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HLPE-FSN 3rd note on critical, emerging and enduring issues

July 2022

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This note by the High Level Panel of Experts on Food Security and Nutrition (HLPE) has been approved by the HLPE Steering Committee.

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Referencing this report:

HLPE. 2022. Critical, emerging and enduring issues in 2022. A note by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

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Introduction

The Committee on World Food Security (CFS), the foremost intergovernmental and international evidence-based and multistakeholder platform related to food security and nutrition, mandated its High Level Panel of Experts on Food Security and Nutrition (HLPE-FSN) to “identify emerging issues, and help members prioritize future actions and attentions on key focal areas” (FAO, 2009, p. 9). In October 2013, the CFS requested that the HLPE-FSN produce a note on critical and emerging issues affecting food security and nutrition (FSN). The request was made in the context of the CFS’s ongoing discussion on the selection and prioritization of its activities. The HLPE-FSN published the first such note in August 2014. In October 2015, at its 42nd Plenary Session, the CFS decided that the HLPE-FSN note would be updated at least every four years, depending on funding availability and the HLPE-FSN workload, and released in time to be used as the starting point for the process of elaborating the following CFS multiyear programme of work (MYPoW). The second note on emerging issues, published in 2017, informed the [MYPoW 2020-2023](#). With this document, the HLPE-FSN has now developed the third note, which has been renamed to include *enduring* issues, recognizing that some of the key issues previously identified as affecting food security and nutrition are – alas! – still very pressing and should therefore continue to inform the preparation of the MYPoW for 2024-2027.

This note identifies seven key issues affecting FSN:

- 1. Building resilient and equitable supply chains for FSN**
- 2. Urban and peri-urban food systems**
- 3. Conflicts and the fragility of food systems**
- 4. Revitalizing climate policies for FSN**
- 5. Recognizing the role and rights of food system workers**
- 6. Building a meaningful interface for diverse knowledges and practices for FSN**
- 7. Emerging and re-emerging infectious diseases challenging FSN.**

These seven issues were identified by the HLPE-FSN Steering Committee and they are presented here for consideration of the CFS. Several rounds of discussion and submission of potential issues for this note were undertaken by the HLPE-FSN, and the results were collated and organized into broader themes. In this process, the HLPE-FSN Steering Committee noticed that several of the critical concerns that were proposed for inclusion in this note have been persistent or recurrent issues for FSN, such as climate change, natural disasters and conflicts. To express this reality, the Steering Committee added the term “enduring” to the title of the note. The V0 draft of this note was then opened to public e-consultation, and the feedback was collected, carefully considered and incorporated into the current draft.

The Steering Committee also acknowledges that the critical, emerging and enduring issues outlined in this note overlap and intersect in important ways. For example, climate change, natural disasters and conflicts can undermine the goal of building more resilient and equitable food supply chains. Climate change is also a contributing factor to emerging and re-emerging infectious diseases, and it exacerbates conflicts. Vibrant urban and peri-urban food systems and equitable and just conditions for food system workers are essential components of resilient global food supply chains. And diverse knowledge and technologies are necessary to address current and future challenges that might have a detrimental impact on FSN. This intersection between the topics reinforced the Steering Committee’s conclusion that these topics are at the forefront of the major challenges facing food systems today, and that these seven themes are of importance to the continuing work of the CFS.

The intersection of the seven topics also reinforces the conceptual approach that is central to the work of the HLPE-FSN and the CFS in mapping out appropriate pathways for food system transformation. This includes the centrality of a human rights-based approach to addressing all six dimensions of food security as an essential element of the “individual and collective” right to live “fulfilling and dignified” lives (Ziegler, 2008).¹ In recent years, HLPE-FSN has also emphasized the need to conceptualize FSN issues within a sustainable food systems framework (HLPE, 2017; 2020). All six dimensions of food security, as highlighted in past HLPE-FSN work – availability, accessibility, utilization, stability, agency and sustainability – are reinforced by taking a human rights-based approach (HLPE, 2020). These dimensions also enable sustainable food systems to develop and flourish. The 2021 United Nations (UN) Food Systems Summit further reinforced the need to understand FSN challenges within a systems framework, rather than separating food security and nutrition outcomes from food systems (UNSG, 2021a). There are also several cross-cutting issues and external conditions that affect all seven themes in ways that resonate with the work of the HLPE-FSN and the CFS. These considerations include conflict, climate change, environmental degradation, natural disasters, migration, inequality, gender disparity, pandemics and emerging technologies. Moreover, these pervasive concerns relate to the disparate impacts of FSN policies on vulnerable groups, such as children, racial and ethnic minorities, Indigenous Peoples, rural communities, migrants and displaced persons, small-scale farmers, herders and artisanal fishers, recognizing that women in all these communities are often the most severely affected. Historically restricted from fully realizing the right to food, these groups often continue to have the least access to adequate and appropriate food, despite the fact that they live and work primarily in the food and agriculture sector. These disadvantaged groups have also suffered from the negative impacts of global crises such as economic volatility, climate change and the COVID-19 pandemic.

This note was prepared in the context of an emerging global food crisis of enormous proportions, greatly magnified by the war in Ukraine, further accentuated by closely following upon the COVID-19 pandemic. These developments caused serious disruptions to food supply chains around the world, threatening the food security of millions of people. These latest crises only intensified the already worsening global FSN situation, which, since 2021, has been aggravated by the onset of inflationary pressures, leading to dramatically higher food prices. Many of the countries most seriously affected by rising hunger and malnutrition have already spent scarce resources to bolster social protection spending and access to food during the pandemic. Changing economic policies around the world, including higher interest rates to quell inflation, are exacerbating the debt problems of the world’s poorest countries, and these countries are finding it difficult to finance necessary food imports, especially given rising global food prices. Climate change has resulted in ever more frequent and severe extreme weather events, as well as ongoing internal and international conflicts. Moreover, growing social, economic and political polarisation also deepens the current crisis, leading to an acute series of challenges.

