

Global organizations and professionals in the food system: is there a shared vision on the systemic change toward sustainability?

A holistic overview of the global food system problems and solutions for systemic change

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CFB063A10: Capstone Project

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June 10th, 2022

Abstract

The research paper strives to answer the following question: Global institutions and professionals in the food system: is there a shared vision on the systemic change toward sustainability? First, the literature review portrays how the systemic problems and possible solutions are seen by the global organizations related to the food system. Next, the results of the qualitative research present insiders' perspectives on the same topics in the form of the expertise of professionals from different food system dimensions. Then the paper describes the similarities and contrasts between the global organizations' review of the food system and that of the professionals working in it. The paper's main findings lie in the significant convergence of views of global organizations and food system professionals on the scale of the problems and urgency of action required. However, the paper also points out the large incompatibility of the views regarding solutions for the systemic transition towards sustainability. The main difference in the solutions is that the professionals focus on tackling the root causes of the systemic problems while the global organizations concentrate on improving the current state of the problems.

Acknowledgements

This paper is a result of combining my culinary working background with interest in searching for ways to solve global problems. Therefore, I would like to thank the people whom I met throughout my culinary career and academic journey in the field of sustainable development for sharing their knowledge and experience, inspiring me with their thoughts and actions and supporting me in writing this paper.

I would like to thank all the qualitative research participants for their time and willingness to share their expertise and opinions in the interviews. I feel very encouraged by these people, their diverse backgrounds, and their motivations for contributing with their daily work to a more healthy, inclusive and nature-positive future.

I would like to express my gratitude to my supervisor, Tim van Zutphen, who supported and challenged my ideas, dedicated his time to our meetings, and provided feedback throughout the working process. I would also like to wholeheartedly thank my mother, Jelena Lohmatova, and my friends, Daria and Anastasia, for supporting me in my work on the paper and for sharing their perspectives and thoughts on the topics that I was working on.

Furthermore, I would like to thank my brother, father and grandmothers for checking on how I am feeling and doing during the process and for supporting me with their kind words. I would also like to express my deepest appreciation to my friends, Jelizaveta, Anastasia, Jevgenia and Mari. They always supported and cherished me throughout my entire bachelor journey while being thousands of kilometers away, which is a great honor I am so thankful for.

Outline of the paper

Introduction	4
Methodology	5
Literature review	6
Results	13
Discussion	25
Conclusion	30
References	32
Appendix A: Interview outline	35
Appendix B: Participants' opinions on the awareness of the systemic problems	37
Appendix C: Personal motivations and inspiration of the participants	38

Introduction

Today, June 2022, humanity is facing numerous environmental, social, economic and political issues: climate change, Covid-19 pandemics, wars and political conflicts, poverty and hunger, to name a few. Those pressing issues are often interconnected, and tension in one of them tends to worsen other vulnerable fields. For example, one of the critical food system problems - hunger worsens due to pandemics, political instabilities, weak economic systems and extreme weather conditions caused by climate change.

Hunger is not the only problem of the food system on a global scale. According to the Global Nutrition Report from 2020, one in nine people is hungry or undernourished, while one in every three is overweight or obese. The amount of countries facing a triple burden of malnutrition, in the forms of underweight, micronutrient deficiency, and overweight, is growing, which seems to make achieving Sustainable Development Goals 2 "Zero Hunger" and 3 "Good Health and Wellbeing" almost impossible by the year 2030 (FAO et al., 2020; IFPRI 2021). The spread of malnutrition is accompanied by unsustainable production and consumption patterns leading to the transgression of planetary boundaries and associated socio-economic problems (Willett et al., 2019).

The food system's current operation has vast hidden costs in multiple affected sectors - environmental, health, social and economic. The Food and Land Use Coalition report from 2019 assesses those hidden costs at \$12 trillion a year, which is \$2 trillion more than the market value of the global food system. From the environmental perspective, the hidden cost is the considerable contribution of the food system to the climate crisis. On the social side, one of the hidden costs is the decline in youth interest in working in the food system as a huge part of the system's workers are chronically underpaid and stuck in a "poverty trap". The poverty trap is described as an inescapable loop of low wealth which occurs due to a lack of access to capital, environmental degradation, poor education, infrastructure, and healthcare (Carte & Barrett, 2006). Furthermore, the hidden costs of the current food system on health lie in having to pay much more in the future to cope with the negative consequences of an unhealthy diet, such as an increase in chronic diseases. Consequently, all those hidden costs will have a negative impact on the economy (HLPE, 2020; Porter et al., 2014).

The way the food system works does not seem to meet the needs of either current or future generations. There is no simple solution available, and the responsibility for action and accountability seems to be diffused. This paper aims to depict the scope of

current food system problems and proposed solutions by the global organizations involved in a literature review, as well as the perspectives on the systemic change of individuals who are a part of the system. The qualitative research was conducted to interview 13 professionals from different parts of the world who work on the food system's social, economic, health, and environmental aspects. The study strives to determine whether global institutions and professionals in the system have a shared vision of systemic change toward sustainability. Furthermore, by exploring diverse perspectives, the paper aims to bring a more holistic overview of current challenges and opportunities in the system. Ultimately, the paper's outcomes can inspire further research and change.

Methodology

A literature review and a qualitative approach were chosen to answer the research question, Global institutions and professionals in the food system: is there a shared vision on the systemic change toward sustainability? The literature review encompassed the latest reports of the organizations, research institutes, steering committees, and global initiatives evolving around the food system topics, such as hunger and poverty, global food system transformation, health promotion, food security, nutrition, humanitarian aid and malnutrition. For the literature review, reports of the following organizations were analyzed: The Food and Agriculture Organization, The International Fund for Agricultural Development, The United Nations International Children's Emergency Fund, The World Food Programme, The World Health Organization (FAO, IFAD, UNICEF, WFP, WHO, 2020), The High-Level Panel of Experts on Food Security and Nutrition (HLPE, 2020), The International Food Policy Research Institute, (IFPRI, 2021), UNICEF (2021), EAT-Lancet (2019), and Metabolic (2017). Furthermore, for collecting the qualitative data, there were 13 semi-structured, in-depth interviews conducted.

The interviewees were chosen according to their involvement in one of four food system sustainability dimensions: health, social, economic and environmental. The dimensions were selected for the research based on definitions of diets' and food system's sustainability pillars by Burlingame and Dernini in 2010, Meybeck and Gitz in 2017, and Braun et al. in 2021, as described in the literature review. Furthermore, the study strived to involve participants with diverse backgrounds - e.g. individuals from different fields of expertise, different levels of experience, from various parts of the world, and of different genders and ages.

The qualitative research focused on the individuals who are part of this system and their

internal perspectives. This bottom-up inductive approach was chosen with the motivation of learning about the views of people that are an integral part of specific elements of the food system and therefore may have a unique perspective from within as well as a more detailed knowledge of these parts than policymakers who are oftentimes in charge of more general decisions in the system.

The questions chosen for the interviews were mainly open-ended to learn from the participants and permit the complexity of a single phenomenon to emerge from the participants' perspectives. The questions of the interviews were divided into three parts - introductory questions, key questions and closing questions (Appendix A). Introductory questions are aimed to learn about the background of participants and how participants define the main concepts of the research - the food system and its sustainability. Key questions are focused on the current state of food system sustainability, dilemmas of local or global solutions and individual or aggregate levels, and a set of actions to shift the system toward a more sustainable state. The closing questions are meant to learn about the participants' perspectives on the food system's future and create a possibility of sharing additional thoughts and reflections.

The interviews were recorded and transcribed. The themes that appeared throughout the transcripts were identified regarding the research question. The discovered codes were next compared and contrasted.

Literature review

Definitions for the key concepts

The research on the transition of the food system revolves around the terms *sustainability*, *sustainable diet*, and *food system*. Therefore the literature review firstly looks at the definitions of those terms. The definitions are followed by describing how global organizations from the food system depict the current state of the system, its problems and challenges, and the solutions for systemic change in their latest reports.

