of Europe and the US.[15] Not just this trend, but also western beauty ideals and body norms influence women on these continents and have been influencing me as well.

However, I do not consider a sustainable and healthy diet a form to pressure everyone to be 'thin', neither is it discussed as such in the discourses I analyzed. I am aware of the problematic discourse on obesity and its contribution to weight stigma and fat-shaming. Studies show that weight discrimination in some of its forms has become more prevalent than race or ethnicity-based discriminations in certain contexts. This stigma, in turn, leads to poor health and weight gain (Tomiyama et al., 2018). This is not just the case in the Global North, but also increasingly a phenomenon that affects people in the Global South (Brewis et al., 2018).

Obesity is increasingly framed as a moral issue and – in a neoliberal understanding – a civic responsibility, especially through popular media and public health departments. However, this

[15] Note that, for example, Ssemugabo (2020) explains that among African millennials, the trend is to eat meat, junk food and foods full of saturated fats (and not plant-based like in Europe or the US).

has to be criticized, as body weight is not just a result of energy intake and outtake but rather also strongly related to societal factors. “Physiological characteristics such as body weight result from complex interactions of genes, other biological factors, behaviors, life course experiences, and exposure to biophysical and socio-economic environments” (O’Hara & Taylor, 2018, p. 7). This is important to mention, as discourses on health and nutrition can be misused to stigmatize people and perpetuate structural inequality. Injustice does not only contribute to malnutrition and famines but also to obesity and eating disorders (Lavaque-Manty, 2001). Therefore, injustice and stigmatization need to be addressed and considered in scientific frames like this.

4.2. Methods

A discourse analysis is an analytic approach that has many variations and no precise requirements that must be met. Consequently, the researcher needs to make decisions on what methods are best suitable and appropriate for the research to get answers to the research question (Keller, 2011, p. 75). In this chapter, the approach used for the empirical part of this work – the discourse analysis – will be outlined. I will describe how I used discourse analysis as a method to conduct this research by analyzing various documents and how this led to my conclusions.

4.2.1. Explanation of the method - Discourse analysis

The method of discourse analysis is common among qualitative researchers. Discourse analysis is a generic term that includes several heterogeneous theories and analytical constructs. Scientists who use this method analyze texts, conversations, and documents to explore the links between social practices, language, communication, power, and knowledge (Muncie, 2006, p. 74). Discourse analyses are popular due to their

> “ability to reveal how institutions and individual subjects are formed, produced, given meaning, constructed and represented through particular configurations of knowledge.” (Muncie, 2006, p. 74).

A discourse consists not just of the linguistic meaning of words, but it contains different types of statements that can be understood from a linguistic, sociological and critical psychological perception (Parker, 2004, p. 308). In Jupp’s (2006) *Dictionary of Social Research Methods*, Muncie (2006, p. 74) defines discourse analysis as:

> "[d]etailed exploration of political, personal, media or academic 'talk' or 'writing' about a subject, designed to reveal how pieces of knowledge are organized, carried and reproduced in particular ways and through particular institutional practices."

Given the background of this method, it is arguable that the approach is appropriate for this research project. The discourse analysis will focus on the narratives of different political and scientific experts who are discussing and working towards the transformation of the global food system through a planetary health diet. I analyze scientific as well as non-scientific material, including reports, scientific articles and study results, as well as online blog posts and articles. This analysis aims to understand how narratives reflect underlying values, what authors include and exclude in the discussions, how the social realizability of the proposition is discussed and what all this reveals about the global power relations in the food system.

The empirical analysis of this work is conceived as discourse analysis, with the specifications of the earlier outlined Sociology of Knowledge Approach to Discourse methodology. The discourse analysis is embedded in the SKAD methodology and the perspective is linked to a hermeneutic-interpretative attitude in the research process (Keller, 2011, p. 65). However, hermeneutics and interpretative methods in the context of discourse analysis do not postulate the search for subjective or hidden intentions of the author, or the need to assign a 'true' or 'objective' meaning to a statement. Rather, social scientific hermeneutics is relevant for discourse research through the possible "methodological control of interpretive processes" (Keller, 2011, p. 76, translated B.S.). Abductive conclusions and ideas that arise from the examination of the collected data material are important parts of this interpretative approach. To distinguish these interpretative claims from 'fiction', empirical social science demands to fulfill the principles of disclosure and comprehensibility of the steps taken in the interpretation (Keller, 2011, p. 76).

Different methodical approaches for the interpretative procedure in a text analysis have been developed in recent decades. One common approach in social science hermeneutics is the grounded theory (Keller, 2011, p. 77), which has been applied to this study. Instead of testing theories or hypothesis, research with the grounded theory method is based on comparative analysis where contrasting cases are repeatedly compared. Through this, abstractions and, in the end, generalizing statements can be made (Bormann, 2011, p. 234).

The formation of the corpus was based on the concept of theoretical sampling in the grounded theory. This indicates that the analysis did not start *after* the compilation of *all* the data, but already the definition and construction of the corpus and the selection of texts to be analyzed was guided by this theory. The selection of key texts suitable for the analysis required an abductive approach, with a back and forth of studying the respective field and the available literature to narrow down the texts and specify criteria for the texts that will be selected in the end. Therefore, it was also important to specify the limits of the study and to substantiate why some articles are part of the sample and others are not (Keller, 2011, p. 90).

The combination of the interpretative SKAD methodology and the Grounded Theory based on Strauss and Corbin outlines the inductive research paradigm. The steps taken in this research are oriented on these methods as outlined in Bormann (2011, p. 235). The first step was to formulate a research question and to review relevant literature (ibid). In this research, after reading many relevant papers in the field and narrowing down the research question, I conducted the first analysis with an open coding process to better understand what topics the discourse contains. I did this by focusing on the discourse around the EAT-Lancet approach that was published in 2019. Open coding is also the initial step in analyses that are based on the grounded theory approach (J. A. Maxwell & Chmiel, 2014, p. 30).

This first analysis already gave me deep insights into the discourses and power relations in this topic. However, I needed to reflect on my next steps in acquiring answers to the research question. As I wanted to know more about the broader discourse, I widened the criteria for the text selection. Not just planetary health diet in the understanding of the EAT-Lancet Commission, but also the broader discourse of sustainable diets – also before 2019 – should be included. Already in the first analysis, I found that various political and scientific experts talk about sustainable diets, but that the topic is also widely discussed in online and offline media by journalists, researchers and activists. Therefore, I had a first understanding of the narratives used in the discourse, what is included and excluded in the discussions and how solutions are perceived and pursued. Through the first analysis I found that the EAT-Lancet report was widely discussed, analyzed and elaborated on already. Therefore, I decided to refrain from analyzing the report myself and rather focus on the perceptions and power relations it creates in the general discourse.

The next step in the analysis and coding process was the in-depth analysis of power relations in the selected texts. I screened over 50 papers in the field on the appropriateness for this analysis. After this, exclusion criteria were defined, which aimed to justify which texts should belong to the sample and which ones should not. These criteria will be further elaborated on in the next sub-chapter, where the sampling process and the approach used for coding is described in more detail.

4.2.2. Sampling strategies and coding process

The sampling of the data and the selection of units of analysis can be outlined with the following methodical steps (Keller, 2011, p. 85). The first step was the determination of the fields of knowledge or discourses to be studied. The following aspects of the discourses are of interest to answer the research question[16]: Issues related to power in the global food system and a planetary health diet, discourse leaders and participants in finding solutions, what is the relation between changing discourses and changing power structures, how are problems and solutions conceptualized and what role do global power relations play in this, how is power thought about in the debates and what shifts are there towards the planetary health diet?

Next, the study variables, their theoretical conception and the data collection and evaluation procedures needed to be determined. This was accompanied by the compilation of the data corpus: The first analysis was conducted with the open coding technique. This means that every important aspect that could be of interest for answering the research question was included. The analyzed texts, however, were limited to those specified in the discourse around the EAT-Lancet report on the planetary health diet. The selection of the texts happened after searching for suitable articles with keywords such as 'Planetary Health Diet', 'EAT-Lancet diet', 'EAT-Lancet Commission', 'Planetary Health Global South', 'EAT-Lancet diet discourses', 'EAT-Lancet diet Global South', '#foodcanfixit', 'EAT-Lancet diet', among others. The first analysis of around 20 articles resulted in around 46 codes. Therefore, the analysis already began before the corpus was complete.

Soon the first discourse strands became evident out of the created codes. In the next step, I grouped the codes into similar categories, leading to code groups such as *Affordability*,

[16] As a reminder, the research question is: How are global power relations in the food system negotiated in planetary health diet discourses?

Criticism on the report, *Socio-economic disparities*, *Study and policy biases* and more. These first discourse strands were further processed and analyzed more deeply in the next step of the second analysis. However, the focus changed and hence the corpus too. So, some articles were replaced with others that were more suitable regarding the broader discussion of planetary health diet and sustainable diets. Therefore, another surface analysis was conducted to specify the criteria for the texts to be analyzed. These criteria involve that the text has to be about planetary health diet in some form, also when it is termed sustainable diet, sustainable food system transformation or any other phrase with the same meaning. The following three criteria were used for guidance:

1. Documents (i.e. scientific articles, policy papers, reports, scientific blog posts, online newspaper articles) in which authors address the limitations of the food system regarding health, the environment and/or inequalities, but also the concepts and transformational goals for a change in the food system.
2. Documents that involve the discourses on sustainable diets not only in general but in a way that provides information about possible aspects of power relations. This means that documents from different geographic contexts, regarding different concerns and potential solutions and with different backgrounds of the authors (e.g. political or scientific) were chosen.
3. Finally, the documents of interest needed to be appropriate to analyze them from a meta-perspective. This means that the documents allow making conclusions on the manifestation of power in the food system through the way the authors address the topic of planetary health diets.

I analyzed documents that involve PHD discourses. These discourses are characterized by calls for systematic and global change in the food system to serve the aspects of diet-related health and climate change mitigation. Of interest in this study is how global power relations in the food system are taken into account and shaped by the planetary health discourses.

4.2.3. Data evaluation and analysis

Before I present the results of the analysis in the next chapter, this section gives information on how I methodically approached the task of analyzing the data. I used an interpretative approach and created and linked codes in an interpretative way. Interpretation is needed to

> "make connections between different components and aspects of the data in order to increase our understanding. In other words, we need to make the data meaningful through a process of interpretation." (Willig, 2014, p. 136).

The interpretive work in this analysis is to identify the global power relations in the food system in the discourses and to understand and reflect on them in the historical framework and context of the complex food system.

This research is methodologically conducted based on constructivism, and also in grounded theory constructivist versions do exist. In this theory, the subjectivity of the researcher and its influence on the data analysis is acknowledged as part of the research but needs to be managed. Data in this orientation on the grounded theory approach is seen as "a form of evidence of what goes on, either in participants' minds or in their social encounters and practices" (Willig, 2014, p. 145). The researcher does not need to use a particular theoretical lens through which the data should be read. Rather, grounded theory research is informed by an approach that is termed as 'empathic' interpretation (ibid).

The researcher drawing on this interpretation style seeks the meaning that is contained in the material and focuses on its manifestation. This is done through paying attention to features and qualities, by noticing patterns and relationships and by linking all this together. Furthermore, the understanding can be increased by forming connections through investigating the material from different angles and moving between focus parts. It is more focused on what is presented and manifested than on identifying the *hidden truths*, as in the so-called 'suspicious' interpretation. However, also the tool of suspicious reading is useful, as it contains efforts to reveal the latent meaning of discourses (Willig, 2014, p. 138).

The data analysis was conducted with the qualitative research software Atlas.ti. The software helped to better organize and keep track of the documents and codes. Although the software includes features such as performing auto-coding, the analysis on a higher conceptual level can only be done by the researcher (Saldaña, 2014, p. 603). These features have not been used in this analysis. However, the software was beneficial for connecting codes and showing their interrelations, as well as for the output of reports. Above all, the software has been used for the creation of codes and linking codes to code families[17]. The applied coding styles were mainly descriptive coding as well as values coding (Saldaña, 2014, p. 593).

[17] The list of codes – grouped into four families of codes – can be viewed in the appendix.

Strauss and Corbin refer to axial coding as the next step after the first step of open coding (J. A. Maxwell & Chmiel, 2014, p. 30). Axial coding in this research is the interpretation and forming of empirical correlations between different categories and codes as described earlier. In the axial coding process, the codes were extended and adapted, as well as linked to each other and clustered into prominent discourse strands. As outlined in Bormann (2011, p. 235), these correlations that are created in the axial coding are then integrated into a theoretical model through a selection process (selective coding). This is the last step before the research findings can be presented as systemically constructed results. For this analysis, the results and discussion of the findings can be found in the next chapter.

5. Results and discussion

5.1. Power relations in sustainable diet discourses

In this chapter I discuss the results of the data acquired through the discourse analysis with the approach as presented in the previous methods chapter. This includes an interpretation and discussion of the findings to give answers to the research question:

> How are global power relations in the food system negotiated in planetary health diet discourses?

The findings and interpretation will be presented in two parts. The first part concerns the setting of the discourse: who talks about sustainable diets? Who participates in the discourse and from which geographic area, scientific discipline, political or economic sphere are these participants? Who has power in the discourse, which topics do different actors address and how are problems and solutions thought about and conceptualized? The second part concerns the topics that are frequently addressed in the debates as well as the solutions that are proposed by different actors with varying approaches and ideological backgrounds.

I noticed already in the first analysis that there are some dominant strands of discourse, which I developed more deeply in loops of further analyses. Three topics regarding the food system's global power relations in planetary health diet discourses became prominent. A ruling discourse on power relations concerns the plant- versus animal-based foods controversy. This includes topics such as ideologies, market interests, policy power, strategic networks and biased science (as science is always embedded in social reality and assumptions made in research can be biased, even in 'positivist natural sciences').

The discourse around the PHD is strongly linked to the plant-based versus animal-based foods discourse, but also other aspects of power and powerful narratives are included. A second discourse strand refers to the conception of societies and inequalities, in particular regarding availability and affordability. Especially, the narrative that a healthy diet is not affordable for many of the people living in poverty is dominant, which reflects the prevailing power imbalance in the modern food system among nations due to policies, economic trade and other political, economic and social power relations. As a third discourse, the effects and power dynamics of commercialization, industrialization, development and modernization mindsets connected with technology and innovation efforts will be discussed regarding its power on various aspects and

people. All the aforementioned processes are juxtaposed or intertwined and will be further elaborated on in the following interpretations section. The examination of the three discourse strands covers a large part of the main debates and help to understand how PHD discourses are involved in global power relations in the food system.