¹ This approach is demonstrated in the Voluntary Guidelines to Support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security (2004), which were endorsed by the CFS to provide practical guidelines to states and other stakeholders in developing and adopting a wide range of measures to contribute to the progressive realization of the right to food. (See <https://www.fao.org/cfs/cfs-old/home/activities/rtf/en/>)

Against this background, it is increasingly apparent that sound governance, a robust research agenda, a strong science-policy interface and appropriate financial resources are necessary to facilitate the much needed transformation of food systems in a manner that is equitable and sustainable (HLPE, 2020). Yet while there is wide agreement on the need to transform food systems and the elements required to support such transformation, there are often conflicting views on how best to achieve this goal. Questions of power asymmetry, inequality, diverging economic and political interests and geographic variability are intertwined in debates about how best to evaluate, manage and implement food systems transformation. These questions inevitably make food systems governance complex and challenging, but nevertheless require consideration, if not resolution. The UN Secretary General’s remarks at the 2021 Food Systems Summit provide us with a suggestive line of guidance: “We need to re-think how we see and value food – not simply as a commodity to be traded, but as a right that every person shares” (UNSG, 2021b). In keeping with this guidance, and pursuant to its mandate, the HLPE-FSN takes this opportunity to provide balanced assessment and advice to the CFS for meaningful dialogue and deliberation on the most promising policy pathways going forward.

1. Building resilient and equitable supply chains for FSN

Rationale

Major events such as the COVID-19 pandemic, the war in Ukraine, extreme weather events due to climate change and natural disasters, reveal structural vulnerabilities in food supply chains. There are also deep inequalities and unsustainable practices in the current food distribution and marketing systems (HLPE, 2021; 2022). Food supply chains have become increasingly complex in recent decades, characterized by growing cross-border trade in food products organized along “just-in-time” distribution systems and the reliance on millions of food system workers to supply inputs and produce, process, move, market and prepare food along the way to its ultimate destination. Food supply chains depend on well-functioning transportation networks (Colon *et al.*, 2021), require vast quantities of land, water and fossil fuel energy (Taherzadeh *et al.*, 2021), and rely on regulations to ensure safety and quality (Machado Nardi *et al.*, 2020). In the case of globally oriented food supply chains, these rely on predictable channels of international trade, enabled by globally agreed upon rules. Domestic food supply chains require robust local and regional infrastructure for inputs, production, stockholding, processing, distribution and marketing. Food supply chains can become strained when any one of the factors required for their proper operation is affected negatively. The risks associated with disruptions and existing inequities in these systems can be multiplied when food supply chains rigidly rely exclusively on global or local supplies and labour, or when there are multiple shocks affecting food systems at the same time (FAO, 2021a). It is important to recognize that food supply chain dynamics are also highly context-specific, with unique structures and organization in different regions and countries (Nchanji and Lutomia, 2021).

Although global, regional and local (often informal) supply chains provide livelihood opportunities, power differentials within those systems can be considerable. Food supply chains are often dominated by just a handful of large transnational firms aiming to achieve economies of scale. But the firms at the top can have disproportionate power to shape supply chains in ways that may be disadvantageous to those with less influence (Clapp and Moseley, 2020). Those actors with the least power – including small-scale producers, processors and traders, women, youth, Indigenous Peoples and refugees – often have the least opportunity to generate sufficient income within the supply chains and bear disproportionate risks in cases of supply chain disruption (HLPE, 2020; 2021). Staple crop production for international trade is also highly concentrated, with just a handful of countries supplying nearly all the wheat, maize, rice and soybeans that are traded on global markets, and just a handful of firms dominating their trade (HLPE, 2022; Clapp, 2015). Similarly, just a few firms tend to dominate in markets for agricultural inputs and for food trade, processing and retail (Howard, 2016), especially in the Global North. Meanwhile, small-scale producers often face challenges in accessing markets (Battersby, 2020) and food system workers often experience harsh working conditions and low levels of compensation (Klassen and Murphy, 2020).

Food supply chains risk disruption from many different types of shocks, including conflict, climate vulnerability, human and animal diseases, financial shocks and local disasters (e.g. Davis, Downs and Gephart, 2021; Béné, 2020). These types of shocks have the potential to negatively impact multiple dimensions of food security. For example, recently experienced shocks, including COVID-19 and the war in Ukraine, have resulted in uneven food availability due to blocked trade, lack of inputs or labour shortages. Supply chain disruptions can also lead to higher food prices that diminish food access and can lead to consumers shifting to less healthy diets. Markets can also become unstable, and prices can rise sharply due to sudden trade restrictions, low stock levels, transportation blockages and infrastructural damage or weakness. Disruptive food system shocks can also lead to wastage, which undermines sustainability. And food supply chain vulnerabilities can deepen inequalities and weaken livelihoods in ways that diminish the ability of food system actors (including producers, workers, traders and consumers) to interact with food systems on their own terms (HLPE, 2021).

There is wide recognition of the weaknesses and vulnerabilities of food supply chains, and growing calls to improve their functioning so that they work better for all participants (HLPE, 2020; CGIAR, 2021). Given the increased frequency of shocks to food supply chains in recent years and the growing risks from a range of sources, it is imperative to explore more deeply how they can be made more resilient – that is, more capable of recovering, adapting and transforming in the face of shocks – as well as more equitable and sustainable, so that they are able to support all six dimensions of food security. Potential measures to improve the functioning of the supply chain include: encouraging greater diversity at all stages of food production, processing, trade and retail, allowing for a better balance between food supply chains at global, regional and local levels, to reduce overreliance on a single food supply channel; making supply chains more inclusive, including creating more equitable employment and income opportunities; finding innovative means of connecting input suppliers to producers and producers to processors and traders, including the use of widely accessible digital technologies; instituting more effective measures to ensure environmental sustainability at all points along food supply chains from production to consumption; increasing the transparency of input and output markets and developing international agricultural trade rules that support resilient food systems; strengthening infrastructure to support supply chains at multiple scales, including the local and regional level; and adopting more coherent policies that support measures for improving supply chain resilience.