Sustainability

Based on the current literature, Johnston et al. suggest that there are at least several hundred definitions of the word *sustainability*. The large spectrum of descriptions for this word leads to significant concerns among scholars that a concrete meaning of the term is missing (Farley & Smith, 2014; Johnston et al., 2007; Newton & Freyfogle, 2005; Ramsey, 2015). However, the common root for the majority of the varying definitions of

sustainability is traced back to the report of the Brundtland Commission of the United Nations from 1987 and its definition of sustainable development: "*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*". Often, the concept of sustainability is seen as being comprised of three interconnected pillars or dimensions, namely economic, social, and environmental (Basiago, 1999; Boyer et al., 2016; Carter & Moir, 2012; Lehtonen, 2004; Moldan et al., 2012; Pope et al., 2004). Despite some common traits of sustainability definitions, like its origin and pillars, it makes little sense to examine the concept in a vacuum as seemingly the definition of the term is largely contingent upon the context in which it is applied, such as, for instance in relation to food - e.g. sustainable diet (Brown et al., 1987; Ruggerio, 2021).

Sustainable diet

The Food and Agriculture Organization (FAO) defines *sustainable diets* as "*diets with low environmental impacts which contribute to food and nutrition security and healthy life for present and future generations*". Furthermore, FAO elaborates on the definition by emphasizing the importance of five key elements of sustainable diets such as environment, culture, equity, economy, and health: "*Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources*" (Burlingame & Dernini, 2010, p. 7). An alternative definition of sustainable diet was proposed by Meybeck and Gitz: "*A sustainable diet is a diet that contributes to good nutritional status and long term good health of the individual/community and that contributes to and is enabled by, sustainable food systems, thus contributing to long term food security and nutrition*" (2017). Both definitions concur that there are four key domains that the operation of the food system should include to ensure sustainable diets for humanity - environmental (protection and respect towards biodiversity and ecosystems), economic (fairness and affordability), social (cultural acceptability) and health (nutrition and health) (Drewnowski et al., 2018). However, the distinctive feature of Meybeck and Gitz's definition is its focus on the food system and its attempt to further define the concept and clarify its goals.

Food system for a sustainable diet

According to the EAT-Lancet Commission, a *food system* comprises interlinked components and activities to produce, process, distribute, and consume food (Willett et al., 2019). The current food system is a result of historical development, which was

critically affected by the intensification processes, especially since the Green Revolution. This revolution led to producing the largest amount of food ever and a reduction of starvation, but at the cost of environmental degradation, unsustainable resource usage, dependency on non-renewable resources and increased social inequalities (Culver et al., 2012; Easterbrook, 1997, FAO, 2011, Pfeiffer, 2013). The Food System in 2022 is a significant contributor to environmental, social, economic and health problems, and it is extremely far from providing humanity with sustainable diets (Bene et al., 2019; Willet et al., 2019). To ensure sustainable diets for humanity, there is a need for the development of or transition to an environmentally, socially, economically and health-wise sustainable food system (Braun et al., 2021). The change of complex multidimensional systems requires smart, complex and intersectional solutions (Gladek et al., 2017). The literature review will continue by discussing the main problems in the current food system and suggested solutions for improving the system's state according to the latest reports of global organizations in the field.

The scope of the global food system problems

Having defined the key concepts and articulated that the current food system could not be considered sustainable from either environmental, social, economic or health domains, the systemic issues in the domains would be further discussed based on the latest reports of the global organizations that work in the system.

The latest reports of FAO, IFAD, UNICEF, WFP, WHO, IFPRI, and EAT-Lancet conclude that the current food system is far from being sustainable and without change, it will likely further contribute to social inequalities, increased risks of morbidity and mortality, economic instabilities and poverty, climate change and environmental degradation (FAO, IFAD, UNICEF, WFP, WHO, 2020; IFPRI, 2021; UNICEF, 2021; Willett et al., 2019). The majority of those problems in the food system are interconnected and have drastic consequences for the food system itself (IFPRI, 2021; Porter et al., 2014). Furthermore, the population growth, COVID-19 pandemic, wars, and global conflicts further burden all the food system problems and demonstrate its fragility (FAO et al., 2020; IFPRI, 2021).

The projections of achieving the SDG2 - Zero Hunger by 2030 have negative forecasts (FAO et al., 2020; IFPRI, 2021). There is a lack of progress in ending hunger, and there is even a growing rate of hunger since 2014. Due to the Covid-19 pandemic and new conflicts, such as the Russian invasion of Ukraine and its impacts on the food security in other countries that largely depend on exported crops, oils and fertilizers from Ukraine and Russia, there is a significant probability of a further increase in hunger (Berkhout et

al., 2022; FAO et al., 2020; IFPRI, 2021, Osendarp et al., 2022). In 2019, an estimated 25.9% or around 2 billion of the population was struggling with food insecurity, among which nearly 750 million people were highly affected by hunger (FAO et al., 2020). The prevalence of food insecurity is largely unequal across the globe; moreover, it is also unequal between genders, which is more prevalent among women (WHO, 2020; IFPRI, 2021). However, adult and child obesity is rapidly rising in all regions (FAO et al., 2020; UNICEF, 2021). Furthermore, the burden of child malnutrition also poses a massive danger across the globe: in 2019, 21.3% of children below five were stunted, 6.9% wasted, and 5.6% overweight, while at least 45% suffered from micronutrient deficiencies (FAO et al., 2020).

A major part of the world can not stick/is not sticking to a healthy diet, which according to WHO, is the ultimate protective modifiable factor from malnutrition and associated non-communicable diseases (NCD) such as diabetes, heart disease, stroke, and cancer (WHO, 2018). An unhealthy diet poses a massive risk of morbidity and mortality, higher than unsafe sex, alcohol, drugs and tobacco combined (Willett et al., 2019). The main challenge to leading a healthy diet is its higher price than an unhealthy diet worldwide. Therefore a healthy diet is unaffordable to at least 3 billion people as its costs are much higher than the poverty line (FAO et al., 2020). Unequal distribution and consumption of different food groups around the globe also make a balanced diet harder or impossible in various contexts (IFPRI, 2021). Furthermore, one of the main issues with unhealthy diets is their hidden costs - primarily medical costs for addressing health issues resulting from those diets (FAO et al., 2020).

In addition to the hidden healthcare costs, there are huge hidden environmental costs of unhealthy diets and food system in general in terms of biodiversity, freshwater losses, and climate damage (Willett et al., 2019). The global food system massively contributes to environmental degradation and transgression of planetary boundaries, further threatening climate stability and ecosystem resistance and simultaneously affecting all aspects of food security (FAO et al., 2020). The climate shocks, in turn, can further trigger unhealthy eating patterns and the overall prevalence of food insecurity (IFPRI, 2021). Furthermore, the food system causes reductions in biodiversity, as it produces large quantities of harmful emissions and is responsible for using around 70 % of all freshwater withdrawals globally (FAO, 2021). Also, the current food system mass-produces animal-derived products - at an especially tremendous rate for high-income countries (FAO et al., 2020). Large-scale production of animal-derived products is problematic due to its considerable negative environmental impact and inability to provide the whole population with the proteins from these products (Willett

et al., 2019). In addition to the listed environmental issues related to the current operation of the food system, there is another crucial matter of food losses and waste, which account for 14% and 17% of food production respectively and have dramatic consequences for the environment without even reaching the plates of people who struggle from food insecurities (FAO, 2019).

The scale of the problems described above indicates that the system is not operating in a smart manner (IFPRI, 2021; Willett et al., 2019). Another issue in the current food system is its capability to provide the growing population with sufficient calories, but leaving over 750 million people with an inadequate amount of food and many more suffering from food insecurities (FAO et al., 2020). The current food system is not focused on producing sufficient macro-and micronutrients for healthy and sustainable diets and does not aim to distribute those so that every person would have access to healthy and sustainable food. Moreover, poverty is deeply interlinked with the food system due to its direct connection with the extent of food insecurities. Around half of the global workforce is employed in a food system, with the majority of those workers being chronically underpaid, which limits development and puts them at risk of food insecurity and a poverty trap (FAO, 2020; Willett et al., 2019). Furthermore, the financial instabilities and declines threaten food security even in peaceful settings and get more harmful in political unrest and conflicts, hindering food security in the long run (Porter et al., 2014).