5.1.1. Relevance of sustainable diet discourses

In the following, I want to stress again why asking the question concerning the PHD's impact on power negotiations in the food system is important in the first place. As outlined in the context chapter, there are major concerns regarding the current food system: its unsustainability for the environment, its negative impacts on human health and its contribution to global inequalities and food insecurity. These aspects are discussed regarding, for example, the food system's contribution to climate change as well as malnutrition in all its forms and the global rise in chronic diseases and obesity (Searchinger et al., 2019). Concepts on sustainable diets have emerged out of these concerns and perceived threats. These concepts address sustainable food and agriculture-related topics on various levels, from academic to political and economic spheres. Since the 1970s, many studies have been published that found benefits for the environment from reducing meat and dairy products in people's diets (ibid, p. 71). Research on the links between diets and environmental sustainability has only increased since then. As a result, people have become more aware of climate change effects and debates on potential solutions emerged on multiple levels. Therefore, also the aspect of food in the context of environmental sustainability has gained attention.

Among the first ones attempting to create a global reference diet is the EAT-Lancet Commission, which published its report on Food in the Anthropocene at the beginning of 2019. This report has coined the term *Planetary Health Diet* and gained much attention globally. The boundaries proposed by it "make it possible to evaluate the absolute environmental sustainability of diets with a more comprehensive set of indicators than before" (Moberg et al., 2020, p. 2). Therefore, the EAT-Lancet report plays an important role and takes a large part in the sustainable diet discourse. It proposes a reference diet that the Commission found to be good for the environment and human health. Globally, public health authorities, political and scientific interest groups resonate with the Commission's approach to a planetary health diet.

The report has a powerful impact on the negotiation of power relations in the food system, solely by including plant-based diets more into the debate (Leroy & Hite, 2020). However, I

agree with F. Zagmutt et al. (2019) that a reference diet that is significantly different to well-established dietary guidelines, e.g. from the US or the UK, needs a close examination. Especially because the report aims to be adopted globally, I argue that a critical examination of the power dynamics it produces is necessary.

Important to mention is that I decided not to include the original EAT-Lancet report by Willett et al. (2019) in the discourse analysis. This is because the focus in the analysis was on the power relations in the discourse and the way other authors responded to the report, which gave more insights into the negotiation of power that the report itself would have revealed. Therefore, the focus was on understanding the discourse that relates to sustainable diets in general, and the power relations involved in them. However, the EAT-Lancet report has been playing an important role in the discourse since 2019. The documents that evolved in response to the EAT-Lancet report are, therefore, important additions to the discourse before its publication and contributed to recent dynamics in the way global power relations in the food system are negotiated.

In conclusion, the importance of discourses on sustainable diets is reflected by a large number of publications regarding this topic and by the number of impactful actors that resonate with the claims to transform the current food system. Furthermore, the concept aims to address the limitations of the global food system and, therefore, its relevance is arguably given just by the fact that it aims to improve human health and environmental sustainability. However, the large scale of the approach is the reasons why it makes sense to analyze its potential effects on power dynamics. An analysis of the approach's influence on existing global power relations in the food system can add important aspects to the discourse. Therefore, I explain in more detail in the following chapter who participates in the sustainable diet discourse and what this reveals about power relations in the debates.

5.1.2. Participants in the debates

Asking specific questions helps to better understand how sustainable diet discourses influence the power relations in the global food system. These questions are, for example: who is particularly involved in the discourse, who writes about sustainable diets and why do these actors write about it? I refer to around 50 articles to answer these questions. I partially analyzed these articles in-depth and partially just skimmed them to define the most relevant ones for the analysis. The debate is held mainly on a scientific and political level. Regarding the academic

field, scientists and academics from various disciplines are involved in the discourse: population health sciences, food technology, safety and health, microbial ecology and technology, social and behavioral sciences as well as schools of nutrition, public health institutes for food policy research, bioscience engineering, public health nutrition, just to name a few. This clearly shows the interdisciplinary character of sustainable diet concepts. Besides scientific contributions to the discourse, academics can also be involved in civil society activism and act as educators for the public. For example, Robert Verkerk is an academic and campaigner in the field of applying sustainability to the environment, food production systems and human health (Verkerk, 2019).

Intergovernmental and international organizations have food sustainability and equity on their agendas as well. For example, in 2021 the United Nations Food Systems Summit takes place and contributes further to the discourse on improving the global food system to "achieve healthier, more sustainable and equitable food systems" (von Braun et al., 2020, p. 2). International organizations also address topics such as agricultural research and sustainability in panels and conferences and cooperate with research institutes for this cause (see, for example, CGIAR System Organization, 2021). Sometimes, consulting agencies are included in the formation of reports or in criticizing them. For example, the World Economic Forum (WEF) collaborated with McKinsey & Company (World Economic Forum, 2020). Consultants from EpiX Analytics in the USA criticized the EAT-Lancet reference diet especially for its lacking data reliability, the methods used and overlooked social aspects (F. J. Zagmutt et al., 2020, p. 985).

Big food companies themselves, such as Coca-Cola, Danone, Nestlé, Mondelêz, PepsiCo, Kellogg Company and Mars are trying to shape discourses to gain and maintain legitimacy (Scott, 2018, p. 99). They are

> "increasingly partnering with development organizations and civil society organizations and, at the same time, are tying their work to the Sustainable Development Goals. These ties to civil society and intergovernmental processes can enhance process-based (input) legitimacy for these corporations." (Scott, 2018, p. 102).

This shows that the power of neoliberal hegemony is prevalent in the discourses and attempts of power shifts have to consider this power of economic stakeholders and big companies. However, companies are not directly focusing on the diet and nutrition aspect of sustainable diet discourses but rather on sustainable sourcing and agriculture (Scott, 2018, p. 107).

Therefore, large companies neglect the health aspect of food and their impact through ultra-processed foods on people's health but still influence diets indirectly through marketing or other strategies (ibid).

To sum up the aforementioned: Planetary health diet is discussed in scientific and political circles and the respective contributions influence each other. The analysis showed that scientists from different disciplines research topics that political interest groups consider to use as a base for their policies. In addition to scientists, also companies cooperate with political organizations in the form of public-private partnerships (Hossain, 2017, p. 25). The arguments in the discourse are often based on international policy frameworks such as the Sustainable Development Goals and the IPCC Paris Climate Agreement (Scott, 2018, p. 102). However, this is still not the whole spectrum of participants in the discourse.

Media, newspapers and online communities on social media or blogs and websites are also involved in shaping the discourse. These channels frequently take up the topic or contribute to the emergence of vivid debates, e.g. after the EAT-Lancet reference diet's report was published (Garcia et al., 2019, p. 2153). Through social media, the number of discussion participants increases strongly, as anyone can participate and share their opinion on any topic. This can have effects such as misinformation, polarization and the spread of conspiracy theories (ibid). Digitalization may have increased civil society's power through an additional way to participate in discourses. Actions and decisions of political power holders, companies and international organizations frequently get instant feedback through the internet. This makes it more difficult to implement changes that were decided only on the higher level of political organizations. Discourses form through social media campaigns as well, where political, social and economic topics are renegotiated. Consequently, this can lead to a shift in discourses and power relations, e.g. through digital counter-movements. Digital counter-movements, that form on social media platforms, are often promoted through specific hashtags (e.g. #yes2meat) (Garcia et al., 2019, p. 2153 f).

In theory, digitalization allows people to take part in the discourse from any place in the world. However, the discourses that contribute to power changes are usually held on the scientific or political sphere. Therefore, in the next section, I will examine where the participants in the discourse are located geographically. The geographical determination of discourse participants helps to understand how the historically grown inequalities between the Global North and the

Global South still influence power relations in the food system today. The contribution of planetary health discourses to change these inequalities will be of interest as well.

5.1.3. Contribution to the discourse from the Global North and the Global South

Not just the departments and disciplines of the academic discourse are diverse but also the researchers' geographical locations. Among others, there are research collaborations between scientists from Belgium, Ethiopia, Burkina Faso and the United States of America (Hanley-Cook et al., 2020), Ethiopia and different states in the US (Hirvonen et al., 2020), the US and India (Gupta et al., 2021), Sweden and Austria (Garcia et al., 2019) as well as Italy and Serbia (Dupouy & Gurinovic, 2020). Case studies and implementation discourses exist from Sweden, Italy, France, Hawai'i, India and Denmark. As of 2016, an analysis found that only two European countries (Germany and Sweden) implemented sustainability recommendations in their dietary guidelines. Outside of Europe, studies found that Brazil and Qatar are the countries with the best implementation of these measures (The Lancet Planetary Health, 2017). This shows that actors in countries of the Global South are involved in the debate. Researchers located there participate in the discourse, for example, through joint projects or panel discussions.

An example of a joint project is an event that was hosted by the European Institute for Asian Studies in 2019. The goal was to bring together European and Filipino experts from different scientific disciplines to discuss planetary health and how the EU and ASEAN can cooperate to fight climate change (Bertucci, 2020). Independent research institutes located, for example, in India, Namibia, Kenya, South Africa, Thailand, Brazil and Australia also make contributions to the discourse. However, as some of these discourses focus particularly on the more general concept planetary health, which does not only include diets but also additional aspects, not all of these discourses were included in the analysis.

The analysis regarding the participants in the discourse shows that researchers from the Global North still dominate the discourse. It can be said that many of the discourse leaders come from the Global North and that the Western science system is strongly represented, which has been criticized by scholars from various contexts. For example, Ssemugabo, a research associate at the Makerere University School of Public Health in Uganda, says about the PHD ambitions that it is a 'northern construction' (Ssemugabo, 2020). Therefore, perhaps fewer studies and policy voices from the Global South exist, because scholars might not see the need to address this

specific topic and to allocate resources towards it. Important to mention in this regard is that a lot of research on diet sustainability, so far, has been done in high-income countries. Food environment research has only currently, as of 2019, been gaining increasing prominence in LMICs (Turner et al., 2020). Political and academic promoters of a global reference diet need to consider that among various nations and regions, populations face different health contexts and forms of production. Therefore, measures that might improve population health and environmental sustainability in high-income countries are not necessarily transferable to LMICs.

Some voices from the Global South on the EAT-Lancet diet argue that their perspectives and knowledge need to be integrated when the reference diet should be applied for actual diets (Green, 2019). Mameni Morlai, the representative of Liberia's government focal point for the *Scaling Up Nutrition movement*, acknowledges that the EAT Foundation "has made an effort to reach out to representatives in Asia and Africa. But in her own country of Liberia, she said, knowledge about the EAT-Lancet report remains low." (Green, 2019, para. 17). Other participants in the discourse express similar concerns:

> "[W]e need to consider much more deeply the implications of power and political economy on food systems and on the ground-level impact of our initiatives. An agenda driven largely by the global North risks undermining the needs of the global South." (Aronson, 2019, para. 16).

However, the aforementioned collaborations give the impression that there is not solely research done *about* the Global South anymore, but rather in cooperation *with* or *by* experts of these countries. Papers from national research institutes, such as the *International Food Policy Research Institute* in New Delhi, India (Sharma et al., 2020), confirm this. But, projects in a more traditional development mindset still exist. One example is a case study from the German Agency for International Cooperation (GIZ) on implementing a planetary health diet in Kenya (Solymosi et al., 2019). As this study was not included in the analysis, no statements about the extent to which Kenyan stakeholders were heard or involved can be made at this point.

Discourse leaders from the Global South are also active in spaces such as panels and conferences. This is reflected by the fact that various reports, online entries on websites and other non-scientific sources discuss the topic of sustainable diets as well. This includes, for example, the articles of the *International Potato Center* (CIP) in Lima, Peru or the *International*

Livestock Research Institute in Kenya and Ethiopia. Both of these organizations are part of the Consultative Group on International Agricultural Research (CGIAR). The CGIAR is an intergovernmental organization and global partnership. It unites international organizations and research centers, which are engaged in food security to reduce rural poverty, sustainable management of natural resources and more (CGIAR System Organization, 2021).

Power relations within the state, the research institutes, the educational system, etc. also influence who can talk and write about different topics. Researchers in the Global South and in the Global North may be influenced by aspects such as political or economic power relations, class, national research traditions or contested resource allocation in research settings. These aspects may also influence whether researchers aim for emancipatory knowledge and consider local power relations of marginalized, vulnerable or indigenous people in their research. However, the inclusion of research from the Global South is per se important as it enriches and pluralizes the dialogues. Diversifying the discourse should be pursued as a separate strategy from the aim of creating emancipatory knowledge. Scholarly discourses, e.g. in the African context, can then contribute to counter oppressive knowledge structures (Krenčeyová, 2014).

5.1.4. Ideological localization and funding structures

The aspect of funding plays an important role in who participates in the conversations and how power relations are negotiated. For example, the paper by Hirvonen et al. (2020) on *Affordability of the EAT-Lancet reference diet: a global analysis* was funded by the philanthropic *Bill & Melinda Gates Foundation*. This foundation operates based on its commitment to fight poverty and inequality around the world. Its (indirect) participation in the sustainable diet discourse increases the awareness of the contexts poor people around the world are facing. The study by Hirvonen et al. (2020, p. 59) estimated that for at least 1.58 billion people the reference diet proposed by the EAT-Lancet Commission exceeds their household per capita income. This knowledge contributes to the consideration of people living in poverty in the sustainable diet discourse.

The WHO also made a clear but indirect statement against the EAT-Lancet report by retracting its endorsement and withdrawing its funding. The organization warned that the diet would have economic consequences if adopted on a large scale. The global implementation of the proposed diet could harm livestock producing countries and cause lost jobs in these places (Bloch, 2019; Nutrition Inside, 2019). Money, as a source of economic power, is an important means in the

negotiation of the food system transformation. The criticism against the EAT-Lancet reference diet shows that international organizations such as the WHO aim to promote equality with their actions and will not support measures that might contradict this goal.