Key questions that the CFS may want to request the HLPE-FSN to examine in a report:

1. What are the main types of vulnerabilities facing food supply chains and what are the potential consequences for food system actors (including input suppliers, food producers, traders, food system workers and consumers), considering different kinds of potential shocks, such as climate change, plant or animal diseases, economic crises, changes in trade rules and conflict?
2. What kinds of inequities and power imbalances are present in food supply chains and how do they affect food security and nutrition and food system livelihoods, especially for those groups facing multidimensional and intersectional aspects of inequality and vulnerability?
3. What characteristics are needed to make food supply chains more resilient, and what types of metrics are useful in measuring and tracking resilience in food supply chains?
4. What are the potential benefits and costs of different supply chain models for supporting FSN, including specialized global supply chains centred on international production and trade, compared with food supply chains more focused on local and regional production and trade, especially in terms of strengthening diversity and resilience in food supply chains?
5. What types of policy changes are needed, including with respect to global trading rules, to enhance the resilience of local, regional and global food supply chains, including consideration of inclusive and equitable employment opportunities, environmental sustainability, access to healthy diets and human rights?
6. What is the role of states in building more resilient food supply chains, including with respect to providing infrastructure, regulatory measures, international policy coordination and policy coherence?
7. What measures are necessary to incentivize private sector strategies and investments that promote supply chain resilience?

2. Strengthening urban and peri-urban food systems in the context of urbanization and rural transformation

Rationale

Almost sixty percent of the global population currently live in urban centres (UNDESA, 2018; Acharya *et al.*, 2020), seen as engines of growth and employment, producing over 80 percent of the global GDP (*ibid.*), but also facing huge challenges in guaranteeing access for all residents to essential services such as health, education, transportation and food. The increase in urban population will be particularly sharp in Africa and Asia, with the fifteen fastest-growing cities in the world all located in Africa. Alongside this urbanization, there has been a “geographical decoupling” (Langemeyer *et al.*, 2021) of cities from sources of food supply, with urban and peri-urban land use being reoriented for more profitable uses. As such, cities and towns are fast losing peri-urban agricultural lands, which have historically provided them with fresh food. Urban areas are also experiencing higher rates of extreme weather events that affect people’s livelihoods, while inequalities among urban populations are growing (Pelling *et al.*, 2021). These trends mean that urban areas also concentrate risks for food insecurity and malnutrition, as became clear during the COVID-19 pandemic. At the same time, urban areas are resourceful and are hubs for education, technology and innovation, health and social services as well as for food production, processing and distribution.

The informal food sector is critical to the food security of poor urban households in most rapidly growing towns and cities in the Global South, comprising a complex network of suppliers, transporters, hawkers, retailers and street and market food vendors, in addition to farmers, and making food more accessible and affordable to urban consumers. Yet, these informal sector actors mainly rely on their own resources and capital and have very little policy support for strengthening their enterprises and ensuring quality, in terms of market intelligence, transport and logistics, cold chains or waste reuse facilities (Tefft *et al.*, 2017). In fact, in the absence of specific food system planning, the sale and consumption of highly processed foods is growing in most urban centres, while local commerce that guarantees healthy, fresh food at affordable prices, and often in smaller quantities, is neglected, with negative impacts on food security and nutrition (Peyton, Moseley and Battersby, 2015; Battersby, 2017; Acharya *et al.*, 2020).

This policy incoherence is exacerbated by the general dearth of city-level data, analyses and empirical evidence to inform decision-making on urban and peri-urban food issues, making it difficult for policymakers to plan, prioritize, design and track urban and peri-urban food system interventions. Furthermore, governments and famine early warning systems (FEWS) have also not been as good at monitoring food insecurity in urban areas as they have been in rural areas, beyond very basic indicators such as food prices (Moseley, 2001; Krishnamurthy, Choularton and Kareiva, 2020).

The strategies chosen for urban development shape FSN, locally and globally, across the rural-urban continuum. Cities can play a vital role in shaping food system policies to bolster their resilience by sourcing locally or regeneratively grown food where appropriate, facilitating sustainable urban and peri-urban production of nutritious food, avoiding food waste and strengthening investments in circular bioeconomy, building inclusive food markets and designing and marketing healthier food products, while mitigating and adapting against the adverse impacts of climate change (HLPE, 2020; Heck and Alonso, 2021).

Urban and peri-urban agriculture is an important option with potential positive impacts on dietary diversity, the quality of city spaces and community action and empowerment. Yet, in most cities, especially in the Global South, there is little state support for urban and peri-urban agriculture. Instead, current regulations in cities and the market value of land limit opportunities for local production. A recent survey indicates that municipal governments play an enormous role in identifying and connecting food system actors to foster innovative community-based initiatives to support food security and nutrition (FAO, 2020). In the face of the dramatic consequences of the pandemic, for example, home gardens provided nutritious and healthy food supplements to the urban middle classes (Lal, 2020). Local markets multiplied, as did initiatives by family producers for home delivery of baskets of fresh food and initiatives for food donations to low-income communities. Many people in urban areas, especially migrants, the undocumented and informal workers, were forced to go to food banks and charities, with great harm to their dignity and agency (Rao *et al.*, 2020). These experiences point to the importance and potential of the territorial dimension of food systems for the realization of the human right to food (Recine *et al.*, 2021).

Given the social and economic significance of urban areas, it is imperative to address the challenges of urbanization in relation to rural transformation to “build back better” in the wake of the COVID-19 pandemic – addressing poverty and inequality, building resilience and social inclusion and fostering sustainable livelihoods. The specific needs of diverse rural and urban contexts, and the linkages between them, should be considered in formulating food policies. The New Urban Agenda calls for the integration of food and nutrition security into urban and territorial planning (UN Habitat, 2016). Some of the recommended policy measures are: equitable access to land and productive agricultural resources for small-scale producers, investment in rural infrastructure, prioritizing people living under poverty in cities and rural areas to access nutritious food and healthier living conditions, and anticipating the interconnected future of urbanization and rural transformation (HLPE, 2020; Heck and Alonso, 2021). A more in-depth analysis of food systems is needed in the context of urbanization and rural transformation to ensure that the rights to food and nutrition security, in all its six dimensions, are met.