Overall, there is a high external cost of food system operation and a huge hidden cost to the health and wellbeing of society, environmental sustainability and economic resilience (FAO, 2020). The problems listed in this section are also linked to delays between scientific alerts and policy recommendations, fragmented and weak food system governance, inefficient multi-sector cooperation within the system, and insufficient investments in science and regulation that suppress innovations (FAO et al., 2020; Porter et al., 2014; Willett et al., 2019).

Proposed solutions for systemic change

To solve the complex and interconnected problems described above, the latest reports of FAO, IFAD, UNICEF, WFP, WHO, IFPRI, HLPE, EAT-Lancet and Metabolic proposed various solutions and strategies. The common trait of the reports lies in the idea that there is an urgent need for action and change in the food system that could also address social, health, environmental and economic problems.

IFPRI, HLPE and Metabolic reports advocate for a shift in the food system paradigm and

policy approaches to systems thinking (IFPRI, 2021; Galdek et al., 2017; HLPE, 2020). Galdek et al. suggest: *"By broadening the scope of decision-making and accounting for systemic effects, we could understand feedback loops and adverse effects early-on, and adapt policy accordingly"* (2017). HLPE argue that strengthening systems thinking around food security and nutrition could serve to prioritize the right to food (2020). Prioritization of the right to adequate food for all and therefore improving economic access to the adequate, safe, and nutritious food is, in turn, suggested as a crucial step for improving the food system (IFPRI, 2021; Galdek et al., 2017; HLPE, 2020; Porter et al., 2014). There is an emphasis on strengthening international cooperation for effective food governance and increasing multi-sector and -level collaboration navigated by scientific targets (FAO et al., 2020; Galdek et al., HLPE, 2020, Willett et al., 2019). Policy shifts toward a more interconnected and collaborative format could help enrich the system's resilience and build strength in the system for protection from the health shocks and pandemics, economic shocks and slowdowns, conflicts and climate change (HLPE, 2020). Some recommendations for building a resilient and inclusive food system emphasize the essence of context-specific instead of one-size-fits-all solutions (FAO et al., 2020; HLPE, 2020).

In addition to the multi-level international cooperation, there is an idea of examining opportunities for creating and supporting an inclusive global science-policy interface (Porter et al., 2014). Another related idea for improving the food system is to increase financial support for research as it could help unpack the main challenges and opportunities to formulate food policies and understand hidden environmental, economic, health and social costs of the policies for identifying trade-offs and synergies concerning SDGs (FAO et al., 2020; HLPE, 2020). One of the ways to establish different trade-offs and solutions for different countries and regions is to promote citizen science and inclusive research where local communities and their knowledge are central to the research and development of innovation (Porter et al., 2014).

When it comes to the environmental side of the food system, there is prevalent advocacy for approaching the food system from the perspective of planetary boundaries and shaping its further functioning in a safe operating space (Galdek et al., 2017; Willett et al., 2019). One of the predominantly proposed ways to stop the planetary boundaries' transgression by the food system is a significant dietary shift to lower-impact and less-resource intensive food sources (Galdek et al., 2017; FAO et al., Willett et al., 2019). The 2019 Report of the EAT-Lancet Commission proposes a flexitarian planetary health diet as a pathway towards better health of humanity and the planet. The EAT-Lancet planetary health diet is a nourishing, mainly plant-based diet that allows infrequent

meat and fish consumption and is very light on sugar and red meat (Willett et al., 2019). FAO et al. also suggest focusing on the transition to food that is healthier for humans and environmental sustainability while it is also cost-beneficial as it could help to avoid paying billions for climate compensation and medical treatment later on (2020).

HLPE argues for the transition towards nutrition-driven agriculture production and therefore shift from just producing enough calories to feed the world to producing and adequately distributing enough calories, macro-and micronutrients to feed the world in a healthy way (2020). The FAO, in turn, argues that the distribution of an adequate amount of healthy food should also become central when solving challenges in food access (FAO et al., 2020). In addition to changing food production and distribution patterns, there is a proposition for policy on behavioural change and change in consumption towards more sustainable habits (FAO et al., 2020; HLPE, 2020). Furthermore, another solution for fostering sustainability of the food system is to include a policy to reduce food waste and support technology innovation for increased efficiency and fewer food losses (Galdek et al., 2017; HLPE, 2020; FAO et al., 2020). Other suggestions for improving the environmental sustainability of the food system are boosting nature-positive production at a sufficient scale, improving ocean management, adopting a half-earth strategy, and investing in innovative solutions for sustainable food production (Porter et al., 2014; Willett et al., 2020). Agroecology is seen as yet another key to a sustainable future as it balances social, economic and environmental aspects of agricultural systems and practices (HLPE, 2020).

When it comes to recommendations for addressing social issues in the food system, there is an emphasis on advancing equitable livelihoods and fair value distribution (Porter et al., 2014). To enlarge global access to healthy food, FAO et al. suggest reducing the price of healthy food and tackling price drivers for nutritious food by forcing transformation within the political economy, food supply chain, food environment, public expenditure and investment policies (2020). Willett et al. propose seeking a national and international commitment as a way to shift to healthy diets and increase food security and the overall health of society (2019). Other solutions related to the social sustainability of the food system are nutrition-sensitive social protection policies, with particular attention to the protection of infants and children and vulnerable and marginalized people (FAO et al., 2020; HLPE, 2020). Furthermore, Porter et al., Galbek et al., and HLPE argue that the crucial solution for food system sustainability is the structural support for the wellbeing and livelihoods of people who work in the food system and women's empowerment in the food system.

This literature review depicted the ongoing discussion among scholars on defining sustainability and applying the concept to diet and food systems, a broad scope of the current systemic issues and an even more extensive range of solutions for the problems. There was notable consistency in discussing most problems in the reports; however, the proposed solutions were less aligned and more numerous. The interview structure was built upon the examined literature. It included questions on the vision of the food system professionals on defining sustainability in the food system, capturing the scope of problems and their interconnectedness and discussing potential solutions for addressing the systemic issues (Appendix A).

Results

The results section describes the outputs of the qualitative research, which was carried out based on the key themes from the literature review.

Background of the participants

The qualitative research participants come from different backgrounds in the food system. The participants' occupations were subdivided into four main domains of the food system and its sustainability: economic, health, social and environmental. The spectrum of disciplines and their relation to the food system domains are depicted in Figure 1. In addition to the main occupations, some participants have further interests and working positions across the food system domains. The profiles of some participants could not be attributed to just one domain, as shown with the lines on the figure.

The participants come from the countries of Western and Eastern Europe, Northern and Southern America, and Middle East. The qualitative research is gender-balanced and is based on the opinions of professionals of different age groups. The participants had various working experiences in the food system, ranging from one year to several decades.

The results section does not specify the participants' background when presenting the qualitative research outputs. There was no significant difference noted between the answers of participants from different food system domains nor remarkable convergence of opinions of participants who were classified in the same food system domain. The paragraphs below present the main themes from the participants' answers in the context of food system problems and possible solutions for sustainable change. The results overview starts with the participants' definitions of sustainability, sustainable diet and sustainable food system.

