



The Food Systems Dialogues

Emerging Themes 2018 –19

V4: 11th December 2019

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Executive Summary

The Food Systems Dialogues (FSDs) were launched in 2018 to allow diverse actors from a range of food production and consumption sub-sectors to meet, discuss and explore options for transforming food systems. From these, an overarching vision for food system transformation has been developed and four themes—each with a set of re-occurring ‘Red Threads’—have emerged. This note considers these alongside the main conclusions of recent expert reports related to food systems transformation. In doing so, it aims to evaluate, compare, and draw out commonalities, inconsistencies and tensions.

The overarching vision of the FSDs is that food systems should ideally enable all people to be able to eat healthy diets made up of from sustainably produced food that they can both access and afford. This would be achieved through involving all actors across the food web in collective action.

The first theme that emerged from the FSDs is **‘incentivize the production and consumption of nutritious and healthy food products’**. The Red Threads under this theme are: (1) accelerate the transition towards the production and consumption of healthy and nutritious food products through innovations that are developed and implemented inclusively; (2) minimize food loss and waste within the context of a circular economy; and (3) ensure that public food procurement practices encourage—and offer appropriate incentives for—the consumption of healthy diets produced from sustainably-produced food.

The second theme is **‘promote equitable access to food systems through inclusive approaches’**. The Red Threads under this theme are: (4) involve all stakeholders (including farmers, fishers, food processors, retailers, carers and chefs) in sustainable food system transitions; (5) pay attention to the interests, livelihoods and voices of food producers and processors (focus on fairness and resilience); and (6) accompany food producers and processors as they make changes to their production and processing practices.


The third theme is to **‘engage food producers and processors - especially smallholders – in all aspects of climate action and in the promotion of sustainable farming and land-use practices’**. The Red Threads under this theme are: (7) remunerate producers for their positive contributions to ecosystem services ; (8) encourage a science-based approach to agroecology, with a particular emphasis on the preservation of biodiversity ; and (9) explore climate-smart agriculture practices with farmers in different settings and be ready to support their adoption, as and when appropriate.

The fourth and final theme is **‘align financing and investments with desired food systems transformations’**. The Red Thread under this theme is: (10) ensure that financial processes and mechanisms align with and encourage the production of healthy and nutritious foods. This theme and Red Thread recognize the central role finance and investments play in food systems transformations and stresses that more solutions-based pathways need to be developed to better support investment decisions.

The slide on the following page summarizes the four themes and the Red Threads.

This report has been prepared by the FSDs Curator at the request of the Principals from the five FSDs partners. It details the emerging consensus on the FSDs Red Threads and links each thread to the evidence-based assessments by several Expert groups. It is intended that, once endorsed by the Principals, the report be presented to the FSDs Reference Group and other interested groups. The consensus around the Red Threads will be examined in forthcoming FSDs events and the new insights will be incorporated into updates of the report, to be prepared at regular (three monthly) intervals. This report and the updates will be available on the FSDs website (www.foodsystemsdialogues.org). It is intended that these intermittent synthesis reports around Red Threads from the FSDs be an input to the preparations of the proposed 2021 UN Food Systems Summit.

Incentivize the production and consumption of healthy and nutritious food products

 Accelerate the transition towards healthy and nutritious food through inclusive innovation.

 Minimize food loss and waste within the context of the circular economy

 Ensure public procurement incentivises healthy diets and sustainably produced food.

Engage food producers and processors in climate action & sustainable farming and land-use

 Remunerate producers for their positive contributions to ecosystem services.

 Encourage a science-based approach to agro-ecology, with a particular emphasis on biodiversity.


 Explore climate-smart agriculture practices in different settings and support their adoption, as and when appropriate

Food systems that enable all people to be able to eat healthy diets made up of sustainably produced food that they can both access and afford.

Promote equitable access to food systems through inclusive approaches

 Involve all stakeholders in the transitions.

 Pay attention to the interests, livelihoods and voices of food producers and processors.

 Accompany food producers and processors as they make change their production and consumption practices.

Aligning financial investments to desired food systems transformations

 Ensure that financial incentives encourage the production of healthy and nutritious food