Key questions that the CFS may want to request the HLPE-FSN to examine in a report:

1. How can urban and peri-urban food systems be made more equitable and accessible both for food system actors and in terms of food security and nutrition outcomes?
2. How can urban food supply chains, formal and informal, local and global, be made more resilient to ensure food security and nutrition within urban settings, in particular for food system workers in the informal economy?
3. What changes are needed in urban planning to better support all dimensions of food security – including support for human rights and agency as well as sustainability, especially for the most vulnerable and those in informal settlements?
4. How can national and municipal governments strengthen the potential for low-carbon, inclusive, relatively self-sufficient and resilient cities and towns to drive improved food security and nutrition in the wake of climate change and crises such as the COVID-19 pandemic?
5. What are the most appropriate policies along the rural-urban continuum to address issues of land tenure, urban expansion into previous farmland, migration to urban areas and the growing competition for natural resources?
6. What are the potential benefits and challenges of territorial markets for strengthening food security and nutrition for urban populations?

7. In what ways can the incorporation of climate-smart agriculture and circular economy practices in urban and peri-urban agriculture provide climate co-benefits for all and enhance climate resilience?
8. How can citizens be engaged and empowered to drive inclusive, transparent, participatory processes for urban transformations and how can complementarity between top-down and bottom-up approaches be ensured?

3. Conflicts and the fragility of food systems

Rationale

Conflict is one of the major drivers of hunger and malnutrition, which, in turn, can be drivers of conflict. The ongoing dire situations in conflict and post-conflict areas – including Afghanistan, Central African Republic, northeastern Nigeria, Somalia, South Sudan, Syrian Arab Republic, Yemen and, most recently, Tigray, Ethiopia – have increased the incidence of extreme hunger and malnutrition (von Grebmer *et al*, 2021). On a global scale, the current war in Ukraine is exacerbating global food system challenges due to the blockage of grains and other produce, price increases, damage to agricultural infrastructure and the interruption of the farming cycle. Moreover, export restrictions and economic sanctions have an enormous impact on net food importer countries and regions that are already food insecure. With the global grain market overwhelmingly concentrated in just a handful major exporting countries and a few corporations, the impact of these disruptions is being felt widely and deeply throughout the world (HLPE, 2022).

When conflict meets with the climate emergency, extreme weather events, infectious diseases and competition over access to resources like water and arable land, severe food insecurity deepens (FAO and WFP, 2016). In 2021, 70 percent of people experiencing acute hunger were living in countries affected by conflict (Global Network Against Food Crises, 2022). At present, there are more than 49 million people, living in over three dozen countries, who are just one step away from a declaration of famine (UN, 2022), a number which has continued to climb in recent years. These fragile states and individuals are in a dire situation.

Without lasting peace, the international community is unlikely to reach the goal of zero hunger. Conflict adversely affects all six dimensions of food security (HLPE, 2020) – displacing farmers and pastoralists, destroying agricultural assets, disrupting markets, increasing food prices and undermining livelihoods. The resulting situations of severe hunger and malnutrition especially impact those already vulnerable, such as smallholder and subsistence farmers, herders, women, children, Indigenous Peoples and racial or ethnic minorities (Moseley, 2017). In conflict situations, severe hunger and malnutrition often spread quickly to neighbouring places through forced displacement and migration. Without an urgent response, conflict-driven hunger not only kills people, but destroys entire food systems (Elver, 2017).

A precursor to adequately responding to these crises is reliable food security data on conflict zones as the conflicts emerge. Beyond early warning systems, however, access to conflict-affected populations is generally limited (Lander and Vetharaniam Richards, 2019), preventing the collection of the data needed to push for fast action.

Humanitarian short-term emergency response is vital, yet ultimately not enough. Such operations are typically meant to address immediate crises, rather than enable the development of long-term peace and sustainable food systems. Moreover, humanitarian organizations are already stretched beyond their capacity to solve even immediate emergencies because of limited financial resources (Development Initiatives, 2021) and increased food prices. The World Food Program (WFP) is paying 44 percent more for food this year as compared to 2019 – an additional USD 73 million per month (WFP, 2022).

Although long-term development assistance and investment are key to breaking the vicious problems of hunger and conflict, without peace building, the impacts of such efforts are limited. The international community has an obligation to respond to the human tragedy of conflict-driven hunger, given the United Nations Charter, the founding principles of Rome-based institutions and international human rights commitments. This includes support for local conflict-resolution strategies wherever possible.

There are examples around the world where effective development policies have helped respond to conflict-driven hunger and solve conflict, giving hope for peaceful recovery and the restoration of sustainable and equitable food systems (FAO, 2016). A long-term, holistic approach is necessary for solving structural problems relevant to food insecurity, such as political and economic shocks, depleted and looted natural resources, and socioeconomic exclusion as a result of conflict (CFS, 2015). Diligent work towards implementing social protection systems to cover the poor and vulnerable will help to resolve these structural problems in the future (Sustainable Development Goal [SDG] Target 1.3).

The HLPE-FSN, in its 15th report (2020), provides recommendations to address the needs of those affected by conflict. These recommendations include providing timely, adequate nutritious emergency food relief; enabling access to clean water and sanitation to facilitate food production, preparation and utilization; building functioning food systems in postconflict situations; and building development and governance capacity (HLPE, 2020). Moving all food systems towards sustainability through innovation, technology, agroecology and localised best practices before, during and after conflicts will reduce their drastic impacts in the long run. This includes, for example, protecting the rights of internally displaced persons and refugee food workers, testing agrispacial solutions to minimize security risks, and investing in small-scale livestock capital and future crops (Townsend *et al.*, 2021).

