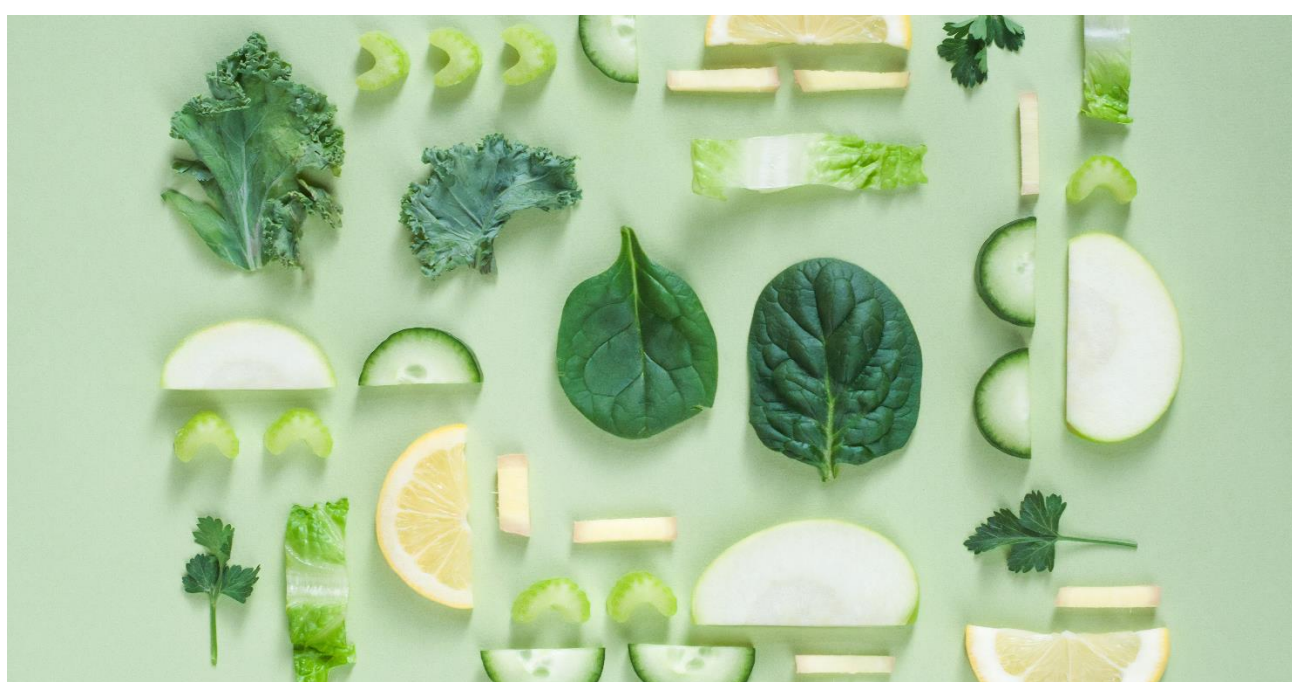


Food Systems and Nutrition Patterns

Neetu Choudhary



Research Paper 2021-3

***From Science to Practice:
Research and Knowledge to Achieve the SDGs***

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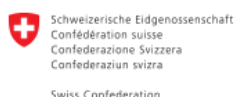
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Box 1. Science to Practice: Research and Knowledge to Achieve the SDGs – About the Project

Scientific research can make a critical contribution to addressing global challenges and achieving the Sustainable Development Goals (SDGs). However, translating the knowledge that comes from research into action remains a complicated task. Research often fails to find its way into policy-making circles due to a number of technical, normative, cultural, political, institutional and financial barriers.

With this in mind, a consortium of Geneva-based institutions has established a new channel through which research and knowledge from International Geneva and its global networks can amplify its impact on national and global policy making and help to achieve the SDGs.

Progress towards the goals is reviewed in July each year at the High-Level Political Forum (HLPF) that takes place in New York. Our process began therefore with a call to organizations to submit research related to three themes, covering the SDGs that will be reviewed at the 2021 HLPF:

- Human well-being and capabilities
- Sustainable and just economies
- Food systems and nutrition patterns

After receiving around 100 submissions from a broad range of organizations throughout Geneva and their international networks, three synthesis reports were drafted that brought together the research submitted and situated this new evidence against the state of the art.

This report is the first step in a larger process to institutionalize this research-to-practice channel over the long term and bring more knowledge-making bodies into the process, to ensure policy making is informed by relevant, timely, interdisciplinary research.

This task is more important today than ever, as we begin the decade of action to achieve the SDGs in the face of economic, health and environmental crises, typified by the Covid-19 pandemic. Such challenges demand we make use of all the knowledge we have available to us. Carving out a clear path for science to play a central role in policy making is an essential first step.

Summary

Scientific research can make a critical contribution to addressing global challenges and achieving the SDGs. As part of an effort to improve processes of research uptake in policy making, this report synthesizes research submitted by Geneva-based institutions and their global networks to the project From Science to Practice: Research and Knowledge to Achieve the SDGs. The report explores the potential for transforming **global food systems and nutrition patterns** so that they minimize environmental impacts, are resilient to shocks, and ensure all people equal access to a healthy diet, now and in the future. It considers the various challenges that are driving hunger and malnutrition, and their environmental consequences—including exclusion of smallholder farmers from global value chains, corporatization of agriculture, shifting nutrition systems as a result of increasing urbanization, and unsustainable consumption preferences—and the ways in which the Covid-19 pandemic has exacerbated existing and brought about new challenges. The report then turns to initiatives across the globe that are providing sustainable alternatives to our broken food system, including community- and solidarity-based food networks, support for smallholder farmers, public investment schemes in sustainable food systems, and the promotion of locally centred consumption. The report highlights the possibilities for scaling up these initiatives through tailored public policy, and the key role that governments, agricultural enterprises, solidarity networks, and scientists and practitioners have to play as agents for sustainable transformation within global food and nutrition systems.

Neetu Choudhary is an Associate Professor at Amity University Patna (India) and Adjunct Faculty at the School of Human Evolution and Social Change, Arizona State University.

1. Introduction

The food and nutrition system, one of the most vital and complex components of the human ecosystem, is “the set of operations and processes involved in transforming raw materials into foods and transforming nutrients into health outcomes, all of which functions as a system within biophysical and sociocultural contexts” (Sobal et al. 1998). Today, this system encompasses a range of human activities beyond food production, spread out across the globe and interconnected through complex networks of relationships.

This system is rife with environmentally unsustainable practices, injustice and inequality, making the right to safe and nutritious food unattainable for many. The question of sustainability is associated as much with skewed land relations and rights to the commons, as with current usage of soil and water in agriculture. It is, therefore, an obvious contradiction that despite growing global food availability, more than 800 million people are still hungry. This is not because the world does not have enough food for everyone; rather, it results from a combination of factors: distorted agricultural relations, skewed exchange relations and extractive environmental relations.