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Introduction

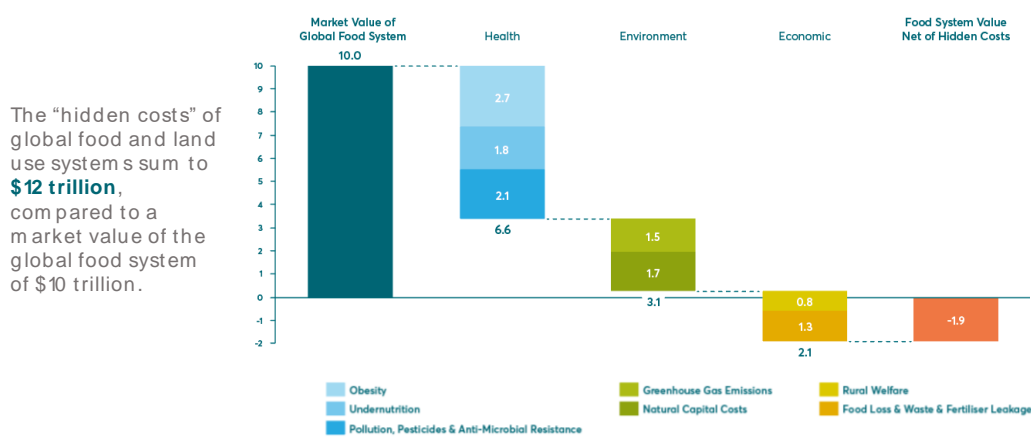
For most people the availability and accessibility of food has improved markedly in recent decades: the amounts of food produced has increased steadily and numbers of people who are hungry has declined except in settings affected by extreme weather and conflict. However, the present situation is a major cause for concern. More than 30% of deaths throughout the world are diet-related, there is a world-wide epidemic of type 2 diabetes and childhood obesity is on the rise. There are multiple reports of ecosystem services being damaged as a result of food production practices (including the emptying of aquifers impacting on freshwater supplies, as well as fertilizer run-off from land impacting on marine life systems and over-use of pesticides affecting pollinators. In many locations the living standards of smallholder farmers are declining, indebtedness is on the increase, foreclosures are common, employment opportunities in agriculture and fisheries are insufficient, migration from the land is on the increase and there are reports of increasing incidence of mental distress among those who continue to farm in rural areas. Food systems contribute to as much as 30% of greenhouse gas emissions and contribute to climate change. The Food and Land Use Coalition (FOLU) [1] has documented the hidden costs of these impacts. In summary, the annual value of food and land use systems is around \$10 trillion but the hidden costs amount to at least \$12 trillion (see figure 2 below).

FIGURE 2: FOOD SYSTEMS HAVE \$10T MARKET VALUE AND \$12T HIDDEN COSTS



Hidden costs today

Trillions USD, 2018 prices



Source: Food and Land Use Coalition, 2019

There is increased recognition of the need to explore and seek to optimize ways in which food is financed, produced, processed, marketed, stored, distributed, prepared, shared and eaten. All need to be examined: this means exploring the interacting processes that together constitute food systems and the hundreds of millions of people who work within them.

Many of those working in food systems appreciate that the systems need to adapt to the needs of coming and future generations in ways that bring benefits to all people and to the planet. But not all

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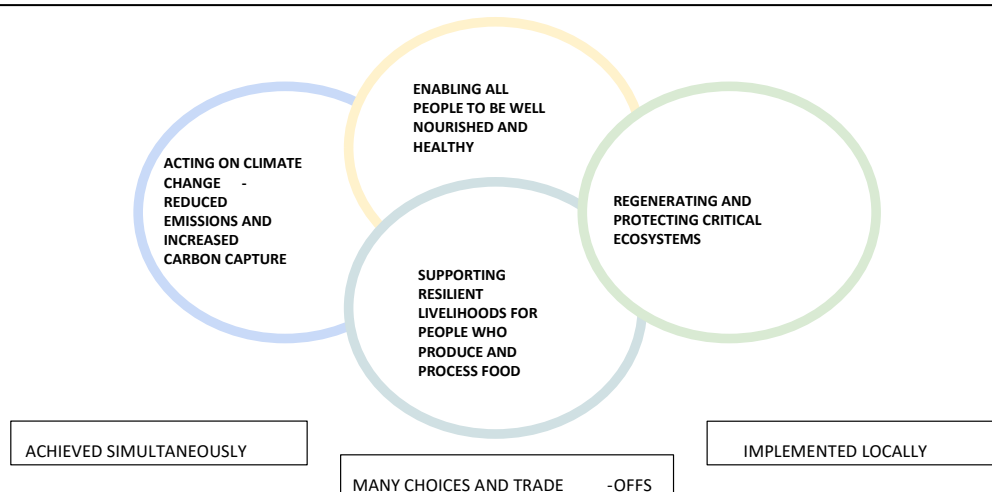


agree on when and how this should happen. Most focus on increasing the quantities of food that are produced, while others pay greater attention to the quality of food. Despite their differences, most commentators agree that transformation must happen at local level and that maintaining the status quo is not an option. There is also increased attention to the methods of food production and a growing recognition that approaches to production must diversify.

One reason for differences in approach is that while some food system practitioners sense that they stand to benefit from the ways in which food systems will change, others perceive that they will be adversely affected. Most recognize that change must take place urgently and want to explore both the options and their implications.

A group established by the United Nations Secretary General in 2015 (the Milano Group) [2] proposes that local food systems are transformed to fulfil four purposes simultaneously (Figure 3)

FIGURE 3: FOOD SYSTEMS FULFIL FOUR ESSENTIAL PURPOSES



Source: * The Milano Group report 2015

2

The outstanding challenge in food system transformation is for practitioners to align their approaches so that all those concerned work towards outcomes that are good both for people and planet.