Key questions that the CFS may want to request the HLPE-FSN to examine in a report:

1. How is the right to food compromised in conflict situations? What research and data are needed to better understand these dynamics?
2. What are the main challenges for humanitarian action in ensuring access to food on the part of vulnerable populations in situations of conflict, including the complex relationship between conflict and other multiple crises such as climate change and the pandemic?
3. What are the main factors driving gender-based food insecurity and inequalities during conflict and fragility?
4. What are the most promising policies, approaches and innovations to support local food systems and ensure resilience in conflict-prone areas?
5. How can local people affected by conflict be enabled to be agents of change rather than passive receivers in times of humanitarian assistance?
6. How can the international community promote the humanitarian-development-peace nexus to prevent conflict-related hunger crises, while building long-term sustainable and equitable food systems?
7. How can policies and laws such as the United Nations Security Council Resolution (UNSCR) 2417 help to pre-empt the use of starvation as a weapon of war? How can they be best enforced?
8. What are the consequences of economic sanctions on human rights, food security and nutrition in conflict and postconflict societies?
9. How can innovative research methodologies help to mitigate food insecurity during times of conflict?

4. Revitalizing climate policies for FSN

Rationale

Climate change remains a critical and enduring global threat to FSN. Since the publication of the HLPE-FSN report on climate change (HLPE, 2012), there have been significant legal, political and scientific developments. Climate change-related impacts have become existential threats, especially in the Mediterranean, Western Asia and North and sub-Saharan Africa, as well as on small islands and in coastal developing states. Warming average temperatures, sea level rise, ocean acidification, extreme weather events like drought, flood, wildfires and tornados, and erratic rainfall have become everyday occurrences (IPCC, 2022). These impacts contribute to severe hunger, malnutrition and poverty, especially in fragile regions and countries (FAO, 2016).

Climate change also affects all forms of malnutrition – affecting the nutrients available in crops as well as encouraging the consumption of more ultra-processed and shelf-stable foods when consumers lack the capacity to store fresh foods safely in times of disasters (Fanzo *et al.*, 2018; Swinburn *et al.*, 2019; Dietz, 2020). Food systems are deeply impacted by climate change at all points along agrifood supply chains, including production, processing, trading and retail activities, with small-scale food producers and informal food sector actors especially impacted by severe weather events that affect their activities, access to market and infrastructure. In many cases, the vulnerability of food systems to climate change has been exacerbated by changes in farming systems, such as an increasingly narrow focus on just a few crops (Ribot, 2014; Moseley, 2016).

At the same time, food systems continue to be a significant source of greenhouse gas (GHG) emissions that contribute to climate change, with between 21 and 37 percent of greenhouse gas emissions associated with food systems (IPCC, 2019; Crippa *et al.*, 2021). Intensive, single-crop and expansionary agricultural land uses and industrial agricultural and food system practices have continued to contribute to GHG emissions (FAO, 2016). These practices include clearing forests for crop cultivation and animal grazing, the release of carbon from tilling the soil, and the use of fossil fuel-based inputs such as fertilizers and pesticides. Intensive animal agriculture also has a high environmental footprint, and the heavy reliance on energy for food processing, the cold chain, long distance trade and global supply chains also contribute to the problem (UNEP, 2019; Pellegrini and Fernandez, 2018). Activities beyond primary food production such as food processing, transformation and retail, as well as post-consumer waste, are also major contributors to GHG emissions (Crippa *et al.*, 2021), with about 6 percent of GHG emissions related to food loss and waste alone (Poore and Nemecek, 2018).

Given the ongoing complex dynamics between climate change, food security and nutrition, and food systems, it is vital to evaluate, coordinate and revise existing policies, and to identify where challenges occur and what opportunities have arisen in the last decade. It is necessary to develop a forward-looking policy tool that is compatible with recent global law and policy developments such as the 2030 Sustainable Development Goals (2015); the Paris Agreement of the UN Framework Convention on Climate Change (UNFCCC) (2015); new developments of the UN Convention of Biological Diversity (CBD), the UN Convention to Combat Desertification (UNCCD) and the CFS Voluntary Guidelines on Food Systems and Nutrition (2021), the latter of which includes a focus on ensuring food supply chain sustainability and healthy diets in the context of climate change.

Recent reports of the Intergovernmental Panel on Climate Change (IPCC) shed light on the complex relationship between food systems and climate change and stipulate that climate change must be dealt with in a holistic manner (IPCC, 2022). This means that adaptation and mitigation policies of the climate change regime should be revised from the perspective of FSN to include justice, a human rights-based approach, as well as sustainability, in the interest of building diversified, equitable and climate resilient food systems. Moreover, recent concepts and methods for more sustainable food production and trade that seek to reduce emissions and encourage adaptation, such as “green economy”, “circularity”, “climate-smart agriculture”, “precision agriculture”, “carbon offsets”, “agroecology”, etc., should be evaluated to ensure their compatibility with principles of climate justice, to prioritize the rights and livelihoods of vulnerable groups such as smallholder and subsistence farmers, food system workers, Indigenous Peoples, women, children and youth, especially in fragile geographies, while ensuring animal health and welfare. Demand side approaches, such as reducing levels of consumption of animal source foods in populations with high levels of consumption and food labelling for carbon intensity, should also be evaluated using these criteria.

Key questions that the CFS may want to request the HLPE-FSN to examine in a report:

1. In what ways has our understanding of the dynamics between climate change, FSN and food systems changed in the last decade?
2. To what extent do the most recent mitigation and adaptation policies address food security and climate interactions?
3. What regions and populations are most affected by the synergistic dynamics between climate change and food systems and what are the food systems and regions that contribute most to these dynamics?
4. To what extent do recent climate-focused technologies and practices for food and agriculture – such as climate-smart agriculture, digital farming and carbon offsetting – represent opportunities to build climate-resilient food systems, and what potential costs and challenges might arise, especially for groups in vulnerable situations and fragile environments?
5. What types of mitigation and adaptation policies and measures are necessary, from which types of actors, to reduce the impact of climate change in the postproduction stages of food supply chains (trading, retail, consumption)? What measures are best suited to building more climate-resilient food systems?
6. What are the opportunities and challenges related to the adaptation of circular economic systems in the agriculture sector and in food systems?
7. What specific policy developments are needed to recognize the role of women and youth in FSN in times of climate emergencies and natural disasters?
8. How can the protection of the ecosystem be fostered from a food system perspective?