The distortions in our food systems and nutrition patterns are also reflected in the triple burden of malnutrition, encompassing undernutrition, micronutrient deficiency, and overnutrition. This again illustrates that the world doesn’t only need more food for the hungry; but, it also needs the right kind of food produced and made accessible in a way that can be considered safe and sustainable in a multidimensional way. A considerable proportion of food produced in the world is wasted every year. According to estimates from the Food and Agriculture Organization of the United Nations (FAO), around one-third of food in the world is lost, during both food production and food consumption phases. SDG indicator 12.3.1 targets halving global food loss and waste by 2030. Given that food production involves intensive resource use, including land and water, any wastage of food necessarily implies wastage of these non-renewable resources, thus posing a major sustainability challenge to our current food systems. Unless this realization is taken into consideration in all policies and practices, the world cannot achieve food and nutrition security for all.

This report explores recent evidence as well as key challenges embedded within current food systems and nutrition patterns, draws out lessons with transformative potential towards sustainable and resilient practices within existing food and nutrition systems, and identifies actors and agents that may be mobilized for translating these recommendations into action.

Box 2. Food systems and nutrition patterns: An integrated approach to achieving the SDGs

“Food systems and nutrition patterns” is one of the six entry points identified by the Global Sustainable Development Report (GSDR) 2019 to achieve desired transformation for sustainable development (Independent Group of Scientists appointed by the Secretary General 2019). Many of the SDGs, especially SDGs 1 (no poverty), 2 (zero hunger), 5 (gender equality), 12 (responsible consumption and production), 13 (climate action) and 17 (partnerships for the Goals), are pillars of a sustainable food system. It is important also to consider biodiversity and ecosystems—as reflected in SDGs 14 (life below water) and 15 (life on land)—when thinking about the long-term transformation of food systems and diets. In transitioning towards sustainable food systems, the focus must be on enabling more equitable global access to nutritional foods and maximizing the nutritional value of produce while, at the same time, minimizing the climate and environmental impacts of production (Independent Group of Scientists appointed by the Secretary General 2019).

Thus, achieving sustainable food systems and nutrition patterns entails coherent action on other goals and targets; each SDG does not stand alone (Fasoli 2018); there are interdependencies and complementarities between various goals and target areas, due to which a single indicator may serve to measure progress across several goals and targets (Mensah 2019). Clustering the SDGs allows for leveraging these complementarities between closely related goals. Isolated attention on one goal without accommodating its synergies with others may result in uncoordinated action and/or duplication of activities, leading to wasteful, intensive or unsustainable use of resources, thus defeating the very agenda of sustainability.

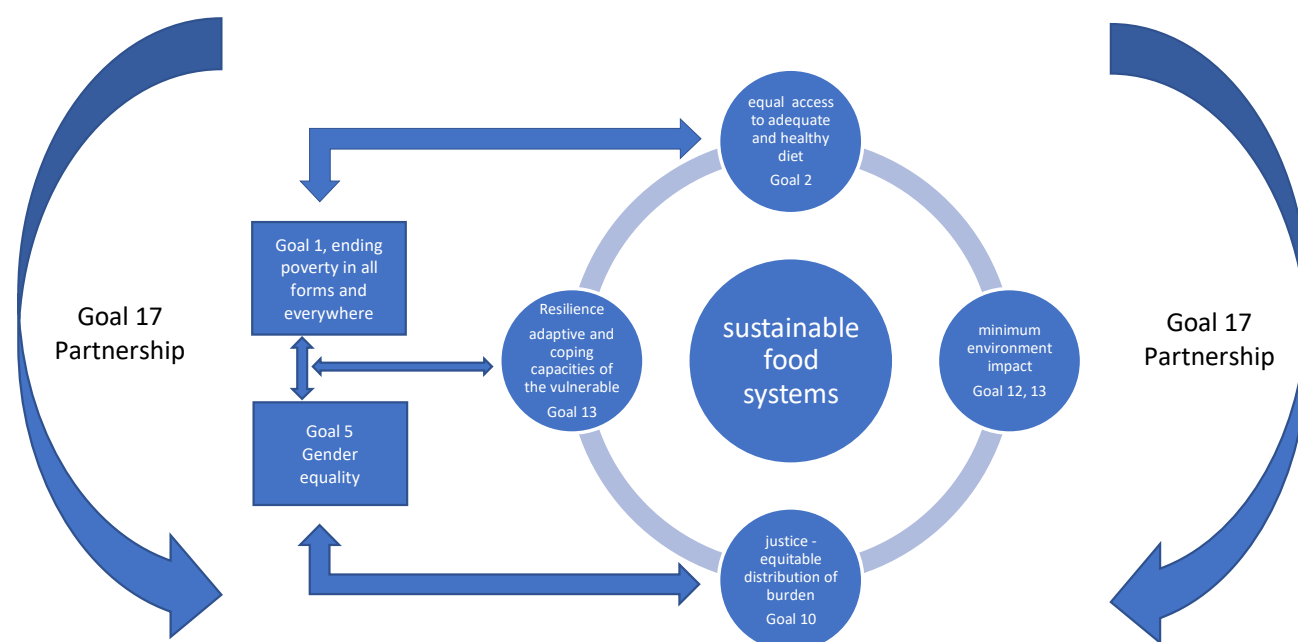
2. Towards Integrated Food and Nutrition Systems: Conceptual Framework

There is a pressing need for an actionable framework based on an integrated understanding of poverty, hunger and nutrition on the one hand, and climate, environment and gender issues on the other. Such an integrated understanding is central to our ability to address problems in today's food systems and nutrition patterns, such as those described above, and may broadly be considered as the food systems approach. Food systems include a range of activities including production, packaging, processing, transportation, marketing and distribution of the food consumed around the world. They are central to food and nutrition security, and must be socially equitable, meet the nutritional needs of the people who rely on them, make sustainable use of natural resources, and be resilient to shocks (Fanzo and Davis 2019).

Despite unprecedented human capabilities to scale up food production, ensuring food security and nutrition remain challenging today. A major component of this challenge emerges from the sustainability question associated with our current practices. The sustainability challenge, in turn, arises from our narrow approach, and/or activities that fail to accommodate the integrated nature of food and nutrition systems. While the left hand acts to mitigate inequality of hunger and malnutrition, the right hand often acts in ways that reproduce those very inequalities. Consequently, our current food and nutrition systems are marked by inequality and injustice. The global community has signed on to the vision of a world that leaves no one behind, in the 2030 Agenda for Sustainable Development, but hunger and malnutrition are unacceptably high with marked differences between countries, within countries and by population characteristics (Development Initiatives 2020; Choudhary 2017). Even in advanced countries there are dramatic racial, ethnic and socio-economic inequities in undernutrition and over nutrition, as well as in micronutrient deficiency (Neff et al. 2009).