Besides this, some authors also criticized the EAT-Lancet Commission for its funding structure and detected potential ideological biases. As outlined in the context chapter, the EAT-Lancet Commission consists of 37 independent scientists (19 commissioners and 18 co-authors) from around the world, with approximately a third of the contributors from the Global South (e.g. Lebanon, India, Zimbabwe, Indonesia, Mexico). The *Wellcome Trust* supports the Commission financially. As stated on the EAT Website:

> "EAT is an independent, non-profit organization based in Oslo, Norway and founded by the Stordalen Foundation, Wellcome Trust and the Stockholm Resilience Centre. All science-related activities of EAT are financed exclusively from non-profit sources" (EAT Forum, n.d., para. 1).

Scholl (2020) explains in the German medical journal ('Deutsches Ärzteblatt') that the EAT foundation itself is non-profit but it works closely with the organization *Food Reform for Sustainability and Health* (FReSH). This organization has influential members such as the international food corporations Cargill, Danone and Nestlé, as well as companies that are seed- and crop *protection* producers, such as Bayer and BASF (Scholl, 2020, p. 1388). The author adds that this link is not surprising as the founder of the EAT-Foundation, Gunhild Stordalen, is a vegan billionaire who advocates for the PHD from her ideological viewpoint without considering perceptions of those who cannot afford the *healthy* plant-based diet and lifestyle (ibid).

Leroy & Hite (2020, p. 2) have also criticized EAT for allying with leading food multinationals through the FReSH network. The World Economic Forum (WEF), the United Nations Environment Programme (UNEP) and the World Business Council for Sustainable Development (WBCSD) are also part of this alliance. Especially the latter is strongly in favor of a more plant-based market (Leroy & Hite, 2020, p. 2). EAT's network nourishes the assumption that the companies have an interest "in ensuring that those markets are supported politically" (Leroy & Hite, 2020, p. 2).

The EAT approach is, therefore, based on the logic of public-private partnerships (PPPs). These partnerships are made between political entities, international organizations and private, marked-based companies (World Bank et al., 2014). PPPs were developed and established in the 1970s and 1990s particularly through the efforts of Maurice Strong. He had an active role in the World Bank, the WEF and the WBCSD, which are until today strongly involved in the debate (Leroy & Hite, 2020, p. 6). In general, PPPs can offer benefits for private and political institutions at the same time, for example, in providing infrastructure. However, people living in poverty may be limited in accessing these benefits if structural inequalities remain unaddressed (World Bank et al., 2014). The discourses held in this respect often refer to innovation and are based on a neoliberal market ideology. I will address this aspect more closely in the later analysis of the third discourse strand.

In this chapter, I addressed the question of *who* participates in the discourse. The following chapter concerns the question of *what* are these actors in the sustainable diet discourses debating. Which topics are addressed and how has this changed over time? All these considerations reveal power structures because political and scientific discourses take place in contested spaces.

5.2. Contested topics determining power negotiation in the food system

5.2.1. Relation of changing discourses to changing power relations

Interestingly, from the around 50 papers I screened for the analysis the majority was published after 2010 and even more concentrated around the years of 2016 to 2021. Therefore, it seems that the discourse and attention towards sustainable diets is a very recent development. In 2013, Lang and Barling published a paper on *Nutrition and Sustainability: an emerging food policy discourse*. The title indicates that the authors perceived the nexus between nutrition and sustainability to be quite a new development. However, as Leroy and Hite (2020, p. 6) state, the „blueprint goes back about 4 decades to the Dietary Goals and the Maurice Strong network", where an ecologically framed business dynamic was formed. Despite this long existence of the concept, it has only now gained momentum. Leroy and Hite (2020, p. 6) explain this with recent developments of "increasing income inequality in the middle classes, highly mediatized food safety concerns, and alarms raised about climate change", which they say "have only increased society's angst about what to eat". As these authors come from Belgium and the US, these statements probably refer to developments in Europe and North America.

Assumably, the rhetoric of the SDGs has also played an important role in the changing perceptions and power relations between high-, middle- and low-income countries. Unlike the MDGs, where the focus was still on 'developing' LMICs and 'helping' the poor, the SDGs shifted the focus towards a rhetoric emphasizing that every country has to contribute its part (Fukuda-Parr, 2016). Together with international climate change prevention efforts, such as the Paris Agreement, a new awareness has been created regarding sustainability and individuals' impacts on the environment. Also, the effects of globalized trade and global production networks, with all their effects on people and environments, has attained increased attention. All of this has led to recent discourse changes in societies, politics, academia and the international community. As an effect, these shifts in discourses have changed or are still in the process of changing power relations in the global food system. For example, the discourse on meat has changed a lot in many countries especially in the Global North: from a food item associated with vitality and strength to the 'scapegoat', blamed for many of the food systems' shortcomings as well as for sustainability and health problems. There has been a powerful shift as this change in perception of meat has huge social, economic, health and sustainability effects.

The change in the debates is accompanied by changing perceptions of the Global South in the Global North, partly due to some countries' increasing economic power. As mentioned before, the SDGs agenda is broader and more transformative than the MDGs. The SDGs also reflect the challenges of the 21st century more accurately (Fukuda-Parr, 2016). The industrialization of many countries around the world has increased, with all the accompanied and contested advantages and disadvantages. Incomes increased for many people and with expanding affluence a western lifestyle is steadily adopted. However, this is neither the case everywhere nor to an equal extent, and the divide between rich and poor is growing rapidly around the world. Various forms of malnutrition, from hunger to obesity, often exist within the same country and originate from the same food system structures. This indicates that hunger is often not a problem of scarcity but a political and poverty issue (Beardsworth & Keil, 1997, p. 34).

As the analysis of the discourse suggests, many people in the Global South see the greatest need for change in the countries of the Global North, which are identified to be the largest contributors to climate change in many instances (e.g. meat consumption) (Ssemugabo, 2020). This statement involves the ethical question of who is responsible for the damage that the longstanding practice to externalize costs to future generations or other places in the world created? How is the international community trying to solve these global problems? What is

interesting here is how these problems and solutions – also regarding the food system and sustainable diets – are conceptualized and conceived, since they are arguably about the negotiation and renegotiation of power.

Further, the increasing globalization and digitalization are global processes that perceptibly have changed power relations, also in the food system. Through the internet, power relations are being renegotiated all over again. Suddenly, everyone who has access to the internet can express their opinions and, under certain circumstances, even gain high attention from it. This development raises the question whether this made the world a more equal and interconnected place. However, it also shows how knowledge is renegotiated. Former orders of power, e.g. dominated by white middle-class men in academia or politics, are changing or at least being increasingly contested. In terms of sustainable diets, this also means that many people do not simply accept new dietary recommendations, taxes or other strategies to nudge them into a certain direction. Politicians, scientists but also companies increasingly face resistance from the public through social networks, for example, when they implement new policies. Social networks formed as a strong civil society force. This, however, has pros and cons. The new negotiation of knowledge is also reflected in highly polarized debates online, including misinformation, conspiracy theories and personal attacks (Garcia et al., 2019). But, it also shows the power of society, which no longer localizes knowledge so strongly in specific geographical points and authorities. Accordingly, discourses can also take on (more) global dimensions.

Due to its current relevance, the aspect of COVID-19 also has a big impact on food systems but also on the discourse that is shaped. For example, Miles (2020) argues that the origin of virulent diseases is often located in agriculture and the food system. Diseases and pandemics like COVID-19 can happen more frequently due to deforestation, population growth and the expansion of urban areas, where people live in close density (ibid). These circumstances allow for zoonic diseases to spread more easily. In the plant-based versus animal-based discourse, this gives rise to the negative connotation of meat consumption and contributes to the changing discourse of what and how to eat in the future.

5.2.2. Overview of topics in sustainable diet discourses

Different debates and topics are dominant in the discourses on planetary health diets and reflect various global power relations in the food system. The debate on a planetary health diet is based

on considerations regarding the Anthropocene epoch. The concepts are located in a transdisciplinary field of research that involves many subfields and is, therefore, quite complex. The report of the EAT-Lancet Commission (Willett et al., 2019) has been the focus of attention a lot, be it from an approving or a critical perspective. In rather approving discourses (see, for example, Bozeman et al., 2020, p. 161; Poole et al., 2020; Searchinger et al., 2019, p. 84), the question is often how to apply and merge the reference diet with national dietary guidelines and national particularities. These considerations result from the Commission's statement that national and cultural adaptations have to be made when implementing the diet into national guidelines. Incorporating the environmental and sustainability aspects into national dietary references is on the agenda of food institutes, public health and university research departments, for example, in Denmark (Lassen et al., 2020), Italy (Tucci et al., 2021) and France (Kesse-Guyot et al., 2021).

Swedish researchers benchmarked the Swedish diet relative to global and national environmental targets and environmental boundaries suggested by the EAT-Lancet Commission. In the comparison of global and national indicators the researchers found that global indicators, such as the EAT-Lancet variables, need additional measures to sufficiently capture local aspects and circumstances (Moberg et al., 2020). Similarly, Indian researchers compared the Indian diet with the EAT-Lancet reference diet and found that "[c]alorie share of whole grains is significantly higher than the EAT-Lancet recommendations while those of fruits, vegetables, legumes, meat, fish and eggs are significantly lower" (Sharma et al., 2020, p. 1). This affects especially poorer households, but even the richest households in India consume a diet rather high in cereals and low in fruits and vegetables (ibid). Case studies like these also exist, for example, concerning the United States of America. Diets in the USA also do not "meet EAT-Lancet criteria overall or across racial/ethnic subgroups" (Bozeman et al., 2020, p. 160).

The critical perspectives towards the report (see, for example, Leroy & Hite, 2020; Verkerk, 2019; F. J. Zagmutt et al., 2019, 2020) are partly based on criticism towards limitations of methodological and methodical questions of knowledge production. This includes considerations such as: what we can know? What we can see as truth in order to create policies that are aimed to influence and transform the whole world? In social science methodologies, it is assumed that an only truth does not exist in the social world. Some discourse participants follow this premise regarding the complex issue of sustainable food systems and diets.

Therefore, the EAT-Lancet report, but also other attempts to formulate scientific reference points for policies, have sometimes been confronted with methodological and methodical criticism (F. J. Zagmutt et al., 2019). Study outcomes can depend on the assumptions made by the researchers and the data they use, for example, regarding the measures used to calculate the carbon footprint of food (Drewnowski, 2020, p. 6). Dietary references can then turn out to be misleading. Normative assumptions and confirmation biases may lead to favoring some groups of people more than others. This involves the problems of approaches in nutrition sciences, which deal with the ambiguity of correlations of food items and their health outcomes. As Searchinger et al. (2019, p. 71) state in the *World Resource Report*, "[d]ietary implications for health remain contentious because it is difficult to distinguish the effects of diets on human health from the effects of other behaviors."

A very dominant debate regarding health and sustainability comprises the *animal- versus plant-based food discourse*. In this discourse, meat is blamed for both, the dietary as well as environmental challenges the world is facing. Its positive aspects and the wider picture are often ignored. The discussion will be examined more closely in the subsequent analysis of this discourse strand. It is at the core of planetary health diet debates and reveals a lot about the current global power relations that are already in the process of being transformed, including power shifts but also power consolidations.

It seems as if the planetary health diet was predominantly conceptualized in the Global North and brings potential troublesome outcomes in the Global South if applied in a widespread manner. The discourse on the applicability of the reference diet in the Global South refers to topics such as costs, income disparities and the resulting question of affordability and availability of the proposed *healthy diet* for millions of people around the world. This especially refers to vulnerable groups such as people living in poverty. Political and economic power relations are intertwined with the social aspects, for example through government subsidies, subventions or laws and policies. This became evident with the example of the Green Revolution and its focus on a science-based transformation of *Third World agriculture* (Shiva, 1991, p. 19). National governments, international donors and the US government launched this program, for example, in the Indian Punjab (Shiva, 1991). It caused social and environmental problems among the population (ibid) but benefitted bureaucrats, elite scientists and affluent farmers (Niazi, 2004). This discloses national power relations and hierarchies that exist in addition to the global power relations. The aspects of affordability and global inequalities

through power relations will also be discussed in more detail in the specific analysis of this discourse strand.

Power relations between different political players are connected to these kinds of inequalities through their entanglement with companies and big food corporations, which are often involved in the policy-making processes. Further, also different ideological positions of scientists can potentially influence the outcome of, for example, studies, policies, reference diets and publications of reports (Leroy & Hite, 2020, p. 6; Verkerk, 2019, p. 20). All of this leads to power through discourses as defined in the methodology chapter, because people act in the way they understand and see the world. The negotiation of power relations between political players and big companies is addressed in the third dominant discourse strand. The discourse strand concerns debates on the need for innovation and modernization to improve the global food system's influence on sustainability, health and food security. This further involves aspects of changing power dynamics of the past years due to growing urban areas, increasing affluence in LMICs, and the impact this has on people's health and dietary choices.

5.3. Debates on obstacles and solutions: a discussion of three discourse strands

Three discourse strands formed out of the most frequently mentioned and concise codes. Moreover, they also reflect well the most frequently mentioned limitations of the sustainable diet concept and are, therefore, good indicators for relating power relations. The first discourse strand elaborated in this chapter concerns discussions on the burden on human health and the question of what to eat, with all its political and social implications. This includes people's needs for nutritious food and the animal-sourced food (ASF) debate in LMICs (Adesogan et al., 2020, p. 3). It also concerns the theorization of climate change and all related scientific shortcomings such as methods, biases, ideologies, normative goals from politics and the conceptualization of solutions.

A second dominant discourse concerns inequalities and poverty, as well as the effects the PHD approach has as a discourse and especially with its implementation. A third discourse strand contains discussions on innovation as a solution, which is based on the concepts of efficiency and improved technology. Included are the factors of development and modernization as well as market failures such as external costs (as described in the sub-chapter 3.3.3). The

contribution of processed food is also quite important in this context. Participants in the discourse often only talk about meat, eggs and milk. However, processed foods make a huge contribution to unsustainability and the burden on human health. The producers of processed foods have a lot of power in the food system. This aspect is often simply overlooked in the discourse (Scott, 2018, p. 93).