5. Recognizing the role and rights of food system workers

Rationale

Food systems employ the majority of people - especially in developing countries - in both self and wage employment. While rural transformation² is reducing the number of those employed in primary production, it is increasing jobs at intermediate and downstream stages of food supply chains. However, despite their contribution to entire food systems, workers across the food system have long been underpaid and undervalued, facing occupational hazards, poverty and food insecurity (Hurst *et al.*, 2007; HLPE, 2021; ILO, 2020).

Many food system workers are subject to low wages and precarious working conditions, including lack of protection under labour legislation and lack of access to social protection (ILO and FAO, 2021). These workers are rarely unionized and many work in hazardous occupations that can lead to work accidents and occupational illness, as well as chemical contamination (Elver, 2017; OHCHR, 2022). Workers who are in the animal production and processing sector are also in danger of exposure to zoonotic diseases (ILO, 2017; ITUC, 2021; Wilshaw and Willoughby, 2019). Workers in restaurants and fast food chains are often employed under informal, seasonal and temporary arrangements, and are subjected to long working hours, low wages and hazardous conditions. More recently, the so-called "uberization of the economy", or the "gig economy", has created jobs in food delivery services. These workers, however, most of whom are young, are not guaranteed respect for their labour rights, are underpaid, overworked and are among the most vulnerable. All these challenges are particularly aggravated for migrant, undocumented and seasonal workers, who may lack access to legal protection and face further discrimination due to language and cultural differences or their inability to seek justice.

Workers across the food system have been particularly impacted by the COVID-19 pandemic. Despite being de-facto "essential workers", they have received few protections on the job (Elver and Shapiro, 2021). Exposed to the disease due to environmental conditions and cramped working spaces, they have had little access to health care and have been excluded from many economic stimulus programmes (Food Chain Workers Alliance, 2021).

As to employment within the agriculture sector, there are a number of serious issues that must be addressed. There are countless reported cases of child labour, workers in conditions similar to slavery and sexual violence. Around 70 percent of child labour – nearly 112 million boys and girls – takes place in agriculture, including farming, livestock, forestry, fishing and aquaculture (ILO and UNICEF, 2020).

On average, women make up 40 percent of the agricultural labour force in the Global South, ranging from 20 percent in Latin America to 50 percent or more in parts of Africa and Asia. Despite their significant contribution to the agriculture sector, including fisheries, rural women typically find themselves in disadvantaged positions. They are more exposed to sexual or other harassment; are subjected to discrimination at work with respect to pay, contractual arrangements and responsibilities; and rarely have access to social protection.

² Rural transformation is "a process of comprehensive societal change whereby rural societies diversify their economies and reduce their reliance on agriculture; become dependent on distant places to trade and to acquire goods, services, and ideas..." (Global Donor Platform, 2022).

Another critical issue in food systems is trafficking in persons (also referred to as human trafficking). Both adults and children are victims of this crime, which is linked to high levels of informality and a lack of oversight and labour rights protection institutions and practices. According to Siobhán Mullally, UN Special Rapporteur on trafficking in persons, “The growth of agribusiness and the power of corporations, combined with the rapid pace of climate change have further exacerbated risks of trafficking in persons” (OHCHR, forthcoming).

Improving the quality of jobs in the food system requires attention to increasing stability in earnings, and improving working conditions, especially for women, youth and migrants (Townsend *et al.*, 2017). Besides impacting workers, the precarious working conditions in food systems also compromise the achievement of the SDGs. These conditions must be accounted for and reversed (Kurtz *et al.*, 2021). A necessary precursor to this is to have data regarding food system employment and conditions. Labour force data reported by the International Labour Organization (ILO) is not disaggregated in a way that allows for extrapolating food system-specific data (Fanzo *et al.*, 2021). There is a long-term need to modify the modes of data collection in order to allow for this.

Key questions that the CFS may want to request the HLPE-FSN to examine in a report:

1. How can the working and living conditions of all food system workers, including those in animal production and processing, in fisheries, and those with informal and seasonal contractual arrangements, be improved?
2. How can human rights principles and national labour laws be harmonized; freedom of association be strengthened; and the capacity of unions, government ministries and institutions be improved to ensure the realization of labour rights for food system workers?
3. How can the working and living conditions of unpaid family members contributing to the food economy, such as women and youth, be improved?
4. How can the effective elimination of root causes of child labour in food systems be ensured?
5. How can the right to food be linked with the right to work in a food-system approach?
6. How can business and human rights principles be implemented and monitored for supply chain workers, plantation workers and workers within the gig economy?
7. How can social protection systems be improved and extended to include those working in the informal sector; undocumented, migrant workers; and care workers?
8. How can cooperation be promoted among institutions dealing with human rights and labour rights, such as FAO, the ILO, the Office of the United Nations High Commissioner for Human Rights (OHCHR), the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO), as well as the International Union of Food, Agricultural, Hotel, Restaurant, Catering, Tobacco and Allied Workers' Associations (IUF), in order to improve synergies and coordination to improve the employment conditions of food system workers?

6. Building a meaningful interface for diverse knowledge systems, technologies and practices for FSN

Rationale

Despite global economic growth and rapid technological transformations, 2.3 billion people globally face moderate or severe food insecurity, increasing by an additional 150 million since the outbreak of the COVID-19 pandemic (FAO *et al.*, 2022). The failure of existing policies to meet SDG 2 (Zero hunger) has made plain the urgent need to re-examine strategies for making food systems more resilient and equitable. Central to this process of food system transformation is to engage with different knowledge systems and worldviews, in addition to acknowledging new and emerging trends in technology and innovation.