The greatest cost associated with lack of sustainability or imbalance in food systems is often borne by vulnerable groups. This is either because they depend upon nature more directly, or because they have no access to nature at all, as in the case of urban food deserts found in wealthier countries. This vulnerability is magnified due to a lack of access to farm inputs or other support mechanisms required to build up communities' capacities for coping and adaptation. Since poor and vulnerable groups lack private resources, they are unable to ward off negative externalities resulting from activities that degrade the environment. As a result, these groups suffer the most from deterioration in the environmental conditions that are needed for optimal human health such as clean air, drinking water, and the ability to produce, raise, harvest and gather food resources of sufficient and safe quantity and quality (Fanzo et al. 2021); and this, in turn, further exacerbates inequality within the food system. Salm and her co-authors (2020) observe, for example, that climate change interacts with inequality to affect nutrition because the impact of adverse climate shifts on human nutrition itself is not evenly distributed across population groups. For example, due to the gendered division of labour and gender inequality in resource access, women farmers are likely impacted more severely in the wake of any shock as compared to their male counterparts. This is amplified by the fact that women are most often smallholder and subsistence farmers with little access to farm inputs. If we aim to battle inequality in hunger and malnutrition, we can no longer ignore the sustainability question, and vice versa. Building equitable, just and sustainable food and nutrition systems requires an integrated approach to the SDGs, and in particular one that is attentive to SDG 17, which strives towards partnership and cooperation among various stakeholders.

Figure 1. Towards an integrated food and nutrition system: Conceptual framework



Source: Author

3. Context of Crisis: Covid-19 and Mounting Food and Nutrition Challenges

The outbreak of Covid-19 and its aftermath has further compounded the food and nutrition challenge. Recent World Food Programme (WFP) projections indicate that, because of the economic effects of and supply chain disruptions associated with Covid-19, the number of food insecure people may have doubled in 2020, to 265 million people (The Lancet 2020). Estimates of both hunger and severe food insecurity were revised upward in 2020, with the Covid-19 pandemic adding between 83 and 132 million people to the total number of undernourished in the world (FAO 2020). Around 370 million children missed out on school meals due to school closures in spring 2020 in countries both rich and poor. In 2020, the World Food Programme estimated that due to the pandemic, by the end of the year the number of people experiencing extreme hunger would increase by 82% compared to 2019 (WEF 2020), with hunger increasing in existing “hot spots” but also popping up in new ones (Oxfam 2020).

Disruption in supply chains following Covid-19 lockdowns created threats of agricultural and food crises not only in poor countries but also in North America and Europe. Richer countries undertook several relief initiatives to support their farmers and food supplies: the United States announced a USD 19 billion package to support American farmers during the pandemic and adopted the Coronavirus Food Assistance Program (CFAP); Canada announced funding of USD 36 million to assist farmers, fish harvesters and all food production and processing industries; and the European Commission took legislative measures to provide flexibility to farmers in abiding by competition rules (OECD 2020). Global South countries also made efforts to mitigate the effects of the pandemic on food supply: the government of India increased its procurement of grains, and Nigeria released large quantities of food grains from its national reserve (AMIS 2020).

Since higher income countries generally have more effective institutions, their relief systems are likely to perform better. The situation is likely to be severe, however, in countries with weak

institutions and in countries that are already dealing with other crises such as conflicts or climate-related disasters (Smith and Wesselbaum 2020). As Periera and Oliviera (2020) aptly state, in many countries in the global South, the state promulgates emergency relief or social support policies as a “gift”; guaranteeing sustained access to adequate food and health care is not considered social protection or public responsibility.

According to preliminary assessments in the FAO’s *State of Food Security and Nutrition in the World 2020* (FAO et al. 2020), the nutritional status of the most vulnerable population groups is likely to deteriorate further due to the health and socio-economic impacts of Covid-19. Across countries like Bangladesh, Burkina Faso, Ghana, Nepal and Sierra Leone, among others, widespread drops in employment and income were observed and by April 2020, many households were unable to meet basic nutritional needs due to reduced access to markets, insufficient social protection and mobility restrictions (IPA 2021). The United Nations Children's Fund (UNICEF) estimated a 30% overall reduction in essential nutrition services coverage, and declines of 75–100% in lockdown contexts, including in fragile countries (UNICEF 2020a).

As noted by David Nabarro, special envoy of the World Health Organization (WHO) Director-General on Covid-19, “people who already suffer as a consequence of inequities—including the poor, women and children, those living in fragile or conflict affected states, minorities, refugees, and the unsheltered—are particularly affected by both the virus and the impact of containment measures” (Wise 2020). Children in fact are among the worst hit because their potential for growth is hugely compromised and the impacts will be lifelong. Increasing numbers of children are becoming malnourished due to the deteriorating quality of their diets, interruptions in nutrition and other essential services, and the socio-economic shocks created by the pandemic in low- and middle-income countries (LMICs) (Fore et al. 2020). The pandemic is leading to multiple forms of nutrition failure for children, including stunting, wasting and micronutrient deficiency. Before the outbreak of Covid-19 nearly 47 million children aged below 5 years were estimated to be moderately or severely wasted, mostly in sub-Saharan Africa and South Asia (UNICEF et al. 2020). An estimate covering 118 low-income and middle-income countries suggests that there could be a 14.3% increase in the prevalence of moderate or severe wasting among children younger than 5 years due to Covid-19. And of the 6.7 million children estimated to be wasted in 2020, 57.6% are in South Asia and an estimated 21.8% in sub-Saharan Africa (Headey et al. 2020). These steep increases are primarily due to declines in household income and rising food prices, following mobility restrictions imposed to curb the pandemic. For example, according to FAO data, food prices since February 2020 have increased by more than 10% in Belarus, Bolivia, Ghana and Myanmar, and by more than 20% in Guyana, Sudan and Zambia (Smith and Wesselbaum 2020). According to UNICEF’s estimates, in developing countries the number of children living in monetary-poor households could increase by 142 million by the end of 2020 (UNICEF 2020b).

Box 3. Unmasking reproduced inequities in SDG achievement: A challenge for research uptake in a pandemic and post-pandemic world

Addressing disparities in access to food requires rigorous data collection to pinpoint the source of these inequalities, and how to address them. Collecting, using and studying disaggregated data to capture sex/class/segment/group specific effects is one of most critical tasks, a particularly daunting one for countries where the data management infrastructure remains weak and less reliable. In terms of food and nutrition systems for example, accurate data on food consumption and intra-household food distribution is generally not available. We are not able to capture gendered inequality in hunger even in normal times. The Covid-19 pandemic might reinforce these anomalies because it has severely restricted the scope for participatory data collection. An analysis of the data availability for SDG Indicators finds that for four out of the 17 Goals, less than half of countries have internationally comparable data (Min and Peinrucci 2020). As such, one of the biggest challenges for research uptake today is to unmask inequities reproduced by the pandemic while dealing with this data challenge so that scientific understanding of the current situation is not compromised, and appropriate and timely translation of research into practice is not interrupted. In the particular context of food security and nutrition, the challenge is to surmount and manage the data gap during and after the pandemic, and undertake research that not only enables disaggregated insights into the changing landscape of food systems as we transition from the pre-pandemic to post-pandemic world, but also guides the policy processes towards more resilient societies.