In order to accelerate this alignment, and unleash the power of collective action, the World Economic Forum (WEF), the World Business Council for Sustainable Development (WBCSD), the EAT Foundation, the FOLU and the Global Alliance to Improve Nutrition (GAIN) came together to launch **Food Systems Dialogues (FSDs)** in June 2018.

The FSDs are designed to welcome and engage different practitioners who are seeking to influence how people inter-relate with the food they eat. They enable the practitioners —from a range of food production and consumption sub-sectors— to meet, discuss and explore options for transforming food systems in ways that benefit individuals, are good for society and help regenerate the resources of our planet. At the FSDs, practitioners can better appreciate the reasoning of others, understand the basis of strongly held, but divergent, positions and explore options for combining their energies. FSDs

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participants consider the actions that are needed to help shift food systems in a direction that would be best for people, for the environment and for those working within them. The outcomes of the FSDs are being synthesised as a contribution to the planned 2021 Food Systems Summit.

The objectives of the FSDs are to:

- I. bring together actors with different interests in food systems, so that they can **interact and appreciate each other's perspectives**
- II. provide a forum to **explore proposals and pathways for food systems transformation**
- III. encourage stakeholders to move beyond dialogue and engage in **joint efforts which contribute to food systems transformation**
- IV. maintain interaction among all involved through **sequential dialogues**
- V. inspire FSDs participants to **promote multi-stakeholder dialogue within their own spheres of interest**

The FSDs encourage interactive debates about the future for food systems. Taking place in different places all around the world, participants focus on the actions to be prioritized and trade-offs to be considered as food systems are adapted to the needs of coming and future generations within a specific setting. The FSDs therefore improve understanding of complex interactions in different settings; expose trade-offs; encourage cross-sector collaboration; and, through sequential events, increase the likelihood of cooperation.

The FSDs are structured to enable participants to explore synergies and to foster alignment. At each event, participants gather around in up to 12 dialogue tables for facilitated discussions. The intention is that dialogue tables are safe spaces where divergent views from different perspectives are welcomed and respected. Participants are encouraged to continue meeting with those at their table at intervals with a view to advancing the dialogue.

Box 1: Format of the FSDs

There are around eight participants at each table; the duration of the dialogue is limited to 70 minutes and the participants consider a specific aspect of the future of food systems. Chatham House rules encourage frank discussion and experimentation. At the beginning of the dialogue period participants check-in by introducing themselves and reviewing the issue for discussion. Ten minutes before the end of the dialogue, participants prepare a note (using a simple template) that describes the outcome of the table discussion. It is expressed as a proposal for collective action: any disagreements that emerge are recorded as well. The proposals emerging from each table are shared and discussed with the other tables at the end of the session and the conclusions are then pulled together by a Curator. A summary report with details of the proposals from each table is developed for each FSDs event.

There have been 24 FSDs events to date involving more than 1400 food system practitioners. These dialogue events have yielded more than 150 proposals for action. Despite the diverse nature of participants and their contexts, similarities emerge between several of the proposals. Those that recur over time are referred to as the FSDs '*Red Threads*'. Each Red Thread reflects a direction for food systems transformation that would contribute to the 2030 Agenda for Sustainable Development.

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Ten Red Threads have emerged, and these are grouped under four overarching themes. The themes and Red Threads will continue to evolve as the FSDs progress and aid the framing of issues for debate at FSDs tables in coming events.

In this note we situate the vision, themes and Red Threads alongside the main conclusions of recent authoritative reports related to food systems transformation (what we refer to as “the literature”). In doing so, we evaluate, compare, and draw out commonalities, inconsistencies and tensions.

Overarching Vision of the FSDs

The overarching vision expressed by participants in the FSDs is that food systems should ideally **enable all people to be able to eat healthy diets made up of from sustainably produced food that they can both access and afford.**¹ This would be achieved through involving all actors across the food web in collective action.

Themes and Red Threads

Theme A: Incentivize the production and consumption of nutritious and healthy food products

The theme that was repeated most throughout the FSDs relates to the need to incentivize production and consumption of nutritious and healthy food products. Four Red Threads have emerged under this proposition.