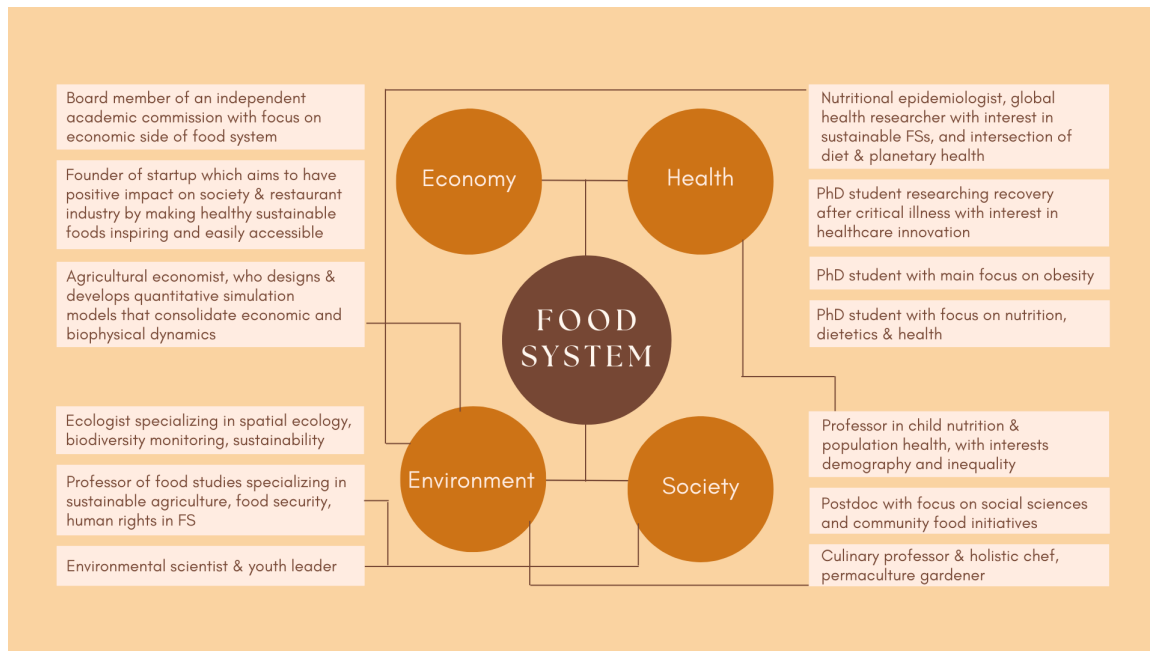


Figure 1. The occupations of the qualitative research participants.

Participants' definitions of sustainability, sustainable diet and sustainable food system

All the definitions of *sustainability* given by participants were unique. However, almost every participant acknowledged that environmental health and planetary boundaries are essential parts of sustainability. None said that sustainability refers solely to the environment; instead, some participants expressed a worry that it is common to talk about sustainability only in the environmental context, which undermines other vital components. Most participants referred to social welfare, inclusivity and human health as the second element of sustainability. Few people mentioned the economic aspect of sustainability as well. Words like *balance*, *long-term*, *future-proof*, and *resilient* were used to describe sustainability. Most participants pointed out that the term is often used without a specific definition, which devalues it. One of the participants also referred to sustainability as a utopian and questionably reachable idea for privileged people as they have more options and resources to make "sustainable" choices. Another participant said that due to confusion with the term, they started using alternative terms instead to clarify the main idea and context with the words *nature-positive*, *inclusive*, and *healthy*.

Concerning the definition of a *sustainable diet*, all participants described it as

environmentally friendly and beneficial for the long-term health of people. Some people pointed out the importance of this diet fitting in cultural contexts, value systems and geographical conditions. Other people emphasized the importance of the affordability factor of those diets. Three participants referred to the EAT-Lancet planetary health diet as an example of a sustainable diet and stressed the importance of this diet fitting into cultural background and availability of resources on the local level.

When defining the *sustainable food system*, inclusivity, food justice and health factors were put up front. Every participant said that a sustainable system has to offer food security for humanity and ensure that all people have access to affordable, healthy, safe food. One of the participants emphasized that health should become public and not a private issue to ensure that institutions would be motivated to work toward improving societal health. Furthermore, the environmental factor was mentioned in the context of a sustainable food system being the system that does not over consume natural resources to ensure food security for both present and future generations. The majority of participants mentioned the importance of continuous education to raise awareness, foster change, and shift the food demand toward healthier and more sustainable choices. The following paragraph will depict the food system's problems that set it apart from the presented vision of the sustainable food system.

Participants' vision of the critical problems that do not allow systemic change

Participants considered many current patterns of the food system responsible for restricting an adequate and rapid shift to a more sustainable systemic operation. The most emphasized problem was an ignorance of the root causes of the problems and a narrow focus of institutions on specific situations and desirable outcomes. Half of the participants explained that they see capitalistic systems and neoliberal thinking as the root causes which led humanity to the situation where profit is valued over people and the planet. The subsequent issues linked to these root causes were neglectance of the food system problems and thereupon persistent insufficient action of the people in power who have the grandest opportunity to lead the change: *"Our solutions will not come from the same organizations, agencies, people and bloodlines who have been imprisoning, murdering and systematically destroying the earth"*.

When talking about the system's development around the financial profit as a core driver, participants pointed at the following outcoming issues :

- Little to no governmental commitments due to the short-term financial interests;
- The continuous vast negative influence of corporations and their lobbying in

doing sustainable shifts, slow overall progress towards resilience and equity, diffusion of responsibility and holding no one accountable for the negative impacts;

- Increased inequalities and exploitation of the rest of the world by the wealthiest countries, facilitating a considerable part of the food system workers being stuck in the poverty trap;
- The absence of regulations and restrictions for making healthy food affordable and widely available;
- The supermarkets' composition being nowhere near the guidelines on the healthy and balanced eating;
- Unhealthy food being considerably cheaper, making healthy and sustainable choices available mainly for the elite.

Most participants pointed to the fragility of the food system, describing it as an outcome of the unstable foundation of the system. The participants illustrated the problem by giving examples of recent drastic systemic downfalls in the multiple crises we face - Covid-19 pandemics, the war in Ukraine, and climate crises. Few participants pointed out that in times of crisis, food security always becomes a bigger problem, and instead of helping people in times of uncertainty by relying on emergency stocks, the food system adds a burden to the situation due to its predominantly degenerative patterns. Three participants also named globalization as a cause that explains the wide prevalence of homogeneous food, devaluing food and forgetting about cooking, which results in drastic environmental and cultural consequences, and decreased self-sufficiency of the local food systems. One of the participants highlighted another problem originating from the non-resilient system: ignorance of hidden costs in the current system. Those hidden costs are becoming more prominent in health care costs, environmental damage, and growing inequalities, endangering the future even more.

Each participant mentioned inequality and inequity within the food system as substantial systemic problems. Participants pointed out the systematic exploitation of poorer countries, uneven distribution of damaging impacts of unsustainable system operation (wealthiest countries emit most while poorest countries suffer from damaging consequences), lack of food security, and unequal resource distribution. One of the participants said that the system seems too far gone to make the resource redistribution happen as the gap between poor and wealthy is tremendous.

When it comes to the environmental aspect of the food system problems, all the participants said that there are many problems that the food system is contributing to.

Biodiversity loss, monoculture and simple crop domination, soil degradation, reliance on fossil fuels and fertilizers, water intensity of the food system, expanding livestock and pollution - to name a few. Most participants said that we are in a climate emergency, and the food system is its significant catalyst. Some participants noted that despite the food system being a massive contributor to environmental degradation, it is not always discussed among policymakers when designing agendas for lowering emissions as the main focus is usually on electricity, heating and transportation.

Another two big topics mentioned as a burden for a sustainable change of the food system were insufficient education and oversight of psychological aspects of transition. Almost all of the participants pointed out inadequate education for change on multiple levels:

- the absence of education for understanding the origins of different foods and all the entangling impacts;
- missing education on the current food-related issues and responsibility division in changing them;
- poor education on nutrition for healthcare professionals whose primary field is outside of dietetics.

When it comes to psychology, some participants noted that there is a problem of unwillingness to be confronted with the reality of the food system's complex problems and change individual behavior regarding food. This difficulty was attributed to the fact that food habits and understanding of food usually form throughout life, and therefore the change is highly challenging once it has been part of daily life for too long. Furthermore, not many people are willing to decrease their living standards to facilitate the food systems change. Therefore, it can be seen as a non-beneficial act to acknowledge the problems' urgency. One of the participants emphasized that sustainable behavior change is a highly complex process which needs painstaking attention and research.

Lastly, few participants talked about the inconsistency within the food system that could also explain why the current system can seem so wrong. The examples of the inconsistency were:

- Lack of the shared language (for example - the absence of a standard definition of what a sustainable system is);
- Lack of the food system performance as a "system" due to poor networking and cooperation within the system;
- Lack of consistent actions across different levels;

- Lack of shared understanding of the problems;
- Differences and abuses of consensus in the policymaker's beliefs on the urgency of the issues and ways to address them.