5.3.1. Of knowing what to eat – power shifts through plant versus meat discourses

For the longest time in human history, meat was perceived as a valuable food and has been associated with strength, vitality and health (Leroy & Hite, 2020, p. 1). However, concerns about the human impact on the environment through various unsustainable practices increase. Social movements like planetary health, which aim to transform current practices of living, contribute to a change in the perception of meat consumption among scientists, policymakers and consumers (Marinova & Bogueva, 2019, p. 2). Since the 1970s, many studies have been published that explain the inefficiency of animal-based foods in their production and, therefore, recommend a reduced consumption to prevent far-reaching environmental consequences (Searchinger et al., 2019, p. 71). Livestock contributes a significant share of the global GHG emissions and much research evidence shows that global warming is human-induced (Marinova & Bogueva, 2019, p. 3). The underlying assumptions, e.g. concerning GHG emission, water use and other aspects, were outlined in the context chapter. However, inefficient allocation of resources between countries also contributes to global inequalities and forms of malnutrition, with hunger on the one side and obesity on the other side of the spectrum.

For example, wealthy nations "have higher economic power on the global market for grains which leads to inefficient use of valuable resources as animal feed rather than directly for human consumption" (Marinova & Bogueva, 2019, p. 3). Global common goods such as land, water, vegetation and minerals are limited. In many debates, advocates for plant-based diets argue that the longer chain from *plant-to animal-to human* is not just nutritionally less efficient than the *plant-to human* chain, but also exploitative towards the common global natural resources. This means that it harms the environment and benefits only a smaller fraction of the global population, causing hunger among the poorer and obesity problems among wealthier societies (ibid).

As a result, plant-based food advocates present a vegan or vegetarian diet as the solution for all the global problems concerning climate change and chronic diseases. These diet forms are

praised to be the best solution for health and sustainability. Meat consumption, in contrast, is discussed as unethical and bad for the environment as well as for human health. Animal source foods are "regularly stigmatized for their alleged link with disease, environmental deterioration, and animal abuse" (Leroy & Hite, 2020, p. 1). However, some authors propose that the discourse needs to be more nuanced. The impact of ASFs varies depending on their production and consumption characteristics. This ranges from production on a huge industrial scale and too high numbers of consumption (as is the case in many high-income countries, but also increasingly in LMICs), to concepts of a more sustainable production and consumption which a circular economy concept implies (Van Zanten et al., 2018, p. 4185).

Further, conflicts of interest also exist for proponents of plant-based diets. A common rhetoric to promote these diets includes that plant-based food is the holistic solution for a healthy planet and healthy people and that plant-based is how to 'eat right' and morally correct. Conflicts of interest are often overlooked. This includes especially the market-based and neoliberal agenda that is prevalent in many of the plant-based diet discourses. Global corporations, who research and develop meat alternatives on an industrial scale, are seen as the ones working for a good cause and helping to fight climate change and the NCD epidemic. In contrast, meat consumption and production is increasingly accused and connotated as bad. In some discourses, meat is equated with alcohol or smoking and described to have "unnatural substances", which are leading to "impure blood" (Leroy & Hite, 2020, p. 4). Following this example, the discourse leads to stigmatizing meat consumption as morally wrong. Also, the EAT-Lancet planetary health diet approach refers to meat as unhealthy and favors vegetarian or vegan diets, although a small dose of 0 – 14 grams of red meat per day is allowed (ibid, p. 2).

This gives rise to a plant-based diet. Since the 1970s, anti-animal product discourses became increasingly popular across the Anglosphere based on public health goals to work towards a social change and a society free of chronic diseases (Leroy & Hite, 2020, p. 1; Searchinger et al., 2019, p. 71). In addition, debates on animal-sourced foods were "increasingly related to [the] discourse from animal rights activism, feminism, and ecology" (Leroy & Hite, 2020, p. 5). The so-called *alternative food movement*, therefore, denoted eating as an ethical act and gave rise to the mindset of the moral duty to 'eat right'. This morality became an integral part of the discourse on what food in societies should consist of and is used as a tool for social comparison. Also in public media, the narrative of plant-based food was formed through linking the diet to bodybuilders and athletes, e.g. in movies (ibid, pp. 3-6).

This mindset is linked to urban middle classes, who use moral food choices as a tool to "affirm their status and a way to reconnect to nature in hectic urban settings" (Leroy & Hite, 2020, p. 6). The ecological virtue and 'eating right' mindsets are defining aspects of many sustainable diet discourses. Other important aspects, such as *how* we eat rather than only *what* we eat, are frequently overlooked. For example, the EAT-Lancet reference diet is based on a 2,500 kcal (10,460 kJ) daily intake. But, the reference diet does not include the aspect of caloric restrictions that are known to possibly reduce incidences of preventable, diet-related chronic diseases (Verkerk, 2019, p. 16).

Rather, antimeat discourses have increasingly become popular in science and politics. Since "[p]ublic and academic antimeat narratives are substantially intertwined" (Leroy & Hite, 2020, p. 1), these interconnections are reflected in national and global food policies. One example of politicians' commitment to achieving the planetary health diet is the C40 Cities initiative. This initiative has the goal of total exclusion of meat and dairy in people's diets through policies and procurement power. Mayors of global cities in the Global North, e.g. London, Tokyo, Toronto and Los Angeles, committed to the goal of achieving the PHD for all their citizens by the year 2030 (Leroy & Hite, 2020, p. 2). Also, other policy papers, such as the World Resource Report (2019), formulate various strategies to shift consumption towards plant-based food, e.g. by making the consumption of meat socially unacceptable and the consumption of plant-based food socially desirable (Searchinger et al., 2019, p. 89 ff). The meat industry, of course, is fighting back against these claims, and campaign for the consumption of meat by pointing out its importance for every diet (Scott, 2018, p. 97).

Critique towards global implementation efforts of a plant-based diet approach

It seems that the consumption of animal-based food is often equated with the western-style diet, as the following statement indicates: "Another major area of health concern with western-style diets is the link between high-consumption of animal-based foods and a variety of diseases." (Searchinger et al., 2019, p. 71). This overlooks the social realities and circumstances of people in places around the world that have a different approach to the consumption of animal-based foods. To them, the antimeat narrative can be harmful, as it does not reflect their circumstances. This becomes evident by the following statement:

> "Yet, reports like the one recently published by the EAT-Lancet Commission, solely focus on the threat of ASF consumption on sustainability and human health, overestimate and ignore the tremendous variability in the environmental impact of livestock

production, and fail to adequately include the experience of marginalized women and children in low- and middle-income countries whose diets regularly lack the necessary nutrients." (Adesogan et al., 2020, p. 1).

Often, the discourse on animal- versus plant-based food is problematic as it overstates the harmful effects animal source foods have on both, nutritional and environmental aspects (Leroy & Hite, 2020, p. 7). In sustainability discourses some factors are considered more than others. For example, dry land "represents 45% of the world's land area and the role of livestock to aid the 'upcycling' of such land is viewed as increasingly important for the future of food, people and planet." (Verkerk, 2019, p. 19). Depending on the production system, livestock production can either act as a source or as a sink for greenhouse gas emissions (ibid, p. 20). It can be argued that the EAT-Lancet reference diet defames meat consumption and in doing so, is overlooking an important point:

> "meat eating is not the problem per se – it is excessively cheap meat that is the problem, where the cost of the meat does not adequately take into account the true cost of its production in environmental terms." (Verkerk, 2019, p. 20).

In general, the discourse highly focuses on animal- versus plant-based food, without considering the role of industries and ultra-processed foods (Scott, 2018, p. 93). Large companies and associations in the business of ultra-processed foods production are, due to their opposition, the primary barrier for enacting sustainable and healthy diet policies. This, however, is also true for the meat and dairy producers, which are opposing environmental or GHG reduction policies (Swinburn, 2019, p. 4). One larger study on the environmental impact of ultra-processed food products on the average Australian diet found that one-third of the environmental impacts (CO2e, land use, water, and energy use) comes from the consumption of ultra-processed, 'discretionary' foods (Scott, 2018, p. 98).

Ssemugabo (2020) writes about the planetary health diet in sub-Saharan Africa. He is advocating for a transition towards it as the African continent is affected by climate change and chronic health conditions as well as other problems such as demographic pressure. However, he says that the PHD approach is unpopular in Africa because it is considered a northern construction. Further, the diet is considered as a "poor-man's diet" (Ssemugabo, 2020). Meat consumption is perceived as good and thus craved by many people living in poverty and mainly consumed by richer populations. Ssemugabo and other representatives of the Global South,

however, see the biggest necessity for campaigns on meat reduction in high-income countries, as they are the largest consumers of meat (Ssemugabo, 2020). Then, LMICs in Africa and other regions should be able to maintain the current consumption rates. People living in poverty should get more meat while the middle class in urban settings should reduce it (ibid).

The increase of global demands for ASFs stems from increasing affluence, urbanization and education levels in LMICs. Families become more nutritionally secure as their dietary diversity increases (Adesogan et al., 2020, p. 4). Some authors argue that this dietary transition adds to the pressure on the environment (Dupouy & Gurinovic, 2020, p. 4) as well as rising levels of obesity and overweight in LMICs (Searchinger et al., 2019, p. 71). In the World Resource Report, the authors see the convergence towards more resource-intensive foods (a western-style diet) as problematic, especially because this diet is often linked to the consumption of convenience food and fast food (Searchinger et al., 2019, p. 66). In contrast, Aronson (2019) advocates for meat consumption in LMICs, as he gives the example that an "average African eats about 8 kilograms of meat a year; the average European eats about 70 kilograms, and the average American eats more still." (Aronson, 2019, para. 12). The following Figure 4 indicates that meat consumption is not just high among US-Americans, but also in Central- and South American countries such as Brazil, Argentina, Venezuela or Bolivia.

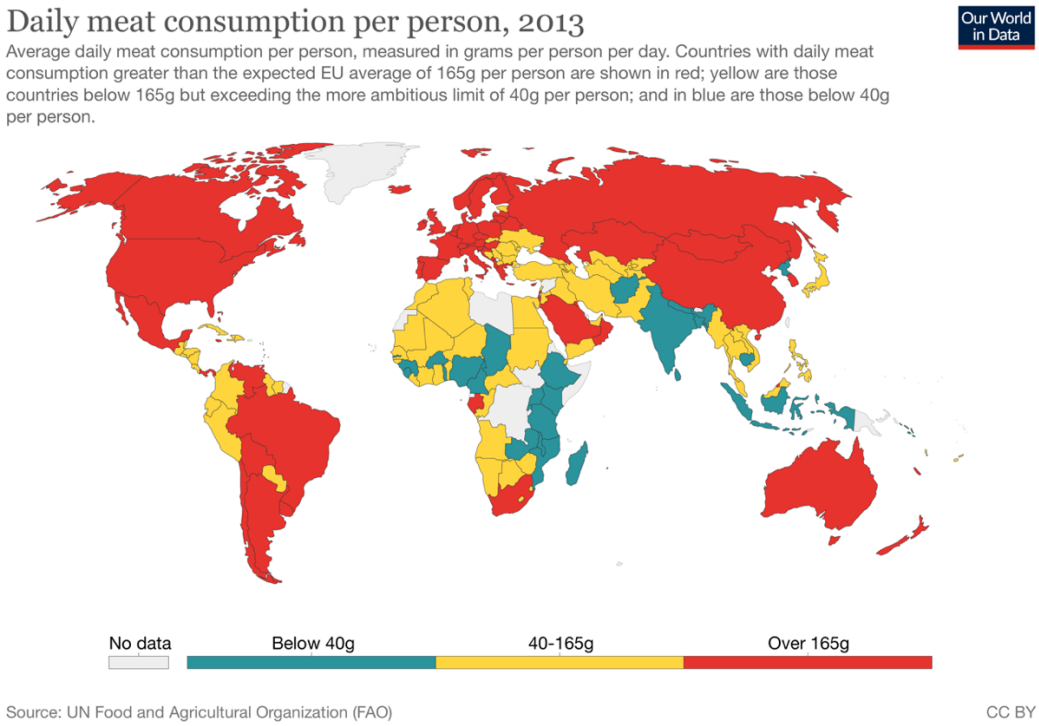

Figure 4: Daily meat consumption per person, 2013. Source: Our World in Data, 2017. Open access under the Creative Commons BY license.

However, not just the dietary transition, but also the antimeat narrative has a considerable influence on diets in LMICs. The cues to reduce consumption of ASFs in high-income countries tend to spill over into developing nations (Aronson, 2019). The EAT-Lancet report itself contributes to that:

> "Though the EAT-Lancet Commission report briefly states that more meat and other major protein sources should be consumed by low income populations that subsist on starch diets to mitigate malnutrition, this critically important fact is contradicted in the key messages and executive summary, which advocate low or less ASF consumption" (Adesogan et al., 2020, p. 2).

This statement strengthens the assumption that the EAT-Lancet global reference diet focuses mainly on higher income populations. However, people have different living conditions which determine their dietary needs. In the following, I will outline the discourse on the importance of considering varying dietary demands, especially regarding the dietary transition in many LMICs.

The importance of considering differing dietary needs in low-income contexts

Dietary needs differ among people depending on aspects such as age, physiological conditions, biological sex, existing health problems e.g. food allergies, intolerances or chronic diseases such as diabetes, physical activity (U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020). While for some, there is evidence that a decrease in the consumption of ASFs will improve their health, for others, ASFs are needed to satisfy their nutritional needs. Therefore, "vegetarianism or veganism may be nutritionally feasible in the very places where ASF is overconsumed" (Adesogan et al., 2020, p. 5). Many studies proved that reduced meat consumption benefits many peoples' health outcomes, especially in wealthy countries. The criticism concerning the plant-based diet approach of the EAT-Lancet report should not diminish the importance of healthy and sustainable alternatives to meat consumption as well as the need to address the global overproduction of meat.

Rather, I want to stress the following point: some authors argue that recommendations like the EAT-Lancet diet do not consider the risks that a plant-based diet can have to those who have limited access to micronutrient supplements or a diverse diet. Also, the proposed diet causes risks to people on whom the diet is unwillingly imposed (Adesogan et al., 2020, p. 5). For infants a potential nutrient deficiency may lead to stunting, underweight and even permanent

epigenetic changes in metabolism. These changes can cause an increased risk of NCDs later in life, especially when these children start to consume a high-calorie and low-nutrient diet that is common in some LMICs (ibid, p. 2). Stunting in children is not just a nutrition issue but also a health and economic issue (Aronson, 2019).