In addition to hunger, food insecurity can itself increase the risk of illness, including Covid-19, by compromising the immune system (Dudek and Myszkowska-Ryciak 2020). This is especially a challenge where second or third waves of Covid-19 threaten, and in the context of variant strains of the disease that are now spreading. While the world was already off track as far as the achievement of SDGs is concerned, the outbreak of Covid-19 has made the outlook all the more bleak.

4. Key Challenges of Current Food and Nutrition Systems

4.1 Continued exclusion of smallholder farmers from global value chains

The underlying logic supporting globalization includes its role in linking local farmers to global value chains. In reality, smallholder farmers are generally excluded, and many of the opportunities are seized by big corporations in partnership with large-scale farmers owning huge tracts of land and having significant control over resources. Food is being seen as a strategic asset; this is resulting in new waves of land, ocean and resource grabs (IPES-Food & ETC Group 2021). Although there are many economic forces at play in the global food market, many of its components are controlled by a relatively small number of actors alongside which smallholder farmers have little institutional, legal or financial support (Independent Group of Scientists appointed by the Secretary General 2019).

More than two billion people draw their livelihood and food security from agriculture, the majority through subsistence farming (Gay and Weeratunge 2013). Smallholder farmers not only have difficulty accessing agricultural inputs, it is also difficult for them to get a fair deal when selling their products, if they sell at all. Women make up a considerable proportion of smallholder and subsistence farmers. Globalization of value chains, despite the promise it holds at some levels, is accentuating various inequalities in agricultural and food systems in rural and semi-rural areas. Economic growth that results from globalization has reduced poverty and hunger, yet, more often than not, poor smallholder families are excluded from the growth process despite having the potential to contribute (Terzini and Knowles 2017). Smallholder and subsistence farming remain an important pillar of rural food systems, as the primary source of food and nutrition for farmers, their families and wider rural communities. Failure to integrate this pillar into many national food and agricultural policies, and global value chains, remains a challenge today.

4.2 Market distortions, corporatization and privatization as threats to sustainability

The exclusion of smallholder farmers has been expedited through corporatization and privatization that have followed globalization of agricultural value chains. Expensive chemical inputs affecting soil health, irrigation costs, low productivity from small land holdings, increased incidence of extreme weather events, and lack of supply chain and market access continue to keep farmer incomes low (Ahlawat 2020). While globalization has, on average, enhanced people's choices, it has also brought changes in agricultural practices that are unsustainable and inequitable. Policies that should seek to enhance food security and boost agricultural efficiency have instead prioritized corporatization, linked local and global value chains, and enforced private ownership rights. Unlike previous Free Trade Agreements, which opened new markets, recent FTAs serve primarily to secure access to resources and protect rights to corporate data exploitation (IPES-Food & ETC Group 2021). Such developments have, as shown by Adu Ankrah and his co-authors (2020) and other evidence, increased inequalities and undermined progress towards the SDGs.

Non-transparent land transactions are a major channel leading to forced displacement, loss of communal areas, violation of women's and Indigenous peoples' rights, and ultimately the right to food. For example, "over-commercialization" has been found to be associated with low average

food security and reduced dietary diversity in Ghana (Adu Ankrah et al. 2020). Commercialization also creates a dichotomy between production and social reproduction, reinforcing the gender division of labour, wage inequality and marginalization of women in Cambodia (Joshi 2020). Numerous instances of violation of communities' customary property rights have been reported in African countries, such as Kenya, undermining access to key resources like water (Golay and Biglino 2013).

Though commercial trade potentially enhances consumption options, in the absence of a well-thought-out policy, it can distort nutrition choices. As a result, the world is today facing new forms of nutrition challenges. Furthermore, global trade encourages corporate farming for export, promotes monoculture, and leads to import dependence for basic food resources. Many countries in Africa that have intensively commercialized agriculture have seen their dependence on food imports increase. While this is not unusual in a globalized world, the 2008 world food price spike again highlighted the importance of locally grown food, as did the outbreak of Covid-19 which led to significant interruptions in food supply chains. To end hunger while also reducing import dependence, countries need to raise food production through the expansion of agricultural land and innovation in agricultural practices,. But this must be done in an environmentally sustainable way, which is currently not the case. As the UN's 2019 Global Sustainable Development Report (GSDR) observes, scaling up current food production practices to meet projected food requirements would be incompatible with meeting the Paris Agreement as well as many of the other SDGs (Independent Group of Scientists appointed by the Secretary General 2019). This necessarily implies scaling back the over-commercialization in agriculture that has resulted in over-exploitation of resources with unsustainable environmental impacts.

4.3 Urban food and nutrition systems and the changing nature of relationships

The world is increasingly urbanized, and a large proportion of urban population growth is occurring in the countries of the global South. At current rates of growth, by 2030 60% of the world's population will live in cities, and by 2050 that proportion will be nearly 70% (Independent Group of Scientists appointed by the Secretary General 2019). Sustainable cities are therefore critical to achieving the 2030 Agenda.

Urban food and nutrition systems have different features from rural systems. Access to food in urban areas is primarily based on the market and the entire food value chain—transport to distribution and consumption—is influenced by market forces. Consequently, purchasing power becomes the key determinant of urban food security. However, as options for wage labour are greater in urban areas, urban dwellers have more opportunities to be able to purchase food. At the same time in rural areas, smallholder farmers may become food insecure if they are unable to produce food as options for wage labour are limited. Further, proximity to markets, street food and global exposure all influence changes in food preferences in urban areas, leading to situations where undernutrition and over nutrition co-exist more than they do in rural areas.

Another issue associated with urbanization is the shifts in gender roles that it brings, changing women's relationships with food and food security management (Evans 2014). Women in urban areas tend to engage more in paid work while their domestic burden remains intact. This pressure leads to constraints on women's time availability, affecting childcare practices for example, or family nutrition. These are just few of the myriad ways food and cities uniquely interact with each other (Riley and Dodson 2019).