Participants' opinions on the awareness of the problems

When it comes to the visibility of the food system problems named above, the participants' opinions ranged from moderate to a great extent of visibility. Most participants stated that the problems are becoming more visible to policymakers and people, but it is not enough. Participants suggested that the visibility needs to be backed up with educating and informing people about the problems, possible solutions and their potential role in driving the change. The opinions on the awareness of the problem are further described in Appendix B.

Claims about the intersectionality in the food system

"Systems perspective is necessary when discussing issues and solutions in the food system as breaking down our goals into singular pieces puts us at risk of losing the internal linkage between them." When discussing the food system's problems, all participants acknowledged a tight intersection between the problems, suggesting that solutions should be multidimensional as well to contribute to systemic change:

"We should not be trying to solve climate change, biodiversity loss, and human rights in silos. Why do we not change the system to tackle everything simultaneously? The same system contributing to gender inequality also leads to climate change, biodiversity loss, etc. So, why are we not going back to the root cause, changing it and creating a new system that is good for every aspect discussed? Everybody wants to create a summit about every problem. Why can we not all just come under one summit that recognizes the root cause of all the problems and then tackles it from there on?"

Participants' opinions on the global vs local solutions dilemma in driving the systemic change

The participants shared quite an identical view on the dilemma of local versus global action to drive the food system change. All of the participants said that only the combination of the global and local actions could be successful in shifting toward a sustainable food system. According to the participants, the global vision and aims should be a guiding mechanism for the action on a local level so that all the actions taken could push the system in the same direction. The global and local aims and actions should be tightly aligned for a successful systemic change. Local and hyperlocal action was

suggested to be critical for the systemic change as the context is crucial for developing and implementing solutions, and there are no one-size-fits-all solutions. Some participants emphasized the importance of large scale interaction of various stakeholders on both local and global levels and established systemic linkage between actors and practices across the levels.

Participants' opinions on the global SDGs initiative and it's timeframe in relation to the food system's change

All participants expressed quite analogous opinions about the role of the Sustainable Development Goals (SDGs) in facilitating the food system change towards sustainability on the global level. Most participants said that they consider SDGs a good initiative as it is crucial to have global goals for navigating change on a global scale and framing agendas. Half of the participants also noted that SDGs serve well to denote the most significant problems and raise awareness.

Despite the favorable opinions on the SDGs framework, participants highlighted many issues related to the goals, with the main focus on SDG 2 - Zero Hunger and SDG 3 - Good Health & Wellbeing and their connection to the food system change. Each participant expressed doubts about the feasibility of the goals and the adequacy of the measures taken to achieve them, as shown in Figure 2. Overall, no participant expressed a strong belief in achieving SDGs by 2030. Two participants suggested that the goals could be achieved by 2050 as the system's transition could take decades, especially with the scope of action that can be observed now. One participant said that the problems could persist over time and that the focus might be shifted from solving the problems to adapting to the consequences of those problems. At the same time, all participants said that we are critically running out of time and parts of the world are already dramatically affected, and time is up as people are in distress and people are dying. Most participants said that the massive action needs to be taken right now as every week of inaction makes it even harder to get on track.

"Nobody is doing enough. We do not want you to bring your bags full of food and give them to somebody because they need it. No, we want you to stop the war that is causing them to be hungry. As long as they want to keep politics outside the issue of hunger, they will never solve hunger. Zero hunger cannot be achieved using Band-Aid solutions."

SDGs in relation to the Food System change

Problems of the SDG framework and its feasibility

- Lack of investigating and tackling root causes of the problems and focusing solely on the outcomes;
- Lack of adequate measuring and monitoring of the progress;
- Share of responsibility, accountability and moral concerns not clearly defined for governments, industries and people;
- Lacking of resilience at the core of SDGs framework, as observed in the current multiple crises situation and shifted focus from sustainability;
- Tackling major problems with band-aid solutions (e.g. Zero Hunger);
- Achieving the goals by 2030 not possible with the current commitments and policies, getting even further from achieving some targets that we were at the moment of setting the SDGs;
- Risk of narrowing solutions to one specific goal could loosen the linkage and interconnection of the issues and solutions;
- SDGs serving more as a marketing tool that institutions, governments, and businesses refer to without sufficient transparency in their actions.

Figure 2. Problems of the SDG framework and its feasibility from the perspective of the food system professionals.

Proposed solutions

When talking about the global scale of change, participants noted that there should be a shift from the capitalism-powered focus on the profitable and politically practical policies to the inclusive policies that respect ecological needs and human health in the long run. Participants acknowledged that the food system paradigm should shift toward systems thinking, which considers the intersectionality of the problems and solutions within the system and their influence on each other. According to participants, the focus of the policymakers should primarily be the long term food security and provision of nutritious food within the planetary boundaries. Some participants stressed that the anthropogenic climate change implications should be considered for redesigning food system policy in a regenerative way that promotes grassland and wetland restoration and simultaneously secures the future of humanity on the planet. Most participants stressed the importance of having a shared vision about the direction in which the system aims to evolve with concrete targets, commitments and deadlines. Some participants said that the hidden costs of the food system should be thoughtfully assessed and considered across all decision-making processes. Most participants suggested that different ministries should work together closely to consider their actions and the effects

of their efforts on the other entities instead of focusing on a single goal.

To tackle the inequalities and inequities in the heart of the food system, participants proposed increasing food security in less protected countries by avoiding degrading ways Western society was/is using to boost production. Empowering lower-income countries was suggested to be a vital part of the current system transition alongside enabling people from those countries to access technology and other innovations that allow them to do so. Furthermore, some participants recommended embracing the debts of lower-income countries and providing any aid and solid social safety needed so that everyone who does not have adequate food could get it. In addition, participants highlighted the importance of changing the trade rules so that less wealthy countries are not systematically at a disadvantage. Furthermore, it was proposed to change the international financial institutions' laws so that they can no longer demand that countries stop assisting farmers or stop their social security programs to start growing cash crops. One of the participants suggested creating a better food aid system for emergencies that wealthy countries would support. Regarding health disparities, further proposed solutions were the transition from the old styles of healthcare, increasing the collaboration between specialized healthcare and more public health initiatives, focusing on the quality of life and food security, and making health public, not a private issue.

Most participants recognized the complexity and challenges of accomplishing the global paradigm shift from indefinite growth to a life-sustaining society. Some participants noted that humanity should be careful in relying on global institutions for solving the food system problems and, in turn: *"break the belief that our overlords will save us, not to disregard the institutions themselves, but to notice corporate and financial influences on them and the complexities that comes with it if we are really attempting to achieve the goals"*. Therefore, some proposed solutions emphasized the vitality of the bottom-up and bidirectional approaches for tackling the food system issues. For example, the local and hyperlocal initiatives and individual actions were proposed alongside the increased cooperation across the multiple levels and sectors, participatory governance, climate diplomacy and strong regulations against lobbying the food industry.

One of the essential elements of systemic transition toward sustainability that was named is a societal shift in consciousness. *"Changing the way we eat and how we think about what we are eating is a critical piece of the transition"*, - said one of the participants. The idea of changing what we eat and our mindset around food was often mentioned throughout the interviews. When it comes to dietary change, each participant touched upon the importance of reducing the consumption of animal products. Some participants

suggested that there needs to be a shift in focus and production from animal-derived protein to plant-based protein sources. Few participants advocated for a place-based diet or eating the most suitable food for a given region and individual's body. Some of the named benefits of the place-based diets were increased regional self-sufficiency, revitalized local ecosystem integrity and soil regeneration. Participants who argued for more plant- or place-based diets claimed that in addition to changing production, distribution and managing consumption patterns, there needs to be enough attention towards dietary interventions and more research on sustainable behavior change. This was explained in a way that behavior change is a long and primarily psychological process which requires a transdisciplinary approach. Furthermore, some participants suggested that the main dietary change should happen in western countries as the western diet is the most significant contributor to the overall food system footprint.