Red Thread 1: Accelerate the transition towards the production and consumption of healthy and nutritious food products through innovations that are developed and implemented inclusively

In all the FSDs, participants were explicit about the need to ensure that the food people consume contributes to their health and well-being: they reflected on the increasing evidence that between one third and one half of people’s ill-health is linked to what is in their diet, and that this has enormous personal, societal, financial and human consequences. They developed proposals for innovative engagement of those who produce and purchase food, prepare meals and decide what should be eaten – and when – in the process of food systems transformation. They also explored innovative approaches to the governance of food systems: so that the interests of consumers were more strongly factored into strategies for food systems transformation. They recognized some of the complexities in seeking to ensure that food systems are designed with people’s nutrition and health in mind, and accepted that this is an area where public awareness is changing rapidly within well-established political structures that have not always put the rights and interests of individuals to the fore. They highlighted the pioneering role played by chefs in bringing nutrition and healthy eating into the future

¹ This goal is like other visions such as that of the EAT-Lancet Commission (“providing a growing population with healthy diets from sustainable food systems”) or the World Economic Forum (“developing inclusive, sustainable, efficient, nutritious and healthy food systems”).

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design of food systems. They considered innovation—in technology, policy, financing and business models—as an enabler and accelerator for people-centred transformation of food systems. They concluded that **innovations have huge potential to drive rapid progress in the sustainability, inclusivity, efficiency and health impacts of food systems, and in the environments within which people decide which foods to incorporate into their own diets as well as the diets of their households.**

The potential impacts of innovation are wide-ranging. Many expert analyses indicate the potential for transformative practices to improve agricultural productivity, restore ecosystem services, transform the eating experiences of individuals and influence their food environments. These include productive and regenerative agricultural systems [3], increasing livestock and pasture productivity [4] and harnessing the potential of the digital revolution, particularly possibilities through the ‘internet of things’ (IoT). Examples include breeding techniques (including biofortification), precision-farming, digitized logistics and marketing tools, supply chain transparency and traceability to reduce waste [3], food sensing technologies for food safety and quality [5], and digital applications that empower consumers to make nutritious and healthy choices.

While FSDs participants recognized the transformative power of innovation they also cautioned that its gains must be accessible to all in an equitable and ethical manner, in ways that respect people’s privacy and autonomy. The literature reviewed for this report contains warnings that many innovations are not accessible to people with limited purchasing power [4]. Indeed, the ways in which innovations are disseminated should always take account of who is enabled to access them: there may be challenges linked with intellectual property, and who stands to gain.

Many food systems innovations do contribute to people’s good nutrition health when they respond to a real need, are available to all, and leave no-one behind. Harnessing the positive impacts of innovation while minimising potential downsides requires deliberate and coordinated efforts by nutritional scientists, investors, innovators and policymakers [5].

Red Thread 2: Minimize food loss and waste within the context of a circular economy

Reducing food loss and waste is the issue that generates the most agreement within the FSDs. Most agree that the current levels of food loss and waste—estimated at one third of primary production [3] [6] and representing approximately 10 per cent of the world’s total energy consumption [7]—is an environmental and social necessity. Cutting food loss and waste, from production to consumption, is a critical component of food system transformation with significant benefits relating to the environment, health, inclusivity and food security [3] [6] [8] [9].

Food loss occurs before the food reaches the consumer as an unintended result of agricultural processes and technical limitations in production, storage, processing and distribution [8]. Many proposed solutions focus on improving agricultural infrastructure, including what happens after harvest: regulations, processing, infrastructure, transport, storage, and packing, as well as training and equipment for producers [3] [6] [10]. Others focus on re-designing food systems based on the

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principles of the circular economy and making food systems' supply chains [6] [11] more sustainable, including through IoT [2] or the digitization of food chains [9].

Food waste refers to good quality food fit for consumption that is consciously discarded at the retail and consumption stages. To address this, the outcomes of several FSDs—in line with expert analyses—have pointed to the importance of changing the way in which people relate to food. Proposals have focused on educating and providing consumers with better information, including more precise labeling. The FOLU has sought to highlight the importance of strengthening and scaling efficient and sustainable local food economies [3].

The overall conclusion is that a **circular economy approach — whereby waste, energy and other materials are fed back into the production chain — has strong potential when addressing food loss and waste** [10].

At the same time FSDs participants encourage **exploration of reasons for food loss and waste** including the underlying market processes that lead to waste and the interests of those actors who stand to gain from the status quo. The FSDs are well placed to explore these complexities further. Yet, **even with regards to minimizing food waste there can be trade-offs**. For instance, the transition towards healthier diets, which contain more perishables, will make it harder—all other things being equal—to contain food waste.

Red Thread 3: Ensure that public food procurement practices encourage—and offer appropriate incentives for—the consumption of healthy diets produced from sustainably-produced food

Accelerating the shift to healthier diets depends on more consumers being ready to change behavior and the extent to which healthy food is available and affordable within their food environment [8]. Many, including the vast majority of FSDs participants, agree that governments have a key role to play in this regard. **There is little consensus however on the specific public policies to be deployed**.

The role of government procurement processes as a stimulus for healthy eating has emerged as a Red Thread across multiples dialogues. FSDs participants propose that the public procurement policies of local and national authorities (e.g. for meals in schools, hospitals and residential institutions) encourage the preparation of nutritious and healthy diets from sustainably produced food [8]. Where such policies are being implemented, they are providing important signals to markets and stimulate wider debate about ways in which food is produced and consumed. This Red Thread is reinforced by calls from many stakeholders, including the EAT-Lancet Commission and the WBCSD, for governments to increase the use of sustainably produced food in the activities for which they are responsible [8] [9].