Some authors criticize the report of the EAT-Lancet Commission for using a narrow interpretation of sustainable diets, which inadequately represents the urgent dietary situation of many people living in LMICs. Debates on sustainability need to consider "the nutritional needs of the world's poor, particularly women and children" (Adesogan et al., 2020, p. 1). For example in India, studies suggest that women often eat a poorer diet than men in their families, but that these intra-household differences are often not collected (Raskind et al., 2018; Sharma et al., 2020, p. 11). The following statement summarizes this point:

> "Sustainability of the planet must consider nutritionally vulnerable populations, women, and children, and the impact that low consumption of ASF has on their lives and futures – a perspective mostly missing or underrepresented in scientific analysis or heated discussions on the impacts of ASF production on climate change." (Adesogan et al., 2020, p. 3).

The environmental footprint of livestock production is often overestimated due to a predominant concentration on overconsumption of ASFs in middle- and high-income countries. Furthermore, sustainability considerations are often reduced solely to climate change as an indicator, which is a narrow interpretation of the term and does not consider many other aspects. Livestock production is important for vulnerable populations and necessary to achieve sustainable development (Adesogan et al., 2020, p. 1 f). Almost 800 million people have less than $1.90/day and are thus considered 'extremely poor' due to their economic situation. Many of these people subsist on a diet heavily based on starchy foods. More, instead of less, ASF will be required to achieve sustainable development (Adesogan et al., 2020, p. 2). ASFs provide nutrients to people living in poverty which they often cannot access in other ways (ibid).

Namukolo Covic of the *International Food Policy Research Institute* (IFPRI) explains that ASF consumption in LMICs remains very low, especially for at-risk populations like infants, pregnant women and the elderly. She adds that it is not equal treatment between all countries that is needed in addressing problems such as climate change or obesity. Rather, lessons learned from mistakes made elsewhere should be used to create a positive direction for the Global South

(Aronson, 2019). Again it becomes evident that the food systems entails a diverse range of different circumstances among countries but also societal groups, e.g. between wealthier and poorer populations. The concept of land boundaries defined by Van Zanten et al. (2018, p. 4185) considers this fact. The authors conclude in this concept that "restricted growth in consumption of ASF in Africa and Asia would be feasible under these boundary conditions, while reductions in the rest of the world would be necessary to meet land use sustainability criteria" (Van Zanten et al., 2018, p. 4185).

However, in a simplified *plant versus meat binary* perspective, the importance of livestock for women in countries of the Global South is not taken into account. To achieve the SDG target of gender equality, livestock production needs to be considered. Livestock is essential for many female smallholder farmers who do not own land (Adesogan et al., 2020, p. 4). Further, almost half of the world's farmers are women (Raney et al., 2011). Some political groups advocate for increasing smallholder productivity, as this would not only allow farmers to raise their income but also raise the availability of ASFs. This in turn would lead to reduced malnutrition and – due to increased productivity – a lower environmental footprint (Aronson, 2019).

5.3.2. Considering 'the world's poor' - Inequalities and socio-economic disparities

The EAT-Lancet reference diet has been repeatedly criticized for overlooking structural, social and local contexts regarding nutrition, sustainability and health. For example, some anthropologists note that the "EAT Lancet's interventions are aimed at changing individual behavior in a way that ignores what may be truly at the root of endemic poor health: structural inequalities and histories of poverty and dispossession" (Leroy & Hite, 2020, p. 3). Similarly, Ethiopia's Minister of Agriculture Gebreyohannes is concerned that the diet does not consider local contexts and can, therefore, lead to unintended environmental or health risks (ibid, p. 2). The shortcomings of a globalized approach like that are that problems and solutions are based on averages. Particularities as well as practical experiences thus become invisible. Examples contradicting the approach, such as "the restoration of marginal grassland through the re-introduction of livestock", are not taken into account (Verkerk, 2019, p. 20).

Some authors perceive the EAT-Lancet report as a northern construct that is not suitable to be transferred globally because the report focuses largely on richer countries. Referring to the Ethiopian context again, animals such as cows, sheep, goats and chicken are assets and bring wealth to all actors in the livestock value chain. Especially rural women, who otherwise lack

opportunities to make money, benefit from livestock (Aronson, 2019). The importance of livestock for many people in LMICs has already been outlined in the previous section. Here I would like to point out again that the antimeat narrative, as well as the consideration of circumstances limited to those of the Global North, can have negative effects. This concerns, for instance, maternal and child health issues and food insecurity in Sub-Saharan Africa (F. J. Zagmutt et al., 2020, p. 985).

The discourse indicates that the high inequalities between people's diets across nations have to be considered in creating a global reference diet. In many LMICs, starch-based diets are the norm among poor populations and consumption of ASFs is very low. This becomes obvious when comparing the numbers of the mean annual per capita meat consumption. In the four lowest meat-consuming countries (Sudan, India, Bangladesh, and Ethiopia) mean annual per capita meat consumption is "less than one-thirtieth of that in the top four (Brazil, Uruguay, Australia, and USA)" (Adesogan et al., 2020, p. 3). Cereal-based diets, prevalent among people living in poverty, often do not sufficiently supply the necessary nutrients if ASF consumption is insufficient (ibid, p. 1). Poor quality of diets is also often caused by "a lack of availability, accessibility, awareness, and acceptability" (Sharma et al., 2020, p. 10).

To attain a shift towards healthier diets, availability and affordability are two key aspects for low-income populations (Hirvonen et al., 2020, p. 59). There are, however, not just differences between rural and urban areas, but availability and affordability might also differ throughout the year due to seasonal fluctuations of production and harvests (Gupta et al., 2021, p. 10; Hirvonen et al., 2020, p. 65). According to a study calculating the costs of the most affordable variation of the EAT-Lancet reference diet, it costs a global median of US $ 2.84 per day in 2011 (Hirvonen et al., 2020, p. 59). The highest expenses of this diet are for fruits and vegetables followed by legumes and nuts, before ASFs like meat, eggs, fish and dairy are in the ranking. Therefore, "[t]he diet costs a small fraction of average incomes in high-income countries but is not affordable for the world's poor" (Hirvonen et al., 2020, p. 59).

The affordability of the proposed diet varies markedly between low-, middle- and high-income countries, due to varying food prices and expenditures on subnational levels (Gupta et al., 2021, p. 2). In many countries, the estimated cost of the EAT-Lancet reference diet exceeded the mean daily per capita household income. This includes Burundi, Burkina Faso, the Democratic

Republic of Congo, Guinea-Bissau, Lesotho, Madagascar, Malawi, Nigeria, Sierra Leone, and Yemen (Hirvonen et al., 2020, p. 63).

A study done in the US, exploring the adherence to the EAT-Lancet diet among different racial and ethnic subgroups, found that "black and Latinx subgroups [in the US] exhibit lower as-is adherence compared with their white counterparts" (Bozeman et al., 2020, p. 172). To promote health equity, policymakers and public health organizations need to address and understand the dynamics among (marginalized) subgroups and the structural obstacles they are facing in the access to healthy foods (ibid). The authors concluded that health policies and behavioral change measures, intending to change American diets into more healthy and sustainable ones, need to take into account inequities in socio-economic status (Bozeman et al., 2020, p. 169). Furthermore, the study found that different groups in the US population need to shift different aspects of their diets to increase the adherence to the EAT-Lancet diet (Bozeman et al., 2020, p. 171). Equity is an important aspect that needs to be considered in food system transformation.

Questions of distribution arise in the context of (rapid) economic growth. Increasing economic equities are correlated with increasing food and nutrition equities.

> "The obesity and diabetes transition has occurred in parallel with the economic transition. Obesity first appears within the wealthy, urban dwellers, but over time the socio-economic gradient reverses and these diseases become much greater burdens within the lower income and rural populations" (Swinburn, 2019, p. 4).

Globally, a planetary health diet, as suggested by the EAT-Lancet Commission, is unaffordable for approximately 1.5 billion people, mostly in sub-Saharan Africa and South Asia (Hirvonen et al., 2020, p. 60). This is due to the high cost of the suggested food, especially fruits, vegetables and meat, fish, dairy and eggs (Hanley-Cook et al., 2020; Hirvonen et al., 2020, pp. 60; 63). If costs of sustainability will be internalized[18] to healthy food it will automatically be more expensive. An obstacle to account for sustainability in food prices is that people do not simply get richer and will not be able to afford the more expensive healthy food (Green, 2019). The following statement addresses this issue:

[18] To internalize costs refers to attempts to reduce the externalization of costs as described in chapter 3.3.3. Externalized costs are external to the market transaction and occur when economic activities turn into social costs, i.e. are imposed on societies and the environment (Rocha, 2007, p. 10). Internalization of costs means incorporating these costs into the market transaction, making producers or consumer pay for them. This makes products more expensive for consumers and causes a problem especially for populations living in poverty.

> "Whereas the path to development has traditionally favored making cheap but unhealthy food available to urban workers, countries in the Global South will need to favor policies that encourage the availability of healthy, sustainably-grown-food – from investing in infrastructure to improve farmers' access to markets, to more extreme measures such as blocking the import of foods that are deemed unhealthy or unsustainable." (Green, 2019, para. 13).

These aspects are all related to the global power relations in agriculture that were explained in the context part of this thesis. This includes factors such as food prices, price volatility and access to technologies, land, seeds, know-how, financial markets. Furthermore, also ideologies, traditions and values contain power because they determine what people eat and how they form an identity in relation to food.

Based on the findings in the discourse analysis it is questionable whether the EAT-Lancet reference diet is suitable to address global food insecurities. Making the diet affordable for everyone globally requires higher incomes and lower prices. Without that, individuals will struggle to obtain sufficient quantities of food from different food groups. Suggestions for attaining lower prices include the improvement of local production, marketing and trade as well as the inclusion of a greater variety of low-cost options in each food group of the reference diet. Higher incomes for poor households would result from inclusive economic growth, which in turn would allow them to buy larger quantities of nutritious foods. To eliminate food insecurity and malnutrition, however, also social safety nets and investments in nutritional assistance would be needed (Hirvonen et al., 2020, p. 64). Rocha (2007, p. 9) defines food aid through, for example, food banks or international donations as "one of the clearest indicators of food insecurity". Therefore, food security is achieved when people do not need food aid anymore.

The power of transnational companies might also influence dietary decisions through food retailers and marketing strategies. Through potential economies of scale, these companies can produce and distribute their products cheaper than comparable goods. Ssemugabo (2020) argues that in Kampala, Uganda, in an average restaurant the price of a glass of passion juice is four times the price of a coke and a salad meal is twice as expensive as junk food. Although it is unclear whether this statement is based on a research study, the promotion of a planetary health diet requires paying attention to these dynamics. Manufacturers like Coca-Cola do have

a big influence, for example in Uganda, through marketing campaigns that target young people and involve advertisements for Coca-Cola in schools (Flynn & Okuonzi, 2016).

Unhealthy diets – although likely linked to affordability – have other reasons too. In India, for example, even the richest 5% of households eat too much processed foods, not enough fruits and vegetables and high cereal and low protein diets (Sharma et al., 2020, p. 10). The food and lifestyle choices of individuals are highly influenced by governments, food marketing, culture and the individual's identity. Various factors influence whether a planetary health diet is feasible or not. As described in chapter 3.2.2. with Bourdieu's concept of habitus, class distinctions between socio-economic groups play an important role in socio-economic inequalities in food choices.

> "Beyond affordability for the world's poor, many other changes would be needed for people to choose an EAT-Lancet diet. Drivers of choice among affordable items include individually modifiable factors, such as time and convenience, nutrition knowledge, and acquired tastes and habits, which in turn are shaped by societal factors such as marketing practices, as well as forces outside the food system, including child care, housing, and transportation." (Hirvonen et al., 2020, p. 64).

Therefore, sustainability in food systems does not just refer to climate change, but also to the production of nutritious foods "that are affordable, socially and culturally acceptable, and sparing both natural and human resources" (Drewnowski, 2020, p. 6). Achieving sustainable diets needs shifts of current patterns in consumption as well as in production. For example, in middle-income countries like India this comes with incentivizing a higher consumption of fruits, vegetables and ASFs accompanied by a reduction in excessive calorie intakes (Gupta et al., 2021, p. 9 f). However, the agricultural food system is not prepared to produce sustainable foods that are affordable and rich in nutrients (Drewnowski, 2020, p. 6). Furthermore, some studies suggest that, in terms of GHG emissions and other measures, nutrient-rich foods are associated with higher environmental costs (ibid). In order to address these issues, many authors advocate for increased efforts to provide solutions through innovation and technological advances.

5.3.3. Innovation, technology and development to achieve sustainable diet goals?

There are various narratives and discourses in how the current food system is failing us due to its threats to ecological and human health. As outlined in the context chapter, this

predominantly results from its development over the last century, which amplified the challenges the global population faces in this century. This involves aspects like “the Green Revolution, massive global population growth, globalization of trade in goods and services, neoliberal economics, and the increasing concentration of market power in the hands of food company oligopolies” (Swinburn, 2019, p. 1). Population growth is repeatedly mentioned as a problem for achieving sustainability (Gupta et al., 2021, p. 9). Concerns of how to feed a growing world population were already a dominant debate in colonial and post-war development (Leach et al., 2020, p. 2). Still today, the narrative that we urgently need to change our diet in order to create a food system that provides nourishing diets for everyone in 2050 is commonly used in planetary health diet discourses. The narrative serves as an argument for focusing on technological innovations in food production.

The discourse on sustainable diets evolves around what the food system in the 21st century should look like and which strategies should be pursued to reach a desirable outcome. Authors have different positions on the question what a transformation of the current food system should look like. Some argue that the limitations of the food system should be addressed with technological and scientific innovations and advocate for this to take place in the current neoliberal, market-based economy, for example through climate-smart agriculture (Taylor, 2018). Others are skeptical of these viewpoints and argue that power relations in the food system need to change comprehensively, which means the current economic system needs to be transformed as well (von Braun et al., 2020).

Among the ones mentioned first, the discourse on sustainable diets is often framed in a neoliberal and market-oriented mindset. As the concept of sustainability has no universal definition, the term provides room for interpretation. This becomes evident when even big transnational companies such as Unilever, Nestlé and the Kellogg Company are very much in favor of the sustainable agriculture agenda (Scott, 2018, p. 102). Companies operate with different intentions and interpretations of definitions. As explained in chapter three, heterogeneous understandings of concepts such as sustainability exist. Therefore, one terminology can include a variety of maybe even conflicting intention of various actors. The concept of sustainable agriculture, favored by many transnational companies, “is still contested and highly context specific” (Scott, 2018, p. 102).