Our evidence base on urban food systems remains remarkably inadequate, however. There is a conspicuous lack of disaggregated data on food and poverty in urban areas, as well as food and nutrition security in urban households (Ruel et al. 2017; Satterthwaite 2014). The urban food literature has not adequately investigated the field of gender, for example; urban poverty literature has failed to engage much with the field of food studies and food/nutrition; and gender literature has not adequately considered the significance of urbanization for food security and

nutrition (Riley and Dodson 2019). An integrated understanding of urban food and nutrition systems is yet to be achieved. Notably, the relationship between urbanization and food systems in the global South differs from that in the global North. For example, the urban population in the global South is increasingly female (Chant and McIlwaine 2016). In developing countries, urbanization is associated with the informalization of labour, population pressures and degrading living environments with difficult access to clean water and sanitation. More than half of urban workers in the global South are employed informally, and the rate of informality is higher among women workers (ILO 2018). These features have unique implications for urban food and nutrition systems, including vulnerability pathways and coping mechanisms. Much more needs to be studied, in varied contexts, to achieve an integrated understanding of these relationships in urban areas.

4.4 Unsustainable consumption preferences and patterns

Consumer behaviour and consumption patterns have a significant impact on the environment and natural resources, and are today confronted with several pressing challenges—including environmental degradation, climate change, social inequity and poverty (White et al. 2019). One important way in which our food system can address the sustainability challenge is through changing people's food consumption behaviour by raising awareness around sustainable food choices. Unfortunately, given the kind of development models we have pursued, our sustainability quotient deteriorates as we develop more. As incomes, urbanization and nutrition standards rise, people move towards more land- and water-intensive diets, in particular through the consumption of more meat and dairy products (Ababsa 2013). This is especially true for high-income countries, but is a growing trend among more affluent segments of society in low- and middle-income countries as well. In fact, meat and dairy are among the most water intensive consumption products (Hoekstra 2012). The social cost of greenhouse gas emissions associated with current dietary patterns is expected to rise to more than USD 1.7 trillion per year by 2030 (FAO 2020). Moreover, there is a hidden social and environmental cost associated with given food systems and accompanying dietary preferences that could alter the assessment of what is “affordable” from a broader societal perspective (FAO 2020).

Current modes of consumption rely heavily on the promotion of commercial farming which bypasses smallholder and subsistence farmers. While conservation agriculture, including agroecological and climate sensitive practices, is contributing and has more potential to reduce resource usage in agricultural and allied activities (FAO 2020), it may need to be supported with favourable consumption behaviour and altering demand patterns.

5. Alternative Initiatives: Lessons for Public Policy

5.1 Community- and solidarity-based food networks

Achieving food and nutrition security in just, sustainable, ethical and equitable ways is what guarantees fair food, food justice and food sovereignty. Many countries today have witnessed the emergence of food movements that provide alternative mechanisms for accessing safe and healthy food, produced through ecologically sustainable means. As the report by the IPES-Food & ETC Group (2021) notes, these food movements are likely to call upon the state to defend universal basic access to rights and resources (land, seed, water, culture) and people-led production in the wake of expanding agro-industrial complexes and mass automation.

Community fair food networks (community gardens, food charities, cooperatives and other social enterprises) differ from more mainstream food security approaches by promoting a plurality of food justice positions (Schlosberg 2013). Rather than low agricultural productivity, the alternative

food movement underscores poverty and inequality as reasons for hunger (Smith 2019). This focus away from the need to scale up current agricultural practices makes these approaches compatible with SDG 2 as well as SDG 12 on sustainable production and consumption.

Community food initiatives in the global North

Alternative food movements are numerous and vibrant in many countries of the global North, such as the fair food movement in Australia or food justice in the United States. They often operate through social and solidarity economy (SSE) enterprises and offer safe and sustainable alternatives at all nodes of the food value chain. The underlying principle is that the right to food is realized when its core elements of availability, accessibility and adequacy, including cultural dimensions, are respected, protected and fulfilled. Australia has more than 500 such networks (Smith 2019). Landowners' associations in mountain villages of Italy are another kind of social economy initiative that are improving the socio-economic condition of local farmers and generating many environmental benefits (Poncibo 2017), which together improve the local food system. Solidarity Purchase Groups in Italy provide yet another example. Consumers cooperate not as mere end-users of a shortened supply chain but as "co-producers" of the conditions of production, enabling the farmers to produce outside conventional market constraints (Grasseni et al. 2013). These can be likened to efforts to move beyond food security towards food sovereignty, which means not only the right to produce, but also to control production (Schuftan 2016).

Solidarity-based initiatives in the global South

In developing countries, especially in Africa and South Asia, social enterprises in the food sector have yet to reach their full potential, although many countries have a history of cooperative enterprises of various types. In Uganda for example, consumer groups have acted as a shock absorber by stabilizing prices of agricultural commodities, and cooperatives in various forms have provided financial and marketing support for agricultural activities (Nannyonjo 2013). Yet due to a lack of awareness, poor agricultural infrastructure and other institutional barriers, these enterprises have been unable to invoke their transformative potential. Muradian (2013) observes that collective action works more effectively at an intermediate level of resources rather than in absolutely scarce conditions. This could be one reason why alternative food networks are not proliferating in the global South, where poverty overlaps with hunger.

Box 4. Participatory Guarantee Scheme: Bringing transformative change in Bolivia

Bolivia initiated the Participatory Guarantee Scheme (PGS) for quality assurance in organic agriculture. PGS is a participatory legal framework for third-party certification based on trust and inclusiveness; it follows international standards of organic agricultural practices while being less costly and less time consuming.

It is bringing transformation through shortening the food supply chain between farmers and consumers, thus improving quality and freshness of organic products. Under the scheme bio-fairs are held periodically where farmers sell surplus produce and also exchange knowledge, experience, products and values. By facilitating access to certified organic products, PGS is contributing to the development of healthy food systems.

Source: Rosse 2018

Several Latin American countries, however, have presented novel and successful initiatives in this regard. Bolivia offers an example of the food sovereignty model through its Living Well paradigm (*Buen vivir*) based on solidarity, reciprocity, harmony and the right to healthy, safe and culturally appropriate food (Rosse 2018). In general, in the global South, social economy enterprises centred around women, informal workers or smallholder farmers exist in greater numbers than enterprises centred around food. However, these enterprises do have positive implications for food security by enhancing members' incomes and women's control over resources (Smith 2015). Also, in the livestock sector, social enterprise innovations are popping

up in many places, especially in Africa . For example, many young Kenyan farmers are engaging in semi-urban livestock management based on low emission and efficient practices, and are contributing productively to the dairy sector of the country (ILRI 2019).

Despite this potential, enterprises promoting sustainable food practices at the local level are not necessarily encouraged by prevailing institutional frameworks. Often, they have been found to be excluded from decision-making processes pertaining to sustainable food systems (Smith 2019). For women-oriented associations especially, realizing the institutional connection between legal or regulatory frameworks and smallholders' livelihood is not easy (Smith 2015). What is needed is greater policy acceptance of such alternatives so that they can be mainstreamed (while maintaining their inherent norms and values) rather than serving as isolated success stories. Acceptance of such a rights-based approach represents a longer-term and structural intervention to address food insecurity and malnutrition that requires states to pass legislation and adopt national policies (Schuftan 2018).