To change the mindset around food, participants suggest working on improving and enlarging awareness and quality education. Some participants indicated that consumption patterns could transform if people understood the actual value and impacts of food: *"Educate from an early age in a creative and fun form about healthy and sustainable food to raise a new generation of people who choose the food that respects people and nature"*. The planetary health diet was an example of the diet philosophy and composition that children and students might be inspired to try via education. Increasing cooking prevalence and decreasing food waste were proposed as ways to help people understand and respect the food they consume.

It was suggested that subsidizing healthy and sustainable food could further influence the dietary mindset. One of the participants said that the current food system is obesogenic, which heavily facilitates and advertises unhealthy foods. To change this environment, the participant suggests addressing advertisements, marketing, restaurants and public canteens, incentivizing sustainable foods and making them the cheapest ones, and adjusting prices to their environmental and social impacts. The participant emphasized the importance of internalizing the externalities and setting food prices, considering the hidden costs and footprints of food, taxing unsustainable and unhealthy food and making healthy and sustainable food cheaper and highly available. According to the participant, this approach could be beneficial even though it seems to require much investment, it will cost much less than paying for obesity and other health conditions related to unhealthy eating. When it comes to business management, one of the participants claimed that a solid value proposition to consumers and confronting them with sustainable and enjoyable choices could gradually influence consumers' behavior change.

From the side of environmental solutions, agroecology was proposed as a production and consumption method that allows for growing diverse food in environmentally sustainable ways to provide all the nutrients people need. Agroforestry was another proposed solution to stop destroying forests by agriculture. In addition to diversifying food systems via agroecology and saving forests and soil with agroforestry, other solutions were proposed, such as lowering reliance on nitrogen fertilizer, rotating crops and intercropping. Furthermore, some participants proposed increasing farming networks to enable learning from farming practices that are successfully working on regenerating soil, water, and native plant life.

Participants named numerous other options for strengthening the food systems locally and making them more robust. First of all, participants emphasized the importance of contextualized and local solutions and integration of smaller efforts globally to make the change happen. Secondly, some participants suggested that national policymakers and local authorities need to redesign policies aligned with global goals. Thirdly, community-based partnerships were proposed to support the public interest and the groups working in the public interest to help answer questions they have and develop a more unified vision of pathways forward, which so far involves much disagreement. The fourth option was increasing networking and practice exchange between local food systems to facilitate the development of new partnerships and initiatives and create a chance to get inspired or give inspiration from own positive experiences, which could be adjusted and tried by other communities. Few participants also supposed that given the multiple burdens of current crises, there should be more emphasis on self-efficacy or achieving food security through international solid trade commitments between countries. Furthermore, local regulation of supermarkets and making the healthy choice the most straightforward option was proposed. Lastly, participants touch upon the importance of social engagement and increased individual responsibility for pushing the system forward.

Role of individuals

As mentioned in the section on proposed solutions, all participants said that an individual could play a role in changing the global food system. However, the answers ranged from claiming that individuals can have a less significant role in food system change and cannot be held accountable to suggesting that individual actions could be the primary driver of change.

The claims about little power of an individual emphasized that even though individual

action is essential, it might be insufficient and not sustainable in the long term if larger institutions are not driving more extensive mindset change and incentivizing sustainable behavior: *"I strongly believe in the power of people. Nevertheless, I think this power needs to be ignited and sustained by other forces. So you need facilitators with attractive value propositions to encourage people's behavior change."*

Another thought related to the opinion that an individual might not have enough power for active participation in the change was related to vast inequality in the opportunities to participate in it as some people might be struggling with finding food to survive while a minority of others have the luxury of being involved in systemic change.

In contrast, the participants who expressed a firm belief in the individual power referred to the ripple effects of individual action and the importance of continuous action, changing dietary behavior and non-violently protest for demanding political change for food systems change:

"Actions of individuals have ripple effects: impacts on the people around, on the people and institutions they work for, and society around. Each individual's actions impact, and collectively it can change things.";

"The one thing that will guarantee that we will not be able to succeed is if we stop acting if we give up.";

"Individual actions are great, especially if they aim to affect the entire food system and fight for political changes. So it is not enough to just vote with your fork or wallet."

All in all, each participant emphasized the importance of greater action, larger involvement of masses in change and demand for a change, local and hyperlocal action and involvement of individuals. The participants were also asked about their own motivations and inspirations to act and be involved in a change, which are described in Appendix C.

Discussion

The section strives to answer the research question and discuss whether there is a shared vision among the analyzed reports and the interviewed food system professionals on the systemic change toward more sustainable operation. The section begins by describing the differences and similarities of key concepts' definitions and main problems' perceptions. Then, the convergence and divergence of the proposed solutions

are discussed.

Convergence and divergence of reports' and interviews' outputs in defining key concepts and main problems

Both literature review and qualitative research outcomes pointed to the difference in the perception of the term sustainability with no consensus on its meaning. Despite the wide variety of definitions of sustainability, the term sustainable diet was defined by participants in line with FAO and Burlingame & Dernini's definitions from the literature review. At the same time, the overall pattern of defining the sustainable food system lies in referring to everything that seems unsustainable now. As "unsustainable" systemic aspects slightly varied, the definitions of the sustainable food system differed too. A lack of consistency in understanding the outlined definitions could explain the diverse patterns of the reasoning behind the solutions for systemic change toward sustainability.

Regarding the food system's "unsustainable" aspects, both literature review and qualitative research outcomes align in stating that the absence of change in the current systemic operation is likely to continue having dramatic consequences on humanity and the planet, the wellbeing of society and the economy. The resilience of the current food system was questioned mainly, especially in the face of multiple crises humanity is encountering now. Furthermore, the literature review and participants' answers involved such terms as hidden costs referring to the expenses humanity would have to deal with due to the current systemic problems and inaction.

All in all, the qualitative research participants named the economic, social, health and environmental problems discussed in the literature review. Furthermore, the interviews covered some more grand issues that were not mentioned in the analyzed reports, namely: neglecting the root causes of the problems, exploiting the world by the wealthiest countries, profit-orientedness and corporate power, availability of sustainable choices solely for privileged people, poor education and food system problems awareness, lack of shared definition for sustainable food systems, lack of partnership and shared language for supporting each other in the transition and inconsistency of the proposed solutions.

The general pattern of defining the food system problems by interviewees was pointing to the root causes, and structural inequalities, whilst the global organizations primarily focused on the current distance from "sustainability". Despite the outlined difference, there was a substantial overlap in interviewees' responses and analyzed reports in defining the critical problems of the food system, especially regarding the environment

and the triple burden of malnutrition. However, there were significant discrepancies between the reports' and interviews' outputs regarding solutions.

Convergence and divergence of reports' and interviews' outputs in proposing solutions for systemic change

This section will discuss the consistency between global organizations' and interviewees' solutions for systemic change on multiple levels and sectors: global, local, inequality/inequity oriented, social, healthcare, environmental and economic (visualized in Figure 3 to Figure 9, respectively).

On the global level, outcomes of the reports' and interviews' analysis align in numerous solutions (Figure 3). Both parties emphasize the importance of an immediate collaborative shift to systems thinking for setting clear aims, deadlines and commitments based on scientific evidence that target multiple problems and facilitate food security, inclusive health and long-term systemic resilience within the planetary boundaries. The difference between the suggested global solutions is similar to the described problems' distinction and lies in the focus of the interviewed professionals on the root causes. Therefore, interviewees proposed to tackle those causes by driving political change and social consciousness change, introducing climate diplomacy and strong regulations against lobbying and diffused responsibility, strict hidden costs assessment and enlarged action of communities and individuals. In turn, distinct ideas from the analyzed reports were creating a global inclusive science-policy interface and setting international commitments to a healthy diet, which sound like powerful ideas. However, the question emerges: Would those ideas be accepted globally and optimally operate if the root causes that put profit over people and the planet would be not addressed?