There are other actions that can be pursued by local and national governments and which have emerged in the FSDs – including the re-orientation of agricultural support (including subsidies), other financial incentives and regulatory measures that support the transition to healthier diets based on sustainably produced food [3] [6] [8]. The FSDs, and the literature, stress that such interventions

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should be adapted to the local setting and that their impact depends on the political context. They may well be captured by vested interests, often to the detriment of the intended beneficiaries.

The FSDs therefore highlight the importance of **being open to a wide range of options and deploying them in a tailored way based on specific needs and national or local context.**

Theme B: Promote equitable access to food systems through inclusive approaches

The transformation of food systems will affect different actors in varied ways. Participants in the FSDs have noted the deeply embedded power disparities that exist in today's food systems, with some interested groups being systematically excluded from policymaking and being unable to experience their share of prosperity, or finding that their accumulated knowledge and experience is just not valued.

This is consistent with the literature: farmers and fishers (especially those with small- medium-sized holdings) face multiple challenges as food systems transition, including appropriation of their biological resources, insecurity of land tenure (and land-grabbing), and exclusion from markets because their produce is not up to standard or in line with specifications. They are particularly threatened by market instability and excessive price volatility. They find it hard to mobilize credit, are vulnerable when support services are dismantled, and are at particular risk of emerging diseases [2].

For these reasons, FSDs participants have emphasised that **prioritizing inclusivity and encouraging equity should be as integral to the process and the outcome of food systems transformation.**

Red Thread 4: Involve all stakeholders (including farmers, fishers, food processors, retailers, carers and chefs) in sustainable food system transitions

Enabling all people to access and afford healthy diets from sustainably produced food is only possible if food systems are transformed through **inclusive and accountable multi-stakeholder processes** – right across the systems and on a massive scale. This involves the engagement of actors right across the food system, from producer to consumer, drawing on their knowledge and expertise.

FSDs participants have urged decision makers at all levels (including themselves) to prioritize equity and inclusion: they should learn how best to pursue these priorities and manage the new trade-offs that they imply. The trade-offs become explicit if disaggregated local-level metrics are developed and decision-makers have access to evidence of what has worked elsewhere. Such a transformation is a long-term process that needs consistent political backing.

FSDs participants have repeatedly stressed the value of inclusive decision-making. The literature suggests that the effectiveness of decision-making and governance is enhanced by the involvement of local stakeholders [6], as well as the gathering and analysis of evidence (including through participatory research) that are more locally relevant need to be encouraged. These will result in

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locally adapted, place-based, sustainable solutions [12]. It will be particularly important that productive and regenerative agriculture scale-up is inclusive and locally owned [3]. Such participatory processes also foster improved accountability – helping to strengthen trust and long-term gains.

There are no universally applicable approaches to food systems transformation: when attempts are made to scale-up single solutions on agriculture, forestry and land use in multiple settings they may lead to uneven results [6] [2]. As noted by the Intergovernmental Panel on Climate Change (IPCC), **strengthened multilevel, hybrid and cross-sectoral governance, as well as policies developed and adopted in an iterative, coherent, adaptive and flexible manner will maximise co-benefits and minimise trade-offs** [6].

Red Thread 5: Pay attention to the interests, livelihoods and voices of food producers and processors (focus on fairness and resilience)

FSDs participants emphasise that just transitions to healthy and sustainable futures must reflect the varied and often divergent interests of all the stakeholders involved. This Red Thread reflects the need to identify and engage stakeholders who feel under-represented in or detached from relevant decision-making.

The literature suggests that if the livelihoods of rural households are supported in ways that are fair and just, and enabled to adapt to the effects of transitions, their communities are likely to be economically vibrant and socially cohesive [3] [8] [2]. If the transformation of food systems is underpinned by a “vision of rural areas transformed into places of opportunity, where thriving communities adapt to new challenges, protect and regenerate natural capital and invest in a better future” [3] it offers communities exciting opportunities for tackling economic and social inequities, while also creating opportunities for investment and job creation [13].

The literature includes several proposals for enabling food producers and processors to improve their resilience and well-being. These include technological innovation (gene-editing, biological-based crop protection and off-grid renewable energy generation) [5]. The challenge is to pursue these in ways that encourage equity and justice within the existing power differentials of food systems.

The inclusion of food producers and processors in decision-making about food systems transformation, with specific efforts made to those who are most often included and leave no-one behind, is often contested. The decision-makers are often facing criticism and adversity and may be side-lined. For example, smallholder farmers see higher revenues when food prices are high. This however results in food, including nutritious and sustainably produced food, being less accessible for many, especially households with lower incomes. Ensuring inclusive transitions must therefore be all-encompassing – seeking to minimize trade-offs and maximize equitable outcomes.