Box 5: Alternative initiatives and their scalability in varying contexts

Numerous “right to food”-centred initiatives aligned with economic solidarity frameworks reflect the possibility of sustainable food systems. However, these initiatives are yet to be considered consolidated alternatives, and they have been received differently in varying contexts. Often, enterprises promoting sustainable food practices at the local level are not necessarily encouraged by prevailing institutional frameworks. Where they get policy support, they have been mainstreamed to some extent (for example, in Brazil and Bolivia). Mostly, however, these enterprises have been excluded from decision-making process pertaining to sustainable food systems (Smith 2019). For women-oriented associations especially, realizing the institutional connection between legal or regulatory frameworks and smallholders' livelihoods is not easy (Smith 2015). Generally, favourable public policy, better agricultural infrastructure, general awareness, women's social status, and freedom from extreme poverty are among the key context-specific factors likely to shape success and scalability of alternative food system initiatives. Scalability of alternatives particularly depends on policy acceptance of the rights-based approach and its mainstreaming through appropriate legislation and national policies (Schuftan 2018). Fortunately, an important aspect of SSE initiatives is that they provide many flexible alternatives to top-down, unidirectional, exploitative and unsustainable agricultural systems. As such it should not be difficult for governments to promote enterprises with features that better suit their respective institutional arrangements and citizens' frameworks.

5.2 Improvement in food access through social protection and support to smallholder farmers

Eliminating hunger and malnutrition requires improvements in food access along with food availability. Food access is total household consumption of food procured either through market purchases or through self-production. Since hunger largely overlaps with various forms of vulnerability, improvement in food access can be promoted through interventions at two levels: (i) those supporting subsistence farmers; and (ii) those aiming at improving market access, especially for disadvantaged or vulnerable people.

Interventions targeting smallholder and subsistence farmers

In the words of Gilbert F. Hounbo, The President of the International Fund for Agricultural Development (IFAD),

I cannot insist enough on the importance of focusing our attention on the small-scale producers if we really want to boot out poverty and achieve SDG 1 and SDG 2 by 2030.¹

¹ Remarks made at the virtual event “Transforming agri-food systems and fostering inclusive rural development in the context of Covid-19 to end rural poverty,” co-organized by FAO, IFAD, WFP and the United Nations Department of Economic and Social Affairs (UN DESA), in collaboration with the Permanent Mission of China and the Delegation of the European Union to the United Nations, which took place in December 2020.

At a fundamental level, agricultural interventions targeted towards smallholder family farmers can minimize the structural constraints that limit their access to various resources, from land and extension services to knowledge, technologies, practical trainings and market linkages (Terzini and Knowles 2017). Public policy can also improve market access by improving physical infrastructure (through better transportation networks for example), or through better distribution of income (Hedden et al. 2016). Broadly, the focus can be on creating an enabling policy environment through infrastructural development and credit support, as well as through technological innovation, dissemination of market information and promotion of trade, as done in Viet Nam (Catacutan et al 2008). Furthermore, as observed in the Philippines, these policies can be direct such as financial initiatives and free distribution of farm inputs, or indirect such as comprehensive land and resource use rights or creating better extension services (Catacutan et al. 2008).

In fact, subsistence farming, urban agriculture and non-commercial animal husbandry, if supported by enabling policies, can be viable means to enhance food availability with certain adaptations to current conditions, such as through diversification, rainfall capture and implementation of strategies to enhance soil fertility along the lines of agroecological principles (Schuman 2017). In fact, as the GSDR (Independent Group of Scientists appointed by the Secretary General 2019:65) notes, “to ensure that no one is left behind, much of the increase in food production will have to come from the 750 million smallholder farmers”.

Social protection to enhance food access

Focusing more on smallholder farmers may not be sufficient unless coupled with an effective system of social protection. Social protections are recognized as an essential tool to address poverty and hunger (UNRISD 2016), and governments across the globe must make more concerted efforts to design and implement social protection measures. Because of the overlap between hunger and poverty, social protection measures that provide income support have a much larger effect on food demand for the poor (Hedden et al. 2016).

A combination of agricultural interventions targeted at smallholder farmers and social protection through government transfers, including non-pension social transfers to unskilled labourers, can be effective in addressing hunger and food insecurity. In Lesotho for example, a national cash transfer programme (Child Grant Programme) is complemented with a home gardening package to improve families’ food security. In Peru, beneficiaries of the Juntos cash transfer programme

Box 6. Enhancing economic access to food through social protection

Social protection has been found to have a profoundly positive impact on food security. Social protection programmes encourage food security either through cash support that augments income or stability of income, or through direct food transfer.

A body of evidence generated by FAO (2016) in partnership with UNICEF showed the productive impacts of social protection interventions in seven sub-Saharan African countries. Social protection can be seen to be contributing to improving consumption and food security, and also unleashing the productive potential of small family farmers in these countries. Social protection programmes have enhanced agricultural activities among beneficiary households by raising access to inputs or reducing dependence on day labour among others.

More recently, a review of studies covering various developing regions recorded an increase of more than 13% in value of food consumption and an 8% increase in calorie acquisition due to social protection programs such as cash transfers (conditional or unconditional), public works, and food transfers (or food vouchers) (Hidrobo et al 2018).

In the wake of the Covid-19 crisis, when poor and vulnerable people have experienced profound disruption in their livelihood activities, many countries (including lower income countries such as Togo and Nigeria among others), have taken specific social support measures to ensure food security of their population (Wouterse et al 2020; AMIS 2020). The fact that most countries have avoided major social upheavals driven by food deprivation during national lockdowns, shows that these measures have been helpful. Exact impact, however, is yet to be studied. In the weaker institutional contexts of many less-developed countries, effective implementation of such programmes remains challenging. Much more needs to be done to reap the potential of social protection in mitigating food and nutrition insecurity.

are entitled to livelihood and financial support offered by the Haku Winay programme (Terzini and Knowles 2017). These are compelling lessons for policy makers in countries that struggle to address the challenges embedded in rural as well as urban food systems. Social protection is undoubtedly a central policy option for providing stable food access, whether to rural populations or to the unorganized and informal sector in urban areas.

5.3 Sustainable public interventions in agriculture and food systems

Public investment towards sustainable agricultural practices

Given that world food demand is still increasing and that scaling up current agricultural practices to raise food production would be environmentally unsustainable, it is important that improvement in food availability is realized through increases in productivity, better land management and support to smallholder farming/non-commercial agriculture for food crops/livestock management, as discussed above. Governments can promote sustainable agricultural practices through direct financial incentives to farmers who undertake crop diversification and shift to less resource intensive crops. For example, in the state of Haryana in India, the government recently announced financial incentives for farmers diversifying away from water-intensive paddy to millet farming (Padhee 2021).