Regarding local solutions, another difference between reports and interview-based ideas stood out: most interviewed participants believe that strengthening local and hyperlocal systems, supporting local initiatives and regulations, and increasing cooperation and knowledge exchange are central to the global food transition. On the other hand, the analyzed reports were mainly focused on the global scale of action and did not specify the importance of local solutions apart from stating that the context-based solutions are essential (Figure 4). The lack of emphasis on the importance of local and hyperlocal action might result in underinvestment and lack of support for local initiatives, leading to losing an arguably vital element for systemic transition.

Global Solutions		
Global Org.	Common	Professionals
Intl. commitment to healthy diets	Shared vision on food system devel., clear aims, deadlines, commitments Urgent Within planetary boundaries	Tackle root causes Political change Change the way we think about food Cost composition
Creating and supporting an inclusive global science-policy interface	Target multiple problems Shift toward systems thinking Towards health, nature positive & resilient food system International cooperation for effective food governance Prioritize right to food and long-term food security Multi- and, sector collaboration navigated by scientific targets Planetary health diet	addressing the hidden costs Climate diplomacy Strong regulations against lobbying the food industry Less reliance of general masses on institutional promises, more action Reduced diffusion of responsibility

Figure 3. Global solutions proposed in the reports of global organizations vs by qualitative research participants.

Local Solutions	
Shared	Professionals
Context specific solutions	Strengthen & robustify local & hyperlocal food systems Alliance of all local efforts on the global scale National policymakers and local authorities to redesign policies in correspondence with global goals Community-based partnership Supporting local initiatives and needs without imposing western/mainstream solutions More emphasis on self-efficacy as well as solid international trade commitments between countries Local regulation of supermarkets for making the healthy choice the most straightforward choice Increased networking and practice exchange between local food systems Increased collaboration of the different ministries

Figure 4. Local solutions proposed in the reports of global organizations vs by qualitative research participants.

To tackle inequality and inequity, analyzed reports and interviewed professionals argued for increasing food security, advancing equitable livelihoods and shifting towards fair value distribution by reducing costs of healthy nature-positive food and empowering vulnerable population groups. Furthermore, increasing support for food system workers and promoting citizen science and inclusive research were proposed (Figure 5). On top of that, global organizations suggested improving farmer productivity in the developing world and creating nutrition-sensitive social protection policies. In contrast, professionals proposed agricultural development in less developed areas by avoiding degrading western ways for increased production, shifting from western diets, making a joint contribution to climate adaptation in the most affected regions, and enlarging the inclusivity of the systemic transition (Figure 6). The central differential part of this solution domain is the interviewed participants' emphasis on the problematic western food system domination and notable neglect of this systemic feature in most reports.

Inequality/Inequity Solutions		
Global Org.	Shared	Professionals
Nutrition sensitive social protection policies	Price reduction for healthy and nature-positive food	Bigger change in western diets
	Fair value distribution	Joint contribution for adapting to climate change outcomes in the most affected parts of the world
Improving farmer productivity in the developing world	Empowerment of poor and vulnerable population groups	Agricultural development in the less-developed areas by avoiding degrading western ways for increased production
	Increasing food security	Enabling and empowering lower-income countries to be part of the current system transition and enabling people to have access to technology and other innovations that allow it
	Advancing equitable livelihoods	
	Support of workers	
	Promote citizen science and inclusive research	
	Shift towards fair distribution	

Figure 5. Inequity/inequality solutions proposed in the reports of global organizations vs by qualitative research participants.

Social Solutions	
Shared	Professionals
Price reduction for healthy and nature-positive food	Improving and enlarging awareness and quality education on the actual value and impacts of food and sustainable diets from an early age (could be in creative and fun form)
Fair value distribution	Influencing sustainable behaviour change by solid value proposition by confronting consumers with sustainable enjoyable choices
	Increased individual responsibility
	Trans-disciplinary dietary interventions, more research on sustainable dietary change
	Increasing cooking prevalence

Figure 6. Social solutions proposed in the reports of global organizations vs by qualitative research participants.

Concerning health, the only shared solution was the planetary health diet of EAT-Lancet, which was mentioned as a way of eating for human and planetary health in the reports and interviews. The proposed solutions of the interviewed professionals include making health public instead of private issues to stimulate institutional actions for making health choices widely available and affordable, shifting from the outdated healthcare models, and conducting research and transdisciplinary interventions on sustainable dietary change. On the contrary, analyzed reports proposed nutrition-driven agriculture and programs for early detection and management of different forms of malnutrition (Figure 7). The former solution could be considered as not sensitive enough to the root causes, which might affect its efficiency. At the same time, systems thinking could be seen behind other proposed solutions, possibly resulting in improved long-term health globally.

To keep the operation of food systems within the planetary boundaries and boost nature positive production at a sufficient scale, agroecology, agroforestry, crop rotation, intercropping, conservation agriculture and polyculture were proposed by both parties. Furthermore, the need to shift to lower impact, less resource-efficient food sources and change production, distribution, consumption patterns and waste management was emphasized (Figure 8). Some participants stressed the importance of land redistribution, place-based diets, grassland and wetland restoration, and nitrogen fertilizer reduction, whilst the reports of global organizations highlighted the significance of phasing out damaging fishing practices and improving ocean management. Additionally, reports

proposed adapting the half earth strategy, which might seem unrealistic given the current extent of global action and collaboration.

Healthcare Solutions		
Global Org.	Shared	Professionals
Nutrition-driven agriculture	Planetary health diet	Health should be universally considered as a public, not private issue
Early detection & support for management or treatment of different forms of malnutrition		Transition from the outdated models of healthcare
		Dietary interventions with trans-disciplinary approach, more research on sustainable dietary change
		Local regulation of supermarkets, making healthy choice - easiest choice

Figure 7. Healthcare solutions proposed in the reports of global organizations vs by qualitative research participants.

Environmental Solutions		
Global Org.	Shared	Professionals
Improved ocean management	Inside planetary boundaries Shifting to lower-impact, less-resource-intensive food sources Agroecology Boosting nature positive production at sufficient scale Managing water supply efficiently Diversifying species through crop rotation, agroforestry, intercropping, polyculture Change in production, distribution, consumption patterns and waste management Conservation agriculture	Relying less on nitrogen fertilizer
Adapting half Earth strategy		Place-based diets
Phasing out damaging fishing practices		Land redistribution
Investing in the development of new sustainable agricultural and aquaculture techniques		Grassland restoration

Figure 8. Environmental solutions proposed in the reports of global organizations vs by qualitative research participants.

The global organizations further proposed to invest in innovative, technical solutions and financially support research, while interviewed professionals suggested redistributing the systemic budget instead of boosting investments (Figure 9). The interviewees suggested internalizing externalities and addressing marketing and greenwashing in the system, embracing the debts of lower-income countries and changing trade rules against systematic disadvantages. Lastly, the interviewees proposed to create an emergency food aid system that wealthier countries would support to provide food security to the endangered regions in case of unexpected food shortages. The scoop of proposed economic solutions once again reflects the focus of the interviewees on the root causes as opposed to the reports' suggestions to boost the budgets for reaching the goals.

Overlooking the root causes of the problems by the global organizations in the food system might be due to the corporate and financial influences on them and related complexities. Therefore, bringing up the expertise of people from within the system could provoke social action and inspire local, hyperlocal and individual action to demand systemic change. Furthermore, it could empower collaboration for finding ways to consciously utilize agencies, resources, and budgets that, to the present day, value profit over people and the planet. Due to the limiting small-scale nature of the study the

further investigation of the research question could be more effective and serve to actually facilitate creation of more reasonable policies with clear accountability structures to enable systemic change.

Economic Solutions		
Global Org.	Shared	Professionals
Investing in innovative solutions	Price reduction for healthy and nature-positive food	Internalizing the externalities Address marketing & greenwashing
Increase financial support for research	Fair value distribution	Create emergency food aid system supported by wealthy countries
Support technical innovation		Embrace debts of poor countries, change trade & financial institutions rules against systemic disadvantages Redistribute food system budget

Figure 9. Economic solutions proposed in the reports of global organizations vs by qualitative research participants.