In the FSDs, dynamics linked to gender-based inequity were frequently referenced but rarely highlighted in the reports of dialogue tables. The literature suggests that the agriculture sector—as well as the national economy—will be more prosperous and foster greater shared wealth if the gender gap is eliminated [14]. Empowering women brings synergies and co-benefits to household food

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security and sustainable land management [6]. Ensuring women have equal opportunities to participate is one prerequisite for sustainable food and land use systems transformation. This reality will receive increased attention in future FSDs.

Red thread 6: Accompany food producers and processors as they make changes to their production and processing practices

The transitions envisaged will be challenging, especially for food producers who have invested significant assets in production and who are indebted. Many of the proposed changes would result in a heavy economic and social burden for them. Given their central role in these transitions, food producers should be accompanied as they change. This has been a resurgent theme in multiple FSDs.

Smallholder food producers operate in structural contexts and market mechanisms that are beyond their control. They may need to pay unexpected costs when systems change. Without support, the costs of change often fall on them. For example, although the health and environmental benefits of a plant-based diet are well known [8], millions of farmers rely on the sell and consumption of meat to ensure the livelihoods of them and their families. These farmers should be involved in determining the manner and pace of change, and to benefit from support that enables them to avoid being disadvantaged.

Moreover, the benefits of innovation can often accrue for small concentrations of people who own the intellectual capital or have sufficient capital to invest. This strips it of its emancipatory potential, further exacerbating social and economic inequalities. Moreover, as alluded to in Red Thread 4, accompanying the various stakeholders through the transitions also brings out a rich diversity of human know-how, further fueling progress.

Theme C: Engage food producers and processors - especially smallholders – in all aspects of climate action and in the promotion of sustainable farming and land-use practices

The complex relationship between food systems and climate—including the best way to accompany food producers and processors as they adapt to changing weather patterns - has been a reoccurring theme across multiple FSDs.

Global food systems are a leading driver of climate change, soil erosion, biodiversity loss and deterioration of the world's water resources [3]. Moreover, climate change and biodiversity loss have also, in turn, consistently been identified as a major driver of food systems challenges and vulnerability [15]. The evidence is clear even in the most 'moderate' scenarios. Box 2 highlights key statistics that are most often referred to during FSDs.

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Box 2: Food systems and the environment – commonly cited statistics

- Agriculture and land use are responsible for approximately one quarter of global greenhouse gas emissions (rising to one third when all emissions from total food value chains are taken into account) [6].
- Food systems are the leading cause of the continuing conversion of the world's tropical forests, grasslands, wetlands and other remaining natural habitats, which are crucial for resilience against natural disasters and the conservation of biodiversity [24].
- The intensified degradation of soil and land, resulting from conventional and industrial farming practices, has resulted in half of the planet's topsoil being lost [3].
- Crop diversity has declined by 75 per cent in the 20th century and just four crops now provide 60 per cent of global calories [3].
- Agriculture is the single largest producer of wastewater and is responsible for over 70 per cent of global freshwater withdrawal – leading to freshwater stress that affects two billion people [3].
- Overexploitation of ocean fisheries has resulted in 33 per cent of fish stocks being critically overfished, jeopardizing the main protein source for 3.2 billion people [3].
- Climate change lowers agricultural productivity while the increase in frequency, intensity and impacts of extreme weather events puts chronic stress on food systems [6].
- The near extinction of certain pollinators puts at risk five to eight percent of agricultural production [15].
- Climate models (at 2°C warming by 2050) estimate that the world will see an additional 540-590 million undernourished people, 4.8 million stunted children and more than 500,000 additional deaths due to climate-related changes in diets [24].

According to the IPCC, these global challenges are **disproportionately affecting those who are most vulnerable and with the least resilience in their livelihoods** [6]. This includes those who are resource poor – especially small-scale farmers and those without assets who earn their income through labouring. They include the majority of the world's indigenous people. Together they contribute to a significant proportion of overall global food production [2].

FSDs participants have repeatedly emphasized that food systems offer pathways for the development of food production and distribution that is good for people and planet. They stress that meeting demands for food while respecting our planet's boundaries calls for the development of food systems that are productive, financially viable and sustainable. The United Nation's Food and Agriculture Organization (FAO) has concluded that this means a new future direction that no longer relies on large-scale intensification of agricultural input use. It must instead reduce resource use in agriculture without compromising yields or the livelihoods of small farmers, whilst also optimally managing livestock residues, a major source of greenhouse gases [1].

A key issue however is the management of trade-offs. Although systems-level analyses, as done by FOLU, suggests that there need not be a macro-level trade-off between producing food and protecting nature, a small-scale farmer or fisher doing the same trade-off at micro-level may produce a different calculation [3]. The many millions of labourers in food systems will have different interests too. Equity considerations therefore remain central and underpin, once again, the Red Threads under this theme.