Many companies seem to try to benefit from the powerful discourses and shifts towards sustainable diets by investing in the rapidly growing alternative food market, which include for example plant-based meat alternatives, egg replacers or other innovative food products (Scott, 2018, p. 97). These companies' participation in sustainability discourses increases their legitimacy and "gives them the ability to shape discourses about the nature of sustainable agriculture and the meaning of sustainability in the context of a growth imperative" (Scott, 2018, p. 94).

Some critics of the EAT-Lancet report recognize this neoliberal and market-oriented ideology in the reference diet recommendations. As already outlined earlier, the EAT Foundation is criticized for being placed within a strategic network with leading food multinationals that are in favor of a more plant-based market (Leroy & Hite, 2020, p. 2). The concern is that the reference diet benefits large agri-food businesses more than it does good for the environment or human health (Verkerk, 2019, p. 15).

Big food companies discuss sustainability from an economic growth perspective in which progress, innovation and technology are the proposed solutions. Therefore, they work on crop science innovation and cooperate with agricultural science universities, for example, to make yields better or cocoa trees less vulnerable. This can lead to improvements in agricultural sustainability, and it also leads to the legitimization of increased industrial production. However, it dismisses "alternative visions of future food" (Scott, 2018, p. 103). Companies might have good intentions, but need to be closely examined to determine what they use their power for and whether their programs primarily classify as greenwashing. The problem is that private governance in the food system leads to weaker conceptions of sustainability and this hampers the creation of a truly sustainable and healthy food system. As Scott (2018, p. 95) argues, "[t]hey can exploit complex and distanced food systems while taking advantage of weak and fragmented governance to further increase their legitimacy as part of the solution for sustainability."

Companies focus on sustainable and responsible sourcing of food and try to sell sustainable and ethical products by making improvements to their supply chains. However, the problem arising with this is that it neither deals with the health issues arising from ultra-processed foods nor does it address the consumption of unhealthy products at all (Scott, 2018, pp. 94; 107). While companies refer to sustainability in their value chains and give the consumers a good feeling

about their product choices, the underlying problem of the unhealthy and unsustainable food products themselves are not mentioned in the discourse. This might be linked to the fact that transnational companies make high profit margins with ultra-processed food products (Leroy & Hite, 2020, p. 98).

Companies and markets often do not regulate themselves, as discussed regarding the economic theory of market failure. Therefore, governance plays an important role in creating a sustainable food system. In governance, power dynamics are most evident: decisions on the enforcement of rules, on the application of economic (dis-)incentives and on the norms and expectations for people and organizations are made (Swinburn, 2019, p. 2). However, politicians who are trying to enact food policies, e.g. for warning labels, restrictions of marketing to children or taxes on high-sugar beverages, often have to struggle against the opposition from the food industry (Swinburn, 2019, p. 5). In many developing and emerging economies, markets are often less regulated and companies can target children and youths with their marketing tactics more easily. In Africa, the efforts of multinational food companies and their social media marketing campaigns influenced many millennials to believe that eating junk foods full of saturated fats and meaty food would be trendy (Ssemugabo, 2020).

However, although companies have the power to oppose food policies, the ultimate responsibility for creating the set of rules, laws and regulations for transformations within the food systems still lies with the governments. At the same time, governments are often highly influenced by lobbyists or the economic interests of big industries. In practice, food companies have significant political power and influence on government policies (Swinburn, 2019, p. 7). But also companies are limited in their efforts to change the food system, as even companies that aim to create healthy and sustainable food systems still have to play the rules that the market sets, such as maximizing profits or seeking advantages against their competitors (ibid, pp. 5; 7).

> Therefore, "business models for the 21st century will need to involve much stronger accountability systems on companies, especially large multinational corporations that have gained inordinate power over the last 50 years through increased corporation size, market concentration, corporate wealth, and political influence" (Swinburn, 2019, p. 8).

All these statements indicate that the political and economic power dimensions are strongly entangled. This is important to consider because these dynamics influence what is subsidized

and which policies are made. Currently, agricultural subsidies can be found in the production of beef and dairy, but also in monoculture crops such as "wheat, rice, corn, sugar and seed oils, which are the commodity ingredients for unhealthy ultra-processed foods" (Swinburn, 2019, p. 4). Based on the analysis I argue that the sustainable diet discourses contribute to a renegotiation of current subsidies and other dynamics that cause a burden on the environment and people's health.

Shift towards sustainable alternatives in production is diversely discussed. The unsustainability of monocultures affects around 1.5 billion subsistence farmers around the world (Holt-Giménez et al., 2012, p. 596). The focus on industrialization with its emphasis on efficiency and food specialization has diminished food diversity and the resilience of many communities (De Schutter, 2017, p. 1). This includes considerations of, for example, the environmental footprint of rice and sugarcane in India, where shifts in cropping patterns would lead to a healthier and environmentally more sustainable food system (Sharma et al., 2020, p. 11). Also part of the discussion on sustainable production are studies on organic systems. Authors argue that a combination of organic and conventional farming can help to address the challenges of rising food demand while minimizing the negative environmental impacts of food production (Holt-Giménez et al., 2012, p. 595).

In sustainable diet discourses, critics of industrialized food systems stress that, in order to achieve a more sustainable and healthy food system, "more dedicated and comprehensive multi-sectoral nutrition-sensitive and -specific policies and programmes are required" (Hanley-Cook et al., 2020, p. 8). However, many governments are reluctant to incorporate sustainable diets. A few, mainly in higher-income countries, have incorporated sustainability into their national dietary guidelines (Scott, 2018, p. 96). Another problem with imposing policies concerns the aforementioned data interpretations and nutritional biases. If taxes on unhealthy foods are imposed, the definition of what is unhealthy needs sound scientific evidence that underpins the statements (Verkerk, 2019, p. 20). Furthermore, as considerations on Bourdieu's concept of habitus imply, unhealthy foods are often consumed among poorer populations and those facing structural socio-economic inequalities (Costa et al., 2015, p. 3). Therefore, implementing a tax on these foods might potentially harm lower socio-economic groups if no cheaper substitutes are available. Improving diets through taxes is more complicated than limiting alcohol or tobacco use through taxes, as food is a necessity and consumption is not as sensitive to price changes (Sarlio-Lähteenkorva & Winkler, 2015).

However, civil society is strongly in favor of policies that limit the consumption and advertising of unhealthy foods and create restrictions or raise taxes, as opinion polls have revealed (Swinburn, 2019, p. 5). The problem is that it is quiet support, and nobody is protesting or marching in the streets on these issues. This, combined with the circumstance that civil society organizations are often poorly funded, small and uncoordinated, their power in the discourse is limited (ibid). However, civil society organizations do exist and, for example, in Latin America, one of their demands for policy action was fruitful in the tax on sugary drinks and junk food in Mexico (Swinburn, 2019, p. 8).

In conclusion, big corporations are strongly involved in the renegotiation of the global food system and hold powerful positions within food value chains. Because terms like sustainability lack a clear definition, various interest groups have sometimes heterogenous understandings of sustainable concepts and use the term with different intentions. The participation of big companies in the discourse increases their power through shaping sustainability discourses and maintaining legitimacy (Scott, 2018, p. 94). Based on the debates in the literature, the companies' influence can either contribute to a transformation in the food system or reinforces existing power structures (ibid, p. 105). Fewer possibilities to participate in the discourse on sustainable diets face civil society organizations. In contrast to the highly consolidated food corporations, small and poorly funded civil society organizations are limited in making - although in many cases important - contributions to the discourse.

5.4. Concluding interpretation of PHD's effects on power dynamics in food systems

In general, the global food system consists of various power relations on multiple levels and spheres. Often the power dynamics operate out of sight and in complex webs and are, therefore, regularly overlooked in the policymaking process (Hossain, 2017, p. 25). Planetary health diet discourses fuel the renegotiation of power in the current food system especially through scientific and political debates. Power is an abstract concept, but an integral part of politics. Its manifestation ranges from domination and resistance to collaboration and transformation (VeneKlasen & Miller, 2002, p. 39). The goal to transform the global food system itself includes the power to change current relations. The PHD discourse contributes to this power negotiation by reflecting on the shortcomings of the modern food system and proposing alternative solutions. Therefore, PHD discourses entail the power to transform diets and agricultural practices globally. But, PHD discourses themselves involve contested concepts and inequal power of participants in the discourse. There is arguably a great need for change in many aspects of the current food system, such as the system's effects on health as well as on the environment, inequalities and food insecurity. However, the analysis indicates that the conception of any sustainable diet approach needs careful consideration of the context in which the concept should be applied.

Addressing two main questions helps to understand the negotiation of power relations through PHD discourses: Who participates in the discourse and what do they talk about? Based on the discourse analysis I found that the limitations of the current food system are discussed to be caused by various developments in the food system. These developments include, for example, agricultural practices that have focused on productivity growth rather than food diversity and self-sufficiency of communities (De Schutter, 2017). The consolidation of retailers, wholesalers and processing firms and their subsequently increasing influence on food policies, local markets and people's food choices also influence the power relations (Hossain, 2017).

Furthermore, dietary trends have shifted towards ultra-processed and processed foods, which are associated with increased incidences of NCDs (Tilman & Clark, 2014). The possibility for companies to externalize costs on health and the environment (i.e. external to market transactions and turned into social costs) through weak governance contributed to environmental pollution and unsustainable production practices (Benton & Bailey, 2019). All of these aspects are linked to the power that big corporations and international politics have in

the global food system. Planetary health diets only partially contribute to a renegotiation of these power relations. As the analysis found, the impact of ultra-processed food is often not addressed, but the discourse on animal- versus plant-based foods is prevalent. Based on the findings of the analysis I argue that a focus only on the limitations of animal-sourced food will not change current power relations. Rather, the discourse will amplify these power relations through the concentration on food or agricultural innovations (e.g. ultra-processed meat alternatives and climate-smart agriculture). The focus on these innovations increases the power of technology and food production companies. This does not mean that a shift towards plant-based food, technology and innovations are not worth pursuing. But, it means that current power relations in the food system, which cause food insecurity and malnutrition in many places, might prevail. I will further elaborate on these arguments in the following.

5.4.1. Dynamics in the global food system and the influence of PHD discourses

The sustainable diet concept developed out of the growing interest in and concern about the human impact on the Earth systems and the consequences of the modern food system for human health. This is reflected by international efforts to address global warming through legally binding, international treaties like the Paris Agreement (Branca et al., 2019, p. 28; IPCC, n.d.), academic discussions about the new geological era *Anthropocene* (Laurance, 2019, p. 953), and societal concerns about what to eat (Leroy & Hite, 2020, p. 6). Planetary health diet discourses contribute to the growing awareness of the impacts globalization has on human and environmental health. Sustainable diet debates are often based on the normative goals of international organizations to elevate humanity out of poverty and hunger and to create a sustainable environment that allows future generations to subsist (EAT-Lancet Commission, 2019, p. 7). As the findings of the discourse analysis indicate, a PHD approach is only as likely to achieve these goals as it considers the contexts of those living in poverty and experiencing hunger. For this very reason the WHO withdrew the funding for the EAT-Lancet Commission (Bloch, 2019). This clearly shows how funding can improve or impair an approach's legitimacy, especially when it comes from a powerful organization like the WHO.

Participants in the PHD discussion also reflect upon the role of science. Science operates within specific rules to increase reliability and validity (Sapsford, 2006, p. 175). However, research is always limited by human capabilities of making sense of the scientific inquiry and results. The science of healthy diets also faces the limitation that it has to work with averages. Humans have diverse conditions, disease patterns and phenotypes and react differently to foods (Engelgau et

al., 2016, p. 2). The discourse analysis indicates that concepts of sustainable diets do not necessarily include the aspect of variety. This causes the discourse to potentially manifest current power relations and harm groups with specific dietary needs. Furthermore, it is known that data on sustainable diets and food system sustainability is often fragmented and incomplete. So, it is uncertain to what extent PHD will contribute to better health and sustainable environments. For example, some studies indicate that the promoted dietary composition may not prevent premature mortalities from NCDs (F. J. Zagmutt et al., 2020, p. 985). This, in turn, challenges the health goals of the reference diet as it aims to lower the overall mortalities from NCDs (Willett et al., 2019, p. 453). All these considerations explain why authors criticized the EAT-Lancet report for methodical shortcomings and potential inherent biases (Drewnowski, 2020; F. J. Zagmutt et al., 2019, 2020).

The data in this study suggests that the EAT-Lancet reference diet is conceptualized as a top-down approach and with a focus on the modern, industrialized food system. In general, even if a PHD approach mainly aims to reduce consumption of ASFs in high-income countries, the cues tend to spill over into LMICs and lower socio-economic classes in high-income countries. When eating meat is framed as a problem to health and the environment, the statements need to consider the broader picture, for example, that animal production systems "can act as sources or sinks for greenhouse gases" (Verkerk, 2019, p. 20). Among the main problems are excessively cheap meat, the price of which does not reflect the true costs of the production (ibid), and the contribution of ultra-processed foods to the increasing NCD burden (Scott, 2018, p. 93). However, the discourse analysis indicates that unequal power relations and the influence of big corporations leads to the fact that ultra-processed foods are overlooked in the discourse. A change in diets – from ASFs to plant-based – seems to be easier to conceptualize than a change in power relations.

Furthermore, the focus on the ASFs discourse seems to distract from other important issues that may contribute to a food system transformation: a discussion on the shortcomings of the modern food system compared to traditional ones. Food systems can be distinguished between modern and traditional food systems, as described in chapter two. The recommendations for a PHD seem to address only the former while overlooking the contexts and benefits of the latter. Not just in LMICs but also in rural areas of high-income countries semi-traditional food systems exist. However, these different contexts are also overlooked in the calculation of the environmental footprint of ASFs. Calculations often focus on the emissions that arise in a

modern, industrialized production setting, and are, therefore, overestimated for other production contexts (Adesogan et al., 2020, p. 2).

The intensification of production, globalized trade and the underlying power of international corporations are issues that are less in the focus than the animal-based versus plant-based debate. Through this, these food groups are often generalized and different production processes or social consequences are overlooked in the discussion. From the four food system typologies that Kledal (2009) suggests, the industrialized system has become the most prevalent. If a PHD approach aims to contribute to sustainability and equity in food systems, a notion of change towards an alternative food system that incorporates values of community, social and environmental welfare could benefit the concept.