Moreover, despite growing pressures from private sector players, food security and nutrition cannot be left exclusively to free markets. Public investment is necessary as an equity tool in reallocating resources in favour of the poorest family farmers and smallholder producers, to address market failures, and to overcome the under-provision of public goods in the food and agriculture sector (FAO 2020). To improve food security on a sovereign and sustainable basis, Schuftan (2016) recommends investment in four key areas:

- (i) domestic/traditional agriculture aimed at strengthening infrastructure and markets, including investment by international aid development agencies;
- (ii) processing and preservation technologies for traditional foods, to improve access and convenience of healthy, safe and yearlong food options;
- (iii) community education and support to programmes promoting traditional food cultures; and
- (iv) technical support for policy makers involved in trade negotiations to help ensure social, human rights, nutrition and health goals are integrated adequately into trade agreements, including support from local public interest civil society groups that represent consumers and food producers.

There is also a need for better coordination among various policy departments, for example, agriculture, health, nutrition, drinking water and sanitation, and local area planning. This may be helpful in evolving, say, a nutrition-sensitive agricultural system or urban agriculture, or food-security sensitive land-use planning.

Public intervention to minimize food loss

Food availability can also be increased through government investment that targets better physical infrastructure and minimizing loss along the food supply chain. Most agricultural research and development focuses on increasing food production. However, productivity gains can be offset by loss along the food supply chain if food systems are not considered in a holistic manner. Globally, around one-third of food is lost during production, processing, storage and consumption, and this tends to be the case across countries, though the wastage may occur at different stages (Independent Group of Scientists appointed by the Secretary General 2019; Hedden et al. 2016). This implies that all governments need to make a dedicated effort to improve agricultural infrastructure in such a way as to minimize food loss. Local markets already exist for many small-scale producers and consumers in the global South and can be further

promoted to shorten the supply chain (IPES-Food & ETC Group. 2021), which in turn can reduce the scope of food loss.

Public investment to support local and indigenous farmers

Government-supported infrastructural development is particularly needed where indigenous rural populations remain excluded from various linkages despite having the potential to contribute to sustainable farming. In Brazil for example, the government has taken several initiatives for developing sustainable value chains around nut gathering and other non-timber forest products by providing state-facilitated market access to rural dwellers (Cunha 2018). This is enhancing the livelihoods of indigenous populations as well as raising overall food availability in the area. The effectiveness of such support offers encouraging lessons for other countries where efforts to promote food and nutrition security can be enhanced through the integration of traditional knowledge and skills with modern value chains. In this regard, government research and development, as well as technical budget lines, need to be redirected to sustainable food systems.

5.4 Participatory, socially owned and culturally appropriate food systems

Food systems that promote participatory, socially owned and culturally appropriate options for food and nutrition security are increasingly gaining appeal across the globe. Numerous experiments—in Australia, Latin America, Africa and Asia—can be identified that are transformative as far as the implications for food sovereignty and environmental sustainability are concerned.

In Sri Lanka, the agriculture sector employs more than one-third of the labour force and more than 650,000 farm families engage in smallholder paddy production. A participatory framework can be seen in efforts by Rural Returns, a social enterprise working with small-scale, traditional rice farming communities to generate income sustainably (Gay and Weeratunge 2013). They use sustainable agricultural practices, and women are involved at all levels of operations. In India, the Self Employed Women's Association (SEWA) helped create the Sabarkantha Women Farmer's Association, providing a platform for groups to help themselves (Gay and Weeratunge 2013). This has resulted in an integrated system that is sustainable, accountable and inclusive in approach wherein a rural distribution network (RUDI) has also been developed to help connect farmers to end-consumers. Similarly, in Kenya, an online platform called G-Soko was developed in partnership with the Eastern Africa Grain Council (EAGC)². G-Soko, which connects farmers and grain buyers, has gained popularity during Covid-19 in Eastern Africa, where it has facilitated regional and national grain trade. Similar efforts towards participatory food-related solidarity-based enterprises are growing in numbers in both rural and urban areas with rural-urban linkages.

An important aspect of such experiments is that they provide many flexible alternatives to top-down, unidirectional, exploitative and unsustainable agricultural systems. As such it should not be difficult for governments to promote enterprises with features that better suit their respective institutional arrangements and citizens framework.

Latin America has several examples where governments have designed legal frameworks to accommodate the functioning of such enterprises. In Bolivia, for example, the Participatory Guarantee System is promoting consumption of organic products while also providing support to farmers undertaking organic farming (Rosse 2018). In Brazil, the National Council for Food and Nutrition Security (CONSEA) works in close coordination with civil society for development of a participatory food security system (Golay 2020).

² <https://borgenproject.org/farmers-and-grain-buyers/>

5.5 Changing consumption behaviour; awareness for sustainable food choices

The growing acceptance of the slow food movement that originated in Italy is an encouraging sign of more sustainable food choices and potentially healthier consumption (Simonetti and Petrini 2012). The movement is focused around preservation and promotion of traditional and local food, encouraging farming and livestock breeding in a way that aligns with the local ecosystem and is therefore also more sustainable environmentally. The agri-environmental development associated with slow food projects in selected areas of Europe has been found to be positive, resulting in food that is “clean and fair” while reducing the isolation of smallholder farmers (Peano and Sottile et al. 2012). The movement has expanded in many developed countries including the United States, United Kingdom and Japan. While these alternatives are being received well in European countries, they could play a more effective role if mainstreamed in the countries of the global South: in addition to being sustainable, they could help the small-scale and marginal farmers that dominate the agriculture of these countries.

The efficacy of these initiatives depends upon how much consumer behaviour and habits can be impacted. Habits are behaviours that persist because they have become relatively automatic over time as a result of regularly encountered contextual cues (Kurz et al. 2014). Our consumption behaviours are automated habits. Changing these will be gradual and require participation from all stakeholders at all levels, starting with educational curricula at the kindergarten level. Citizens’ groups and other civil society actors, along with governments, can be helpful in spreading awareness about sustainable consumption and gradually changing people’s food habits to locally grown, seasonal, vegetarian foods which are nutritionally rich yet can be grown with relatively lower environmental cost. Targeting youth for behavioural change could be particularly fruitful (Pocol et al. 2020). Although the types of local food resources vary across contexts, every country whether in the North or the South, has the potential to utilize locally grown nutrition-rich food which also shortens the supply chain. At the moment this is more relevant for developed countries, but is likely to become as applicable for middle-income countries, for example in Asia. Levying taxes on junk food and unhealthy agro-food industry options is a way to discourage unhealthy consumption behaviour. This crackdown on junk food has been fairly effective, for example, in Mexico and Chile (IPES-Food & ETC Group 2021).