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Red Thread 7: Remunerate producers for their positive contributions to ecosystem services

The ability of societies to benefit from ecosystems and biodiversity (or ecosystem services)² depends critically on how the services are valued and managed. They are public goods, and over time have been managed by societies through collective responsibility. Their governance has become increasingly complex as a result of pressures on these services as a result of multiple competing interests: this has undermined the capacity of local, national and inter-governmental authorities to ensure effective management for the fair, sustainable and regenerative use of ecosystem services within food systems.

FSDs participants highlighted **the significant contributions made by some food producers, especially pastoralists, in maintaining and managing ecosystem services and the (often) inadequate compensation they receive for this vital function.** The literature suggests that they face multiple challenges including insecure tenure, political marginalization, cultural prejudices and impoverishment, all of which undermine their invaluable roles [6] [16].

Payments for ecosystem services to rural communities – to communities or to individuals – through financial allocations, subsidies or market payments, were proposed in several FSDs. Here, the additional income also provides food producers—especially small-scale producers who are generally poor—with the capital to adopt agricultural practices that have a lower environmental impact [10]. Although this approach has considerable potential, there are consistent challenges with implementation, including the valuation of biodiversity and the need to combine efforts to reduce household poverty with the pursuit of environmental public goods.

In this context, FSDs participants used a broad definition for ‘remuneration’, highlighting their expectations of the role to be played by governments. Proposals included the development of legal, regulatory and policy frameworks, as well as organizational modalities, by governments to help smallholder farms adopting sustainable approaches to production as they enter markets and seek to compete with large scale commercial farms [1]. Other proposals include governments granting land tenure to indigenous communities or increasing public investment in improved rural infrastructure, both of which contribute to livelihood resilience and rural-urban connections [3].

FSDs participants recognize the ongoing challenge of establishing means for managing global public goods (such as ecosystems) in ways that are acceptable to all with an interest. There are some challenging trade-offs and not all stakeholders will be comfortable with the decisions made. Consensus can only be achieved through a combination of dialogue and focused action based on community-based research and analysis especially at local levels.

² Examples of ecosystem services include the supply of food, water and timber (provisioning services); the regulation of air quality, climate and flood risk (regulating services); opportunities for recreation, tourism and education (cultural services); and essential underlying functions such as soil formation and nutrient cycling (supporting services).

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Red Thread 8: Encourage a science-based approach to agroecology, with a particular emphasis on the preservation of biodiversity

Participants in FSDs have proposed increased attention to the benefits of agroecological approaches. The literature suggests that enhanced ecological functions within food systems lead to better resource-use efficiency and waste management [11]; promote better nutrition and food security [17]; and improve socio-economic and poverty reduction outcomes by offering rural employment opportunities, especially for women and youth [11].

Within the FSDs there were often calls for standardised definitions of agroecology. FAO defines agroecology as an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems. It seeks to optimize the interactions between plants, animals, humans and the environment in bottom-up and context-specific processes, while taking into consideration the social aspects of a sustainable and fair food system [11].

The literature indicates that agroecology nurtures the relationships between species: this contributes to strengthening biodiversity with a range of production, socio-economic, nutrition and environmental benefits. From a biological perspective, agroecological systems optimize the diversity of species and genetic resources in different ways. Diversification then strengthens ecological and socio-economic resilience, including by maintaining a better functional balance and by creating new market opportunities [11]. By planning and managing diversity, such approaches enhance the provisioning of ecosystem services upon which agricultural production depends [16].

Within the **FSDs there was initially a sense of dichotomy between agroecology and industrialised food systems.** Over time a more nuanced approach developed – one which values natural systems and integrates agroecological processes and principles are into future food production as fully as possible.

Science-based targets then serve as the basis for pathways that support the emergence of sustainable food and land use systems. The selected pathways can be used as the basis for rewarding the contributions of food producers to ecosystem services (see red thread 7). This approach will depend on the availability of analyses into the potential contribution of agrobiodiversity and agroecology approaches to sustainable food systems within different settings: laying the foundations for regenerative agro-industries fit for the long-term.

Agro-ecological approaches cannot be advanced through the application of a single global template: they must be adapted to the social and economic contexts of food systems at the local level. FSDs participants have repeatedly emphasised that context-specific and localised approaches are key to successful food systems transformation (as emphasised in Red Thread 4).

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Red Thread 9: Explore climate-smart agriculture practices with farmers in different settings and be ready to support their adoption, as and when appropriate

FSDs participants stress that successful transformation of food systems requires the adoption of appropriate climate-smart practices in different settings.

The literature describes climate-smart practices as those which work in synergy to mitigate emissions of greenhouse gases, strengthen the social-ecological resilience of communities in the face of unpredictable weather, and contribute to sustainable improvements in productivity within rural livelihoods [2].