Food systems around the world are diverse, embracing a range of knowledge systems and technologies in adapting to different agroecological, political-economic and sociocultural contexts. Despite an acknowledgement of this diversity and of the need for context-specific solutions to enhance human well-being and environmental sustainability (HLPE, 2020), different knowledge systems continue to be juxtaposed against one other – scientific and modern approaches vs. more traditional technologies and indigenous practices. Mainstream agriculture and nutrition interventions, focusing on modern technologies and market-based mechanisms as key organizing principles for food systems, for example, often ignore their sociocultural basis, including gendered taboos and ideas of good health and healthy living (Mistry and Berardi, 2016). While science can undoubtedly provide global guardrails to guide policy on food systems transformation, tensions and contestations remain on the utility of particular technologies, deriving from competing understandings of what knowledge systems are considered effective, legitimate and relevant (Turnhout *et al.*, 2021). This raises the critical question of power relations within food systems, how and why particular forms of knowledge have been presented as marginal, including the role of large corporations and big philanthropy in shaping research and policy debates.

The HLPE (2021), in reviewing how diverse systems of knowledge, learning and innovation contribute to young people's engagement in sustainable food systems, argued for the democratization of knowledge production, both through public research and the strengthening of horizontal networks of grassroots research. This would allow for an interaction and interface between traditional and local, gendered community knowledge (including indigenous knowledge systems) and more formal technical training and education systems, building partnerships that draw the best from both. This is particularly important as knowledge systems and practices change over time and space, in response to changes in the drivers of food systems, whether physical, economic or social. An inclusive approach to assessing the critical role of modern science and technology, alongside other forms of innovation such as those developed from traditional knowledge, is crucial for increasing farm productivity and profitability as well as environmental sustainability and climate resilience. It is also critical for enhancing the agency of different groups of people to develop food systems solutions that work for them.

A good example of the recognition of diverse knowledge systems is provided by FAO's Globally Important Agricultural Heritage Systems (GIAHS), which since 2002 has designated 62 systems in 22 countries as agricultural heritage sites. These represent diverse natural landscapes and agricultural practices that create sustainable livelihoods and food security in rural areas while combining biodiversity, resilient ecosystems, traditions and farmer innovations in a unique way. The wealth and breadth of accumulated knowledge and experience in the management and use of resources should be promoted, conserved and, at the same time, allowed to evolve. In fact, drawing on the biological heritage of neglected and underutilized crop species and landraces in modern agricultural research could contribute to addressing micronutrient malnutrition – a phenomenon that has increased as the climate changes and biodiversity shrinks (Padulosi *et al.*, 2022; 2013).

Indigenous Peoples' traditional knowledge systems are becoming more widely appreciated as methodologically, substantively and contextually strong. Their methodologies developed and evolved over generations through observation and practice (The Global-Hub, 2021). Substantively, Indigenous Peoples' traditional knowledge addresses current contemporary food system challenges through insights on socioecological mechanisms and interactions within food generation environments (The Global-Hub on Indigenous Peoples' Food Systems, 2021). Contextually, and of particular value to sustainable food policy, is the "unique linkage" of traditional systems to the context "through sensitivity and in-depth understanding of local ecosystems, biodiversity and cultures" (The Global-Hub on Indigenous Peoples' Food Systems, 2021). Although upscaling such traditional knowledge is challenging, there is immense value in acknowledging and striving for the interconnection of modern scientific practices and traditional systems of knowledge (FAO, 2021b).

An important development in the knowledge domain is the rapid spread of digital technologies. While digitalisation can exacerbate inequalities between genders and geographies, concentrating power in the hands of "Big Ag" and data platforms, bringing together agribusiness with specialized technology companies, it also offers new opportunities for bringing together modern science and technology (a range of genetic, biological, space and information technologies, renewable energy and value chains to reduce food loss and waste) and indigenous and community knowledge to find solutions across important dimensions of FSN (HLPE, forthcoming). Modern techniques have the potential to contribute to improving resource efficiency, strengthening resilience and social equity through FSN-oriented innovations such as biofortification, drones and sensors, to allow precision farming, mobile-based weather information to mitigate the impacts of climate change, and agronomic practices to reduce greenhouse gas emissions (Schroeder *et al.*, 2021). Farmers on the ground, drawing on local knowledge, however, can be equally adept at safeguarding soil, plant and animal health or water quality, for instance, if their expertise in analysis and problem-solving is recognized, supported and further strengthened (Swaminathan, 1997). Better methodologies, including computer-aided and applied research and extension, are needed to track and support this process of farmer innovation (Salembier *et al.*, 2021). If based on principles of equity and justice, and considering women and men farmers as agents of change, such research and extension support can empower them to make strategic decisions concerning their lives and livelihoods.

A key question that arises in the process of democratizing knowledge is that of intellectual property. Intellectual property regimes have in the past used indigenous and traditional knowledge to secure patents for individuals or companies, thereby creating inequities in the processes of knowledge sharing. Article 9 of the International Treaty on Plant Genetic Resources for Food and Agriculture (2009) affirms the rights of farmers, who have contributed to conserving, improving and making available these resources for future generations. Equitable sharing of benefits is the fundamental principle underlying this treaty, signed by 148 Members. In fact, national legislation from countries such as India, where the Protection of Plant Varieties and Farmers' Rights Act, 2001, sought to ensure that farmers, women and indigenous communities are not deprived of their rights, informed the treaty. The Nagoya Protocol, adopted in 2010, entering into force from 2014, broadened the objective to include the fair and equitable sharing of benefits arising from the utilization of all genetic resources, thereby contributing to the conservation and sustainable use of biodiversity (Secretariat of the Convention on Biological Diversity, 2015). <https://www.cbd.int/abs/about/> As outlined by the HLPE (2020), it is important therefore to bridge the gap between multiple forms of knowledge in equitable and integrated ways, respecting local understanding, in order to improve the resilience of food systems and support enhanced food security and nutrition for all.

Key questions that the CFS may want to request the HLPE-FSN to examine in a report:

1. How can more meaningful engagement between indigenous and mainstream scientific knowledge systems be achieved for building just and sustainable food systems that give due consideration to indigenous worldviews, rather than marginalize them?