The PHD discourse is not just influenced on an international and national level through public health policies, laws and taxes. A food system transformation that is conceptualized on a meta-level may face resistance in the general society, besides civil society organizations. As every person eats daily, many people develop nutrition beliefs that are often based on intuition or conjecture rather than science (Brown et al., 2014, p. 563). This in turn indicates how widespread movements on social media can gain so much power. Beliefs can be solidified in social networks, and scientific communities such as the EAT-Lancet Commission are faced with a changing media landscape and new forms of negotiating knowledge (Garcia et al., 2019, p. 2153). The launch of the EAT-Lancet report created a counter-movement from a community that promoted the hashtag *#yes2meat*. With this, its proponents made a statement against the plant-based agenda of the report. This shows how the planetary health discourse has included the civil society sphere more into the negotiation of the global food system's power relations.

5.4.2. Potential effects of the discourse on diets and food security

By designing the PHD as a construct that dominantly targets western lifestyles, its global applicability is reduced. In poorer settings, many people still depend on starchy foods. A low ASF consumption leads to less efficient nutrient provision, for example, in Sudan, India, Bangladesh and Ethiopia (Adesogan et al., 2020, p. 3). Fewer crop outputs through changing weather patterns only accelerate food insecurities (Fahad & Wang, 2018, p. 301; Kabir et al., 2017, p. 212). The political effects of inequality and power hierarchies in the food system became obvious in the examples of Pakistan and Bangladesh. Above all, people in these countries need policy measures that address price instabilities, access to credits and

technologies for increasing the adaptability to climate change conditions. Political and structural power manifests through lacking market access, poverty and insufficient governmental support (Fahad & Wang, 2018, p. 301). Similarly, all countries where food riots took place over the last decade struggle with economic injustices and inequalities that are grounded on political levels (Bohstedt, 2016; Hossain, 2017). It is thus questionable how realistic and reasonable it is in these circumstances to implement a planetary health diet when food insecurity overshadows the sustainable diet's claims. Participants in sustainable diet debates discuss these political aspects only to a limited extent.

If underlying political issues such as food insecurity and affordability of the diet are not addressed, the PHD's contribution to sustainable development ultimately remains unclear. The debates on sustainable diets might then even reinforce the current power relations in the food system. The root of poor health often lies in structural inequalities and a history of poverty and dispossession (Burnett et al., 2020; Leroy & Hite, 2020, p. 3). In many countries, the modernization of the food system led to extensive societal effects through the nutrition transition and increasingly obesogenic food environments (Tilman & Clark, 2014). This comes with a double burden of malnutrition, as more and more people are adopting a western-style diet high in ultra-processed foods, saturated fats, and fast foods (Dubé et al., 2014, p. 278). The global numbers of NCDs reflect this trend, as the disease burden of chronic diseases is now higher in LMICs than in high-income countries (Benziger et al., 2016, p. 393; Kankeu et al., 2013, p. 1).

The so-called *NCD epidemic* is a clear sign of political and economic power, although often conceptualized as an individual's shortcomings or failure. Rising obesity numbers are linked to marketing by big transnational companies and their corresponding pricing of mostly ultra-processed foods, as well as to the (insufficient) availability and affordability of healthy foods, such as fruits and vegetables (Sharma et al., 2020, p. 10). A planetary health diet that focuses on individual behavior change can lead to unintended health risks caused by the effects of stigmatization and blame. Also, policies that do not address the underlying power relations and focus on personal responsibility are less likely to succeed (Brownell et al., 2010). The report of the EAT-Lancet Commission was criticized for its focus on rich countries and its strategic network with transnational corporations (Leroy & Hite, 2020). With a focus on rich countries and populations, the reference diet does not address the political and economic power relations and will be less likely to succeed in poorer settings and populations.

It makes a difference if a mainly plant-based diet is promoted in high-income or low-income countries. The per capita meat consumption is manifoldly higher in the former than in the latter (Aronson, 2019). Also, the availability of nutritional supplements as well as health care and health insurance differ among countries. Therefore, also regarding affordability it is questionable whether the EAT-Lancet reference diet is suitable to address global food insecurities. By internalizing sustainability and health into the prices of food, it will automatically become more expensive. Without any measures to increase incomes, even more than the estimated 1.5 billion people will not be able to afford the sustainable diet proposed by the EAT-Lancet Commission (Green, 2019).

The sustainable diet discourse may even result in negative effects on the world's poorest populations through reinforcing the antimeat narrative. Especially in poorer settings in LMICs, the availability and affordability of diverse nutritious foods are often limited. Not just for health, also for economic reasons ASFs can have a high value. In many settings, ASFs can contribute to gender equality because for many female smallholder farmers participation in livestock markets improves their welfare (Quisumbing et al., 2014), especially when they do not or cannot own land (Adesogan et al., 2020, p. 4). In the SDGs, goal number five concerns gender equality and the empowerment of all women and girls (United Nations, 2015). The planetary health diet was conceptualized as an agenda that aims to contribute to achieving the SDGs (EAT-Lancet Commission, 2019, p. 7). As the discourses informed by PHD advocates diminishes the value of ASFs, conflicts of interests with SDG goal five regarding gender equality may arise.

However, it has to be noted that, although frequently criticized within this work, the concept of sustainable diets is valuable on multiple levels. As outlined in the chapter on the food system's limitations, limited consumption of ASFs has the potential to reduce the global burden of NCDs as well as GHG emissions, overfishing, pollution and other climate change-related topics. Many case studies and reports on the applicability of the PHD in industrialized countries such as Denmark, Sweden, France and the US show, that poor-quality diets are common in these countries as well. Current diets in these countries differ in many aspects from the PHD recommendations and do not meet the targets of a sustainable and healthy diet (Bozeman et al., 2020; Kesse-Guyot et al., 2021; Lassen et al., 2020; Moberg et al., 2020; Tucci et al., 2021). The planetary health discourse can, therefore, also contribute to healthier and more sustainable diets.

5.4.3. Influence of PHD discourses on negotiations of economic power relations

Overall, power relations and perceptions between the Global North and the Global South have changed in the course of and since the 20th century. Food system related power shifts on a global level occurred in the past decades through the fast economic development of many middle-income countries (Popkin, 2014, p. 92). Particularly in Asia, for example in China, India and Bangladesh, food value chains transformed within two decades to a modern food system with supermarkets and retailers dominating the market (Reardon et al., 2012, p. 12332). Modernization and economic development processes in many LMICs created a broad and increasingly affluent middle class. This led to changes in power in the international political sphere as well as in research settings. As the analysis in this work indicates, research collaborations on global topics such as the PHD started to reduce the dominance of western research institutes. But, for example in the discussion on new technologies such as climate engineering, research institutes from the Global North are still the dominant actors (Biermann & Möller, 2019, p. 151).

Overall, the production growth mindset that dominated food systems for decades after the Second World War is being renegotiated. In the 20th century, the focus was on increasing quantity and production to eliminate hunger, for example through the Green Revolution (Leach et al., 2020, p. 7). This focus has changed, and the awareness of unintended side effects on the environment and human health is growing in the 21st century. Environmental and sustainability perspectives are increasingly included in S&T innovation efforts, such as in climate-smart agriculture developments (Taylor, 2018).

Authors in the field of planetary health diets propose different solutions. Some scientists and political institutions argue for a necessary change towards plant-based foods (see, for example, Marinova & Bogueva, 2019; Willett et al., 2019). Others focus on technology and science and believe that the obstacles can be solved with innovation. The authors also discuss which economic system the global food chains should operate in. Some advocate for a market-based solution, while others criticize the unequal economic power relations and seek to make them more equal (L. M. Pereira et al., 2020, p. 2). All these issues are interrelated and renegotiated in sustainable diet debates. Based on this analysis, it seems as the planetary health diet can, depending on its conceptualization, amplify existent global power relations when it overlooks aspects and realities of poorer countries or population strata, or it can be successful in creating

a sustainable diet that is inclusive and contributes to achieving the SDGs and the Paris Agreement.

The global research field of PHD unites actors from politics, science, business, media and civil society. They come from various geographic locations and participate in the discourse from different perspectives (see chapter 5.1.2.). Although many actors consent on the need for change in the global food system to make it more equitable and sustainable and to meet the sustainable development and climate goals, less consistent are the proposed solutions of how to achieve this change. The discourse revolves around the question of what kind of transformation should be pursued. While some see the solution within the current, neoliberal and market-based system, others advocate for a complete transformation towards an alternative system. Those who see the solution in the market-based, economic system advocate for increasing technological efforts, innovation and economic development. In terms of the food system, this involves adaptation efforts to climate change and food innovations. Technology and science aim to make crops more resistant and increase food production productivity (Scott, 2018, p. 103). Business innovations include, for example, plant-based meat alternatives, egg replacers and other created food products (ibid, p. 97).

The term sustainability has no clear definition. Therefore, companies can use it with different intentions. Whatever their intentions are, they increase their power through shaping discourses and maintaining legitimacy (Scott, 2018, p. 99). Although many companies are tying their work to the SDGs, goals focusing on the well-being of the planet and people can conflict with their interest to maximize profits and market power. For example, the concept of 'sustainable agriculture', used by transnational companies such as Unilever, Nestlé and the Kellogg Company, is contested and context-specific (Scott, 2018, p. 102). Alternative definitions of sustainability come from international movements like La Via Campesina, which foster the discourse of human and ecological costs of the globalized food system. Their understanding of sustainability and health is different from the understanding of big corporations, as La Via Campesina is a movement that fights for food sovereignty and changes in power relations (Hossain, 2017, p. 28). The spectrum of intentions and interests of actors causes contradicting discourses, which lead to power struggles in the political sphere. The negotiation of power determines who can participate in the discourse and whose goals are approached.

Prevalent global hierarchies, with transnational corporations high in power, are more incorporated into the planetary health diet thinking than criticized. Many market-based, private companies are prevalent in the discourse of sustainable sourcing, while technology and innovation are described as an integral part of the solution to climate change, e.g. through climate-smart agriculture. However, the focus on technical fixes and S&T innovations leads to interventions and policies that are implemented in an apolitical framework. Without addressing the underlying inequalities in access and power, these technological fixes often benefit elite scientists, affluent farmers or big corporations the most (Niazi, 2004). These learnings can be drawn from the Green Revolution that took place from the 1960s to the 1980s (ibid), but also from more recent examples. The World Bank is the leading promoter of CSA technologies. The governance framework aims to transform the food system through innovation and diffusing agricultural practices with technology. Agrarian social movements like La Via Campesina criticize the approach, as corporate oligarchies increase their power under business-as-usual proceedings (Taylor, 2018, p. 90).

Regarding diets and nutrition, companies are less likely to be part of the discussion on healthy food and the NCD epidemic. However, companies themselves can benefit from the change in discourses and the accompanying shift towards plant-based diets by growing market fields of plant-based meat replacements (Scott, 2018, p. 97). The assumption is, that as long as it is plant-based, it is healthy. But the replacement of ASFs does not necessarily contribute to the reduction of global NCD incidences, as the recommendations for a plant-based diet are sometimes misinterpreted by food producers and create 'health halo effects' (Her & Seo, 2017). This means that highly processed plant-based foods are not automatically healthier and better for the environment than animal-based ultra-processed foods, although perceived as having these attributes. Both can equally contribute to GHG emissions through production, transportation and distribution. Scott (2018, p. 99) highlights this by explaining that the discussion on plant-based versus animal-based foods often pays less attention to ultra-processed foods as another important driver of food system unsustainability.

In conclusion, various actors in multiple spheres engage in a controversial discussion on the planetary health diet. While it is acknowledged that modern food systems cause environmental harm and contribute to the global health burden of NCDs, the means to change it are in debate. The discourse on sustainable diets reveals global power relations in the food system, with its political negotiation processes. For those in power, a transformation of the global food systems

means the need for scientific and technological innovation and adaptation (Leach et al., 2020). For others, the transformation should include a change in power relations. This change would direct power away from big food corporations back to those who have limited power but may know better how to improve ecological and nutrient outcomes on their lands (Hossain, 2017, p. 28). The negotiation of these power relations, mainly done on an international level, reflects how planetary health diets do not just consider global power relations in the food system but are an integral part of global politics and the renegotiation of them.

6. Conclusion

6.1. Résumé of the study

The present work investigated how planetary health diet discourses are involved in global power relations in the food system. As power can be expressed and manifested through ideas, policies, scientific articles, online and offline media, the findings contribute to a better understanding of power dynamics within the global food system. This understanding acts as a base for further discussions on how to create more equitable policies and achieve international sustainability, climate change mitigation and poverty reduction goals as described in the SDGs and the Paris Agreement. The findings of this study indicate that various actors in multiple spheres engage in a controversial discussion on the planetary health diet. While most acknowledge that modern food systems cause environmental harm and contribute to the NCD burden on human health, the means to change the system are debated in various ways. Based on my analysis I conclude that discussions on sustainable diets are important to address global challenges such as climate change and the NCD burden. However, if the goal of a sustainable diet also involves working towards a more equitable food system, the current planetary health diet discourse can, but not necessarily does, contribute to a change in global power relations in the food system.

This study provides a comprehensive understanding of the newly emerging field of planetary health. This scientific field developed in the past decade out of growing concerns regarding climate change and society's concerns about what to eat (Leroy & Hite, 2020, p. 6). Historically, food has always been at the core of economic, political and social processes. While it is important to understand the historicity inherent in the current food system, especially the recent transformations that took place in the past two centuries created the modern food system with its current power relations and perceived limitations. Notions of the modern food system's limitations include three dominant aspects: the burden on human health, climate change and environmental destruction and inequalities and food insecurities. All of them are connected and influenced by social, political and economic forces and also manifest in these different spheres. Nutrition and diets are integral parts of people's identities and cultures. Behavior change policies that do not account for public acceptability can result in increased health inequalities (Hepple & Nuffield Council on Bioethics, 2007, p. 41). Existing inequalities and socio-economic disparities have a strong impact on the health outcomes of individuals.

The empirical part of this study aimed at identifying dynamics that the planetary health diet discourse contributes to the global power relations in the food system. The goal was to provide an understanding of how global power relations themselves are negotiated within the debates. Methodologically, the study was conducted with an interpretive approach and in a constructivist epistemological understanding. Methodology, as the philosophy of methods, describes the worldview and the philosophical assumptions made by the researcher (Sapsford, 2006, p. 175). The focus lies on power relations that become evident through discourses, based on the assumption that meaning is discursively constructed. Foucault determines discourse as a system of statements regarding a specific topic and a socio-historically specific knowledge practice (Diaz-Bone, 2006, p. 251).