5.6 Use of technology for promoting sustainable production and consumption

Science and technological practices can also play an important role in promoting human nutrition. Although biotechnological interventions in the form of genetically modified products have often been an issue of debate, there are several ways technological intervention can promote sustainable farm practices as well as consumption behaviour, for example, through development of less resource-intensive farming methods, or through hybrid development of safe edible agricultural products, which can be helpful for health, immunity and nutrition. Investment in research and innovation is critical here. Breeding non-GMO biofortified crop varieties is also a pathway that offers a sustainable and cost-effective approach to address micronutrient deficiencies (Padhee 2021).

Digital farm extension services can enable farmers to access and use appropriate data in making farming decisions that are less resource intensive (Santiteerakul et al. 2020). Modern science and technology can also play a key role in improving animal husbandry, minimizing its consumption of arable land and water resources, and reducing its pollution emissions (Jia 2019).

Scientific research can also be leveraged to preserve traditional food practices, add micronutrients into food during processing, or reduce the degree of industrially produced trans-fat along the food supply chain. Well planned commercialization of such activities within an appropriate monitoring framework can also generate employment opportunities and promote sustainable and resilient recovery from pandemics like Covid-19.

6. A Transformative Approach to Building Equitable and Sustainable Food Systems

The world faces a huge sustainability challenge today. However, many alternative experiments scattered across the world do give us hope and future directions that can be leveraged for achieving SDG 2. The alternatives discussed in the previous section have much potential if affirmative action is taken by governments for mainstreaming them. These alternative initiatives mirror lessons that can be adapted into policy practice with the underlying emphasis on the indispensability of the right to food. The key policy recommendations may be summarized as:

- Implementing policy decisions, legislation and institutional reforms that giving substance to the fundamental right to food.
- Building policy consensus, political will and public awareness around sustainable food systems and the need to work towards this.
- Redefining agricultural policy and creating a roadmap to focus on smallholder and indigenous farmers.
- Public investment for supporting smallholder farms and for providing social protection to vulnerable groups.
- Appropriate public policy to minimize trade-induced distortions in production and consumption and promote nutrition-sensitive trade.
- Expanding and aligning food and nutrition policy to address challenges in both rural and urban settings, including a focus on changing networks of relationships.
- Promoting sustainable practices from food production to consumption (“farm to fork”), including minimizing food wastage during production and distribution, and incentivizing market demand for sustainable consumption.
- Promoting alternative enterprises around locally grown food produced through traditional and/or sustainable methods, and creating an enabling institutional environment for such alternatives.
- Supporting scientific and technological innovation for the development of nutrition-rich safe food, and the translation of laboratory research into common usage.
- Engaging in multiple partnerships and collaborative networks for participatory planning and actions.
- Incorporating local and/or traditional knowledge into public policies and their dissemination targeting behavioral change, since sociocultural contexts also impinge upon food security and nutrition (Briones Alonso 2015).

Transitioning to sustainable food systems requires technological innovation, strategic use of economic incentives, new forms of governance and value, and behavioural changes (Independent Group of Scientists appointed by the Secretary General 2019). This in turn will require a broad network of actors and agents:

We have nine harvests remaining until 2030 and achieving the Sustainable Development Goals, and we must galvanize more partners around this urgency [of the Covid-19 pandemic] to work together on understanding the needs of different agri-food systems around the world, and jointly address how to accelerate solutions.³

³ Remarks made by FAO Director-General QU Dongyu at the virtual event “Transforming agri-food systems and fostering inclusive rural development in the context of Covid-19 to end rural poverty,” co-organized by FAO, IFAD, WFP and the UN DESA, in collaboration with the Permanent Mission of China and the Delegation of the European Union to the United Nations, which took place in December 2020.

Box 7. Actors and agents for transforming the food system and nutrition patterns

Governments	Agricultural enterprises	Solidarity enterprises	Scientists and practitioners
<ul style="list-style-type: none"> • international • national • local - rural and urban 	<ul style="list-style-type: none"> • corporations • small • micro • subsistence • indigenous • women 	<ul style="list-style-type: none"> • producer groups • consumers' groups • cooperatives • awareness groups 	<ul style="list-style-type: none"> • agriculturists • crop scientists • environmentalists • social scientists • civil society members • extension services • public health practitioners • nutritionists

Source: Author

The realization of the 2030 Agenda and Goal 2 specifically will require all actors to be engaged—from subsistence farmers to agricultural corporations, unorganized workers to organized consumers, local authorities to international development agencies, scientists and researchers to practitioners and grassroots workers, governments as well as civil society. All these actors can be agents of change, and of translation of scientific knowledge into practice, in ways to achieve sustainable, equitable and just food systems and nutrition patterns so that no one is left behind (Box 7).

Eradicating hunger in a sustainable manner seems a daunting task. But it need not be insurmountable if we consider the possibility of transformative change rather than incrementalism. Effective policy interventions in the past have been able to create transformative change. In Viet Nam, a partnership between the government and civil society helped smallholder farmers to develop sustainable rice farming practices that would have been otherwise unattainable (Connor et al 2020). In India, encouraged by the government's policies towards sustainable agriculture, grassroots movements like Zero Budget Natural Farming (ZBNF) have taken shape. Highly conducive to small-scale farming prevalent throughout India, ZBNF was adopted in India's Union Budget 2019-2020 (Ahlawat 2020).

These are initiatives with transformative potential. In line with the observations made in the 2019 Global Sustainable Development Report, this potential may be realized through an integrative application of technological innovation, economic incentives, new forms of governance, and changing values and behaviour (Independent Group of Scientists appointed by the Secretary General 2019). Transforming the entire value-chain, from fields to households to individuals, is part of the integrative application.

The realization that we are inseparable units of a bigger whole, that our food and nutrition security is part of a larger system of mutual interdependence, and that the right to food is a human right, is central to this transformation. Food systems need to be rooted in diversity, agro-ecology and human rights (IPES-Food & ETC Group 2021). Indeed, the SDG framework is built upon this realization and lays out a broad roadmap for achieving a food and nutrition system that is based on equity, justice and sustainability. This also reflects the fact that today humanity is not lacking the necessary scientific understanding to effect the required change—although knowledge needs to be enhanced continuously and organically. Bringing this scientific understanding into practice is the greater challenge. Since execution depends upon political

leadership, political will is necessary for implementation of the sustainable development framework and for translation of science into practice. Effective policy designs and scientific research may be meaningless if not supported wholeheartedly by political commitment.

As mentioned above, on the positive side, many countries have begun to align their policy processes in the light of their global SDG commitments. Much more needs to be done, however, and progress can be accelerated through constant enrichment of the means of implementation with new evidence created from across sectors and regions. The objective is not just to create scientific knowledge but also to identify channels for translating this knowledge into policy and practice.

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