2. What system change is necessary for equitable, easy access to knowledge, especially for smallholder farmers, women and indigenous and local communities?
3. How can we make local/traditional knowledge and agricultural heritage equally authoritative, and protect against appropriation?
4. How can agricultural research, education and extension systems harness frontier science and technology to transform food systems in a way that strengthens community agency and empowerment and delivers ecosystem services and food and nutrition security?
5. How can joint assessments on biodiversity and ecosystem services, conducted with a food security lens, inform better policies and actions to support the development of more sustainable and organised food systems, while protecting the environment?
6. How can the role of agriculture in concurrently delivering ecosystem services and food and nutrition security be enhanced?
7. How can we address the risks to communities from knowledge sharing, including patenting through regulatory frameworks, and create an environment of trust for knowledge co-production?
8. What is needed to ensure that Indigenous and local people receive their share of the proceeds associated with “protected agricultural sites and other resources” such as forests, biodiversity and ecosystem resources within their localities? How can a win-win situation be created?
9. How can we reduce inequalities in access to digital resources and use these tools to strengthen knowledge interfaces within and across communities and institutions?
10. In what ways can new technologies support farmer innovation and enhance social equity, rather than concentrating power in the hands of a few?

7. Emerging and re-emerging infectious diseases and other biological hazard events challenging FSN

Rationale

FAO has projected that global food demand will increase sharply by 2100, necessitating substantial increases in crop and animal production (Rohr *et al.*, 2019). Unless there is a major transformation to more sustainable forms of agriculture, intensification of production to meet this demand is likely to boost the use of antibiotics, water, pesticides and fertilizer, as well as contact between humans and domestic and wild animals, with consequences for the emergence and spread of infectious agents (Wallace, 2016). Several recent reports, including the Sendai Hazard Definition and Classification Review Technical Report (United Nations Office for Disaster Risk Reduction [UNDRR]/International Science Council [ISC], 2020), and the Hazard Information Profiles: Supplement to UNDRR-ISC Hazard Definition and Classification Review (2021) Technical Report (Murray *et al.*, 2021), have outlined the risks of biological hazards. COVID-19 is the sixth zoonotic epidemic since 1980. The frequency and severity of these events is increasing as people encroach on wildlife habitats and livestock and fish production systems intensify (Nguyen-Viet and Hoffman, 2021). Emerging infectious diseases threaten food security by disrupting food systems and increasing food prices, both locally and globally. On the other hand, adequate food production could improve human health if it leads to lower food prices and increased food accessibility, thereby enhancing nutrition, which would boost immunity and resistance to infectious diseases (Foley *et al.*, 2011).

The interplay between emerging and re-emerging infectious diseases and FSN was brought to the fore by the unfolding COVID-19 pandemic, which has affected food systems and threatened people's access to food via multiple dynamics: lower food productivity and production, disruption to food supply/value chains, increasing food prices, loss of income and lower income, disruptions to school meal programmes, altered food environments, etc. (Moseley and Battersby, 2020). Together, the unprecedented rate of infectious disease emergence and the need to sustainably feed the global population represent two of the most formidable ecological and public health challenges of the twenty-first century.

A closely related hazardous threat to FSN involves the rise of anti-microbial resistance (AMR), fuelled by the misuse of antibiotics and other antimicrobial drugs in both human medicine and agricultural production. AMR occurs when bacteria, viruses, fungi and parasites change over time and no longer respond to antimicrobial drugs, making infections harder to treat and increasing the risk of disease spread, severe illness and death in livestock and humans. The availability of antimicrobial drugs for therapeutic use in terrestrial animals is essential for animal health, welfare and productivity and contributes to food security, food safety and public health. The growing resistance to antimicrobial drugs could reverse these benefits; making treatment ineffective and increasing the severity of diseases, thus reducing productivity and leading to economic losses.

An added dimension of the issue of invasive pests is the increased use of pesticides. In many developing countries, the uncontrolled use of both natural (mycotoxins) and artificial (pesticides) food contaminants has become a growing food safety problem, threatening human nutrition and health.

These complex dynamics need to be investigated, and global policy decisions are required to tackle both the COVID-19 crisis and future emerging and re-emerging infectious diseases and other biological hazard events at a regional and global scale, with special attention to their FSN implications. In this regard, in consideration of the multiple entry points for disease arising from the way food is now produced, transported, processed, sold and consumed, in 2021, the UN Food Systems Summit adopted the One Health focus (Bron *et al.*, 2021). According to the One Health High-Level Expert Panel (OHHLEP), a quadripartite organ comprising FAO, the World Organisation for Animal Health (WOAH, formerly OIE), WHO and the UN Environment Programme (UNEP), "One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems" (UNEP, 2021).

The One Health Commission has also produced considerable research linking the importance of human, animal and environmental health to SDGs 3, 6, 11, 13, 14 and 15. Surprisingly, the links to SDG 2 and FSN are less explicit in this debate, and more work is needed to draw out the linkages and explore the policy implications.

Key questions that the CFS may want to request the HLPE-FSN to examine in a report:

1. How does the threat of emerging and re-emerging infectious diseases and other biological hazard events affect food security and food system stability, resilience and sustainability across different regions?
2. How do societal inequities (regional/global, urban/rural, etc.) contribute to the problem of emerging infectious diseases and other biological hazard events, and how do those in turn affect social inequities and, hence, FSN?
3. What is the role and impact of agricultural production practices and systems, the agrifood industry, and food processing, transport and retail, in the emergence and spread of new infectious diseases and during other biological hazard events?
4. How do some food practices and systems help respond to infectious diseases?
5. How does consumer and social behaviour affect responses to the impact of infectious diseases and other biological hazard events on food security, nutrition and food systems?
6. In what ways are labour-intensive food production systems and food supply chain/structure vulnerable to infectious disease and biological hazard events' disruptions to food systems?
7. How can One Health programs, policy and processes address challenges across the food system that are increasing human health risks from emerging and re-emerging diseases and other biological hazard events and strengthen the resilience of food systems?
8. What are the broad implications of emerging and re-emerging infectious diseases and other biological hazard events for the six dimensions of food security and nutrition (availability, access, utilization, stability, agency and sustainability)?

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