The discourse analysis is based on the assumption that current, popular discourses on sustainable diets contain power through the effects they have on shaping realities in society. Further, the discourses can reveal global power relations in the food system by analyzing how issues are talked about, how problems and solutions are conceived and who participates in the discussions. The method used was a discourse analysis, which is an interpretative procedure (Keller, 2011, p. 76). I oriented the research method on the Sociology of Knowledge Approach to Discourse methodology combined with the Grounded Theory approach based on Strauss and Corbin, as discussed in Bormann (2011, p. 235). The corpus was formed through concepts of theoretical sampling and the coding process resulted in 49 codes and four families of codes.

The findings of this study indicate that the present PHD discourse reflects the current renegotiation of the modern food system. The challenges of the 21st century, including climate change, the increasing NCD burden as well as inequalities and food insecurities, are all in some way linked to the developments that modern food systems entail (Swinburn, 2019). Various interest groups and actors advocate for a transformation of the food system. However, the debate on ways to achieve these goals is less congruent than discourses pointing out the limitations. Common discourses revolve around the pros and cons of plant-based versus animal-based foods, the need for technological and scientific innovations, and arguments for business-as-usual versus arguments for a shift away from the neoliberal, market-based system. A third aspect involves the considerations of food insecurities, as a healthy and sustainable diet needs to be available and affordable for everyone. The way actors will address the economic, political and social limitations in the food system will determine whether or not the transformational goals can be achieved. The analysis of the present planetary health diet discourse indicates that

the conceptualization of any sustainable diet approach is always political and will contribute to the negotiation of the future global food system. Power is an abstract concept, but an integral part of politics. The goal to transform the global food system itself includes the power to change current relations. If the concept aims to be globally applicable, such as the PHD approach by the EAT-Lancet Commission (Willett et al., 2019), it is all the more important to challenge power relations in the food system. Otherwise, such concepts may reinforce existing structural, political and economic inequalities. While the aspects of health, the environment and inequalities were separated into three separate sections in the analysis of this thesis, in reality they are all closely linked and interrelated.

The questions of who participates in the discourse and what do these actors talk about are important to understand the negotiation of power relations in the food system through PHD discourses. Large corporations and international politics have a lot of power in the current global food system and this study indicates that planetary health diet discourses only partially contribute to a renegotiation of these power relations. As the analysis found, the impact of ultra-processed food is often not addressed, but the discourse on animal- versus plant-based foods is prevalent. A focus only on the limitations of animal-sourced food will not change current power relations but rather amplify them through the concentration on food or agricultural innovations. This does not mean that a shift towards plant-based food, technology and innovations are not worth pursuing. But, it means that current power relations in the food system, which cause food insecurity and malnutrition in many places, might prevail.

The prevalent discourse on nutrition and the ‘eating right’ mindset depicts food choice as a moral issue (Leroy & Hite, 2020, p. 2). Plant-based diets are increasingly conceptualized as the solution for climate change and the growing NCD burden. Although studies suggest that meat consumption influences both, climate change and the NCD burden, constructing this influence as bad does not contain the whole picture. This prevalent discussion on the benefits of plant-based foods over animal-based foods forms a narrative about the health, sustainability and moral superiority of plant-based foods. Not only does this create a ‘health halo’ (Her & Seo, 2017) that acknowledges the increase of ultra-processed, plant-based food products without reflection. It also contributes to biased discourses that can have negative effects on food insecure populations. In many settings, animal-sourced foods are a necessary and integrated part of living. ASFs provide important nutrients, the animals graze on sometimes otherwise

inarable land and are a source of economic power for many farmers around the world (Adesogan et al., 2020).

Besides food insecurity, the importance of livestock varies between social and economic contexts. This study detected potential conflicts of interest between the PHD diet goals to reduce ASF consumption and SDG 5 regarding gender equality. Especially for many female farmers who do not own land, livestock is essential (Adesogan et al., 2020, p. 4). Further, meat consumption is on the rise in many LMICs, and it is questionable if and how a planetary health diet would be implemented in these countries any time soon. In an African context, people may perceive the planetary health diet as a northern construct that is not suitable to be transferred globally, and as a 'poor people's diet' (Ssemugabo, 2020). I believe these statements are important indicators that a mainly plant-based global reference diet does not acknowledge the heterogenous food cultures and identities of people in different regions. Also, animals can bring wealth to all actors in the livestock value chain that would otherwise lack opportunities to earn money, for example, rural women in Ethiopia (Aronson, 2019).

It seems that the focus on the plant-based versus animal-based discussion draws the attention away from debates on the global corporations' power and the effects of ultra-processed food products on environmental and human health. The power of global producers and retailers is inherent in modern food systems (Hossain, 2017). Therefore, they advocate for a food system transformation that is based on the current neoliberal, market-oriented approach. This manifests through proposed solutions that are innovation-driven, such as climate-smart agriculture or plant-based ASF replacements (Scott, 2018, p. 97; Taylor, 2018). In contrast, alternative solutions propose food sovereignty and power shifts. Such a power shift should, for example, increase peasants' rights by decreasing transnational corporations' influence (Hossain, 2017, p. 28). Discourses on planetary health diets are often held in the context of the former system. The reference diet by the EAT-Lancet Commission has, therefore, been criticized for its focus on rich countries, modern food systems and market-based solution proposals (Aronson, 2019).

This focus on rich countries and populations overlooks that the affordability of the proposed diet varies between low-, middle- and high-income countries (Gupta et al., 2021, p. 2). In LMICs such as Burundi, Burkina Faso, Lesotho, Malawi, Nigeria or Yemen, the cost of the EAT-Lancet reference diet exceeds the mean daily per capita household income for many people (Hirvonen et al., 2020, p. e63). Without policies or growing incomes, the internalization

of sustainability into the cost of food products will make healthy food unaffordable for millions of people around the world (Green, 2019). The EAT Commission refers to the SDGs as an integral part of achieving a planetary health diet, as all 17 SDGs are linked in some way to food and nutrition (Lucas & Horton, 2019). As the findings in this study suggest, current planetary health diet discourses and transformation plans will not comprehensively contribute to a sustainable and equitable food system if some underlying power relations are not considered.

In conclusion, it can be said that the planetary health discourse has a wide-ranging and powerful impact on the political and social power relations in the food system. The negotiation of power relations mainly takes place on an international level. Planetary health diets are an integral part of global politics and the renegotiation of inherent power dynamics. Due to its increasing prominence in various channels like politics and media, it influences perceptions and habits from people around the world. However, from a critical perspective, the findings of this study indicate that the planetary health diet will not necessarily decrease inequalities. Therefore, it may miss its aim to contribute comprehensively to achieve the Sustainable Development Goals and the Paris Agreement Climate Change targets. Considerations of a healthy, climate-friendly planetary diet need to include the availability and affordability of this diet for the poor and vulnerable groups around the world and the different typologies of food systems, beyond the modern and industrialized ones prevalent in the Global North. I hope these observations might contribute to further discussions on the conceptualization of a global, sustainable reference diet.

6.2. Final remarks

6.2.1. Limitations

Due to limited personnel, financial and time resources this study and its design face some limitations. The fact that the research has not been conducted by a research team limits the study from potential benefits through an exchange of ideas and perspectives. Different approaches and backgrounds can enrich a study throughout different phases, from the design to the interpretation and resulting discussion.

Limitations of the methodical approach of a discourse analysis include competing interpretations. However, I attempted to present justifications for how I came up with results. Due to these limitations, especially regarding time and finances, the study includes only a

limited selection of power relations, historic themes and contexts regarding the global food system.

Another limitation of this study are the language constraints. I am aware that the discourse is also held in other languages, such as in the Spanish speaking world with a discourse on 'la dieta saludable planetaria', for example in the Argentinian journal article on "Una alimentación saludable y una producción sustentable para la salud de nuestra población y de nuestro planeta" (Doval, 2019). Discourses on a planetary health diet and sustainable nutrition in other languages can have different results. As this study has been conducted in English, these potential different outcomes remain unknown. Further, much of the research on this topic has been done in the Global North, and knowledge from those highly affected by the power relations and inequalities could only be included in this study to the extent that data and articles from the Global South were available.

6.2.2. Further research

This study is theoretically located on a meta-level and analyses power relations in the discursive sphere. The field could benefit from more in-depth analysis from different contexts, countries and social groups. This could include an analysis of the actual effects on PHD discourses, how it is implemented in different settings and how individuals in different countries and communities perceive the approach and its underlying power structures.

A more transdisciplinary methodology with bottom-up approaches could enrich the discourse and future studies by including the perceptions on power, sustainable diets and climate change of those, who have no access to the higher political or academic science spheres. This is important because many of those who are most affected by climate change and its effects on agriculture have little possibilities to participate in discourses that could eventually change policies and power structures. This includes, for example, indigenous people, farmers in tropical regions or women and men of marginalized sub-groups.

An important aspect for future studies on planetary health diets is the correlation between food insecurity and the underlying political and structural power manifestations. Further research is needed to define what a healthy and sustainable diet could look like when underlying power relations and political influences are considered.

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Appendix

Abbreviations

ASF	Animal sourced foods
BMI	Body Mass Index
CSA	Climate-smart agriculture
DALYs	Disability-adjusted life years
e.g.	exempli gratia (meaning: for example)
FAO	Food and Agriculture Organization
GBD	Global Burden of Disease Study
GHG	Greenhouse gas
i.e.	id est (meaning: that is)
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
LMICs	Low- and Middle-Income Countries
NCDs	Non-communicable Diseases
PHD	Planetary Health Diet
PPP	Public Private Partnership
SDGs	Sustainable Development Goals
S&T	Science and Technology
UNEP	United Nations Environment Programme
WBCSD	World Business Council for Sustainable Development
WEF	World Economic Forum
WFC	World Food Council
WHO	World Health Organization

List of figures

List of codes and analyzed documents

List of analyzed documents

Adesogan, A. T., Havelaar, A. H., McKune, S. L., Eilittä, M., & Dahl, G. E. (2020). Animal source foods: Sustainability problem or malnutrition and sustainability solution? Perspective matters. *Global Food Security*, *25*. https://doi.org/10.1016/j.gfs.2019.100325

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List of codes

"Eating right" Mindset

(Evolving)Public and academic antimeat narrative

Affordability for consumers

Antimeat narratives in food policies

Availability and affordability in LMICs

Belief systems and ideologies

Causes for poor quality of diets / nutrient deficiency

Challenges of sustainable, healthy food systems and policies

Companies not focusing on diet aspect in sustainable sourcing approach

Consequences/Outcomes of increasing affluence (in LMICs)

Considering dietary situations in LMICs

Considering different needs of different food groups

Criticism: centralized approach

Criticism: Data reliability and methods

Criticism: Overlooked local, social and individual aspects

Critics of the report/PHD approach

Digital countermovement

Effect on mortality / chronic disease rates

Food innovation, technology and modernisation

Food system is failing us Narrative

Governments' power, responsibilities and omissions

Importance of ASFs for SDGs and LMICs

Income disparities

Influence of antimeat narrative and importance of ASFs

Info gaps in report

Integrate knowledge from the global south

Liberalization of markets, unregulated markets

Limitations of nutritional studies

Livestock in sustainability debates

Negative effects of PHD discourses

Neoliberal ideology - market benefits

Perceptions of PHD in LMICs

PHD constructed and shaped by politics and ideology

Planetary health diet advocates

Polarization

Political power over consumers / policy power

Power and influence of food companies

Power dynamics between players

Power of civil society

Pro-meat studies, arguments and discourses

Requirements for transformation

Role of ultra-processed food in sustainable diets

Social change

Socio-economic disparities in adherence to EAT-Lancet diet

Strategic network with food multinationals and quasigovernmental entities

Strategies to shift consumption

Studies and policy bias

Sustainability in growth context

Sustainable alternatives in production

Codes listed in four categories

Group: Discourse on what to eat – sustainable diets (18 Codes)	
"Eating right" Mindset	(Evolving)Public and academic antimeat narrative
Antimeat narratives in food policies	Belief systems and ideologies
Consequences/Outcomes of increasing affluence (in LMICs)	Influence of antimeat narrative and importance of ASFs
Considering different needs of different food groups	Effect on mortality / chronic disease rates
Food system is failing us Narrative	Importance of ASFs for SDGs and LMICs
Considering dietary situations in LMICs	Limitations of nutritional studies
Livestock in sustainability debates	Perceptions of PHD in LMICs
Pro-meat studies, arguments and discourses	Requirements for transformation
Role of ultra-processed food in sustainable diets	Strategies to shift consumption

PHD report (13 Codes)	
Criticism: centralized approach	Criticism: Data reliability and methods
Studies and policy bias	Critics of the report/PHD approach
Effect on mortality / chronic disease rates	Info gaps in report
Limitations of nutritional studies	Negative effects of PHD discourses
Perceptions of PHD in LMICs	PHD constructed and shaped by politics and ideology
Planetary health diet advocates	Polarization
Criticism: Overlooked local, social and individual aspects	

Power relations between players (15 Codes)	
Companies not focusing on diet aspect in sustainable sourcing approach	Strategic network with food multinationals and quasigovernmental entities
Food innovation, technology and modernisation	Governments' power, responsibilities and omissions
Liberalization of markets, unregulated markets	Neoliberal ideology - market benefits
Polarization	Political power over consumers / policy power
Power and influence of food companies	Power dynamics between players
Power of civil society	Requirements for transformation
Role of ultra-processed food in sustainable diets	Digital countermovement
Sustainability in growth context	

Social aspects (17 Codes)	
"Eating right" Mindset	Affordability for consumers
Availability and affordability in LMICs	Causes for poor quality of diets / nutrient deficiency
Challenges of sustainable, healthy food systems and policies	Consequences/Outcomes of increasing affluence (in LMICs)
Considering dietary situations in LMICs	Considering different needs of different food groups
Social change	Food innovation, technology and modernisation
Importance of ASFs for SDGs and LMICs	Income disparities
Integrate knowledge from the global south	Perceptions of PHD in LMICs
Criticism: Overlooked local, social and individual aspects	Socio-economic disparities in adherence to EAT-Lancet diet
Sustainable alternatives in production	