Conclusion

The paper aimed to answer the research question of whether global organizations and professionals within the food system have a shared vision on the change toward more sustainable systemic operation. The research question was examined by reviewing the latest reports of global organizations in the food system and conducting a qualitative study to interview professionals who work in the system. The outputs of the reports' review and results of interviews were compared and contrasted with analyzing convergence and divergence of the organizations' and professionals' views on critical problems and possible solutions for systemic change.

The research outcomes revealed significant convergence of the vision of environmental, health and partly inequality and inequity problems and global and environmental solutions. Global organizations and interviewed professionals stated that the food system is a significant contributor to environmental degradation and that its lack of resilience and insufficient focus on health and inclusive food security endangers the lives of current and future generations and our planet. Both parties noted the importance of urgent change in the food system with clear aims, deadlines and commitments, with cooperation across countries, sectors and levels, focusing on increased food security, fair value distribution, environmental footprint reduction and regenerative approaches to agriculture.

The divergent views were mainly seen in the fact that interviewees, as opposed to analyzed reports, referred to the root causes of the current state of the food system when speaking about the systemic problems and pointed out the importance of acknowledging and targeting those root causes for solving the critical problems of the food system. The participants named neoliberal thinking, capitalism, and globalization the leading causes of a socially unjust, monoculture-based, highly interdependent and fragile system cracking under the multiple crises humanity faces. In turn, the reports mainly focused on changing the current state of problems rather than tackling its root causes. This difference leads to a large variety in the proposed solutions, mainly in social, economic and health domains and local-level solutions.

Interview participants stated that old patterns would not lead the food system to a healthy state. Therefore systematic disadvantages should be tackled, finances redistributed, and an approach to land changed. On the contrary, some solutions from the reports suggested investing more in technology, improving farmer productivity in the developing world and creating programs for tackling malnutrition in the early stages. The distinction in the listed solutions lies in the point that reports' solutions might imply a continuously western dominated food system where technology would be able to keep the supermarkets in the wealthiest countries full, whilst interviewees suggest a shift in the consciousness of society and shift from the profit-centered to people and planet centered system. Furthermore, the interviewees emphasized the importance of local, hyperlocal and individual action for the systemic change, which was not mentioned in the organizational reports.

To conclude, food system's organizations and professionals have convergent and divergent views on various aspects of systemic change. However, as opposed to the reports of global organizations, the opinions of professionals from the system are not publicly available. Therefore the systemic change discussion might be missing important insider perspectives and criticism that could benefit systemic transition. This research attempted to bring up the missing perspectives to get a more holistic overview of the food system's current state and possible ways to move forward. As the study was relatively small-scale and limited in time the further research involving more global organizations and professionals in the field would be beneficial and could serve as a more inclusive approach for developing, embodying and evaluating solutions for systemic change.

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Appendix A: Interview outline

Introduction

Opening questions

- Could you please tell me a bit about yourself?
- What is your current occupation and field of working?
- As we are going to talk mainly about sustainability and the food system, I would first like to ask you how you define the term “sustainability”?
- And how would you define the term “sustainable nutrition”?
- In your opinion, what should the food system look like to be able to guarantee that every person has access to “sustainable nutrition”?
- How close do you think the current food system is to the system that you just told me about?
- Do you think the current food system is in a phase of transition towards a “more sustainable” food system?
- In your opinion, what are the key problems in the current food system that challenge its transition towards a more sustainable operation mode?
- What are your thoughts on the visibility of those problems on a global scale? For governments and policy makers? For the world population overall?

Key questions

- Do you see any interconnections between the food system and current social, environmental and economic issues? If yes, then could you tell about your vision on the interconnectedness of the matters?
- Do you think sustainable transition of the food system could play an important role in solving other global problems? In which way, if yes? Do you think the sustainable transition of the food system could become a leading example for the transition of other key systems and sectors?
- From your perspective, to drive a change in the global food system there need to be locally or globally oriented solutions implemented in the first place? Why?
- What are your thoughts on the global initiative of sustainable development goals? There are goals of achieving zero hunger and good health and wellbeing by 2030 (SDG2 and SDG3) - do you think it is an attainable and effective way to solve current issues within the global food system?

- What is your opinion about the timeframe of SDGs in relation to the food system? Do you think that the systems' transition to sustainability has to be done by 2030 or do you have other vision on the time that is available/approachable for making the major changes to the current system?
- What needs to be done in your opinion for creating the conditions for a sustainable food system?
- Talking about the social part of the food system: it seems that the food system involves lots of inequalities, which are getting worse with such events as pandemics or conflicts (e.g. recent example of Covid-19, war in Ukraine, to name a few). Is there any specific issue in the paradigm of the current food system that is a burden for achieving an inclusive and just food system?
- What is the role of an individual in the change of the food system? Is there a way to involve people into the processes of leading or participating in the change?

Closing questions

- What is your personal motivation for working in the food system? What is your source of inspiration?
- Do you have anything further to add?

Appendix B: Participants' opinions on the awareness of the problems

When it comes to the visibility of the food system problems named above, the participants' opinions ranged from moderate to a great extent of visibility. Most participants stated that the problems are becoming more visible to policymakers and people, but it is not enough. Participants suggested that the visibility needs to be backed up with educating and informing people about the problems, possible solutions and their potential role in driving the change. Some participants said a generational difference with younger people being more aware of the problems than older people. Few participants said that environmental problems of the food system are getting very obvious, but social, economic, and health problems still lack visibility. Few participants pointed out that the big companies are lobbying, and there are insufficient regulations for corporations and marketing to shift from awareness of the problems to tackling the problems. One participant said that humanity had not reached the tipping point yet - referring to a moment when enough people would be talking about and working on the problems to make a global change happen. Few participants also said that the awareness of the food system problems is more prominent on the local level concerning the local food system, but the visibility of the global scale food system problems is lacking. Three participants said that the global food system problems are evident and apparent, especially for policymakers, since the signing of the Paris Agreement in 2015. However, despite this visibility bringing some inspiring action, it is too small to drive global change. One of those participants said that the mismatch between visibility and action could be due to Western society not wanting to be confronted with this reality and change its harmful lifestyle and consumption patterns.

Appendix C: Personal motivations and inspiration of the participants

The participants were asked about their motivation and source of inspiration which keeps them willing to work in a system that has so many constraints. The personal motivations varied. For most participants, the urgency of the problem and worry about future generations were the main factors to act and be involved. For a few people, the primary motivation was their connection with farming from an early age and passion for everything around the topic of food. For two educators, the primary source of motivation was their curious students and their wish to support and help those students explore the problems and experiment with solutions. For the other two people, vast inequality was named as one of the main drivers. One of them was concerned with the lack of accountability for environmental damage and inequality in facing the consequences of this damage. The other person's passion for researching injustice in children's health is related to their personal experience. For a youth leader, the primary motivation was the youth's actions and involvement. The youth leader also named the actions of some people and organizations as an inspiration to do everything possible to help at least a few dozens of people to get out of food insecurity. Another participant said that once learning about everything wrong with the system and seeing someone trying their best to drive the change made them want to become part of that change. Furthermore, one of the participants said that the food system is one of the most exciting problems in the world, and its complexity keeps them interested in learning more and doing more on the topic:

"As a scientist, I see this as one of the most interesting real-world problems because it is connected to so many different topics and is highly interdisciplinary. It is fascinating to learn a lot about very different topics. Also, it has high societal relevance, and it explains my motivation to improve the system. The system understanding is fascinating to me as it is almost like a computer game to understand how it is all connected and to understand the rules behind this and then to find out what is happening."

Another participant explained personal drive to work in the field of food as followed:

"If we were to really see this planet as the product of four and a half billion years, and if we take away NASA and other space, people tell us that we're alone out in this universe and that we're floating through space at a fast speed. There are not many planets like us. This is a pretty sweet gem. So to me, it is like if I am one of the custodians, if I'm one of the guardians on this planet, then this is how I want to act. This is how I want to work. I'm not

here to be dead end and working at any job and paying my bills to take this here. I'm not just a resident. I mean, I'm a guardian on the planet. So I know everyone is, you know? And it should not be unique to me. That understanding seemed to be my catalyst, like, I am given this gift of being on this planet, so what can I do for her?"