A large-scale shift to regenerate agriculture, for example, has the potential to maintain yields, while enhancing soil health, and increasing the diversity of healthy, planet-friendly foods produced and consumed [3]. Given that practices that damage environments are not easy to abate in poor communities, [10], this Red Thread emphasises the need for special attention to smallholder and low-income farmers. These are often women who consistently seek opportunities to engage in climate-smart agricultural practices.

The propagation of climate-smart agriculture will require the enhanced transfer of technology, knowledge and best practice. This relates as much to the transfer of ‘advanced’ industrial knowhow, as to the deep knowledge of regenerative farming that has built-up in rural communities over millennia. It also implies the spread of climate-smart technologies.

Despite small holdings supporting the livelihoods of an estimated 2 billion people, the access of small farmers to innovations, technology, knowledge and information that are needed to enhance productivity and incomes remains limited [1]. This gives rise to numerous challenges, including the need to respect intellectual property regimes while ensuring the benefits of technology and innovation are well-spread. One solution supported by many FSDs participants, also proposed by FOLU, is the creation of an open-source information sharing system to be established throughout food and land-use systems.

Participants in FSDs proposed interventions that encourage the adoption of good practices and discourage practices that are damaging to climate, ecosystems and livelihoods. This applies to the misuse of fertilizers (often encouraged by subsidies), crop protection compounds and antibiotic medications, amongst others. It also applies to the avoidance of dishonest behavior, such as “green washing” by business or governments.

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Governments have a range of tools to deploy, such as taxing undesirable outcomes and subsidizing desirable ones. Businesses can empower rural communities with efficient agricultural models that simultaneously address environmental degradation, climate change and rural poverty, while ensuring that their ways of doing business promote (rather than undermine) sustainability. Initiatives such as the WBCSD's Climate Smart Agriculture Programme or the Livelihoods Fund for Family Farming should be explored to assess their suitability for different locations and replicated as appropriate. Policymaking should be also informed by expert groups such as FOLU or Foresight4Food - enabling more strategic dialogue between the private sector, government, science and civil society [18].

Theme D: Align financing and investments with desired food systems transformations

The importance of financial actors cannot be understated. This theme recognizes the central role finance and investments will play in global, national and local food systems transformations.

Red Thread 10: Ensure that financial processes and mechanisms align with and encourage the production of healthy and nutritious foods

In today's market economy, financial actors, corporations, and technology agents increasingly control everything from agricultural activities to upstream operations to consumer food choices [17]. However, getting capital in the right places with the urgency required will not be straightforward. Risks (real or perceived) in making the required investments remain high, especially in Sub-Saharan Africa [3]. **Governments and public-private partnerships can play a key role in fostering more conducive financial environments.**

The investment required to finance successful food systems transformations is modest in comparison to the gains [3]. Models developed by FOLU suggest that a new investment of between \$300 billion and \$350 billion a year would capture a \$5.7 trillion annual economic gain for society by 2030, a societal return ratio of more than 15:1 [3]. A paradigm shift to truly long-term strategic thinking is therefore urgently needed.

The financing of food systems transformation is frequently mentioned across the relevant literature and publications. However, except for the 2019 FOLU Global Consultation Report, **pathways for mobilizing finance and navigating the challenges linked to the political economy of food, remain undeveloped.** Though many publications make broad recommendations for shifts in public funding, the solutions that enable all countries to access resources so that they can enact their priorities.

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Conclusion

This report is an analysis of the outcomes (themes and threads) that are emerging from the FSDs. The contents of the report reflect a growing consensus that is held among the ever-growing number of FSDs participants who have a variety of interests and intentions. This report also links the themes and threads to conclusions of expert groups that have reviewed available evidence on food systems change.

The FSDs specifically emphasize the links between food systems and human nutrition, the contribution of food producers to food systems transformations (including provision of ecosystem services) and the potential impact of investments. They also highlight the heterogeneity of national and local food systems and emphasize the need to establish context-specific and inclusive pathways for transition. This is generally consistent with the conclusions of the expert groups.

What has also emerged through the FSDs Red Threads is the importance of managing trade-offs. This paper has sought to highlight the complex and sometimes surprising trade-offs that occur among the different proposals for food system transformation. It concludes that such trade-offs can often be minimized by ensuring transitions are locally relevant and based on principles of inclusivity and equity. The FSDs represent an important space to explore these challenges further.

The outcomes of this first series of FSDs suggest that there is value in continuing the exploration in different locations with the involvement of diverse stakeholders, ideally with dialogue continuing at intervals and informed by locally relevant information as it becomes available. To this end, the FSDs could continue to be adapted to local needs as their use becomes more widespread. This will lead both to increased local appreciation of options and a more diverse base from which the FSDs outcomes can be documented. This, in turn, will increase the value of intermittent FSDs synthesis reports for national and international policymakers and make a significant contribution to the preparation for the proposed 2021 United Nations Food Systems Summit.

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