Global Panel
on Agriculture
and Food Systems
for Nutrition

Pursuing food systems transformation despite financial constraints

Food systems need to be urgently transformed – to address hunger and malnutrition, to become sustainable, and to drive prosperity. Yet many governments are constrained to act by severe financial constraints. This brief highlights many actions which are cost-neutral, or low cost in terms of their benefits. Together, they provide a foundation for a broader strategy for food-system transformation.

POLICY BRIEF No. 18 | September 2023

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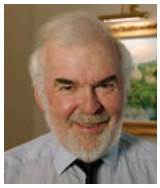

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RECOMMENDED CITATION:
Global Panel. 2023. Pursuing food systems transformation despite financial constraints. Policy Brief No. 18. London, UK: Global Panel on Agriculture and Food Systems for Nutrition.

The Global Panel on Agriculture and Food Systems for Nutrition would like to thank the following individuals for their contribution in producing this paper.

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Summary

The question addressed in this brief concerns how can governments pursue food systems transformation in the face of severe financial constraints, financial shocks and food-price crises. Transformation is urgently needed to address long-term goals around addressing hunger and malnutrition, as well as making food systems sustainable and resilient. The brief shows that many important changes to food systems can be implemented which are low cost, or even cost-neutral. These relate to: improving governance of food systems; repurposing and leveraging governmental resources; leveraging resources in the private sector; harnessing the power of consumers to drive change; and improving access to finance by low- and middle-income countries (LMICs). While this brief is primarily intended for policy makers in LMICs, recommended actions are equally applicable to high-income countries (HICs).

Introduction

Food systems (see Box 1) are in need of urgent change.[1] This was widely acknowledged in the 2021 UN Food Systems Summit (UNFSS), as well as in the UNFSS +2 Stocktaking Moment in July 2023.[47] Food systems are failing to deliver affordable, healthy diets to more than three billion people, while 900 million often run out of food, or, in extreme cases, go without eating for more than a day.[2] The consequences are widespread malnutrition and ill health, which in turn act to perpetuate entrenched poverty and inequality.[5] Food systems are also operating unsustainably and are locked in a spiral of decline with climate change and environmental systems.[3] They are a major contributor to climate change (accounting for around 30% of anthropogenic greenhouse gas emissions), while also driving biodiversity loss and degradation of many of the world's environmental systems leading to, for example, deforestation and poor soil health, and pollution of land and water bodies.[37] At the same time, climate change and environmental degradation are driving food systems to produce ever more food on land that is increasingly degraded and subject to intensifying weather events.

The transformation of food systems is increasingly seen as a global priority, the benefits of which represent global public goods of the highest order.[6] Every nation must play its part, given the interconnectedness of local, national, and global food systems. Middle- and high-income nations are the most significant emitters of greenhouse gases and they need to work hardest and fastest to bring down their contributions to the climate and environmental crises that affect the globe. But low-income countries also need to act because their own patterns of dietary consumption are rapidly converging with those of the rest of the world (with the same implications for the climate and environment), and because the ill health burdens linked to sub-optimal diets are growing.

Box 1. What is meant by food systems?

Food systems encompass: their constituent elements, i.e., environment, people, inputs, processes, infrastructures, institutions; activities that relate to the production, processing, distribution, preparation, and consumption of food; and the outputs of these activities, including socio-economic and environmental outcomes.[31]

The health, economic, social and environmental gains of effective actions to transform food systems will be substantial, particularly for resource-constrained countries which already struggle to cover burgeoning healthcare costs, manage equitable income growth, and deal with the fast-growing impacts of climate shocks. LMICs are increasingly experiencing multiple, overlapping crises with compounding effects. These drain financial and governance resources while diverting attention from realising the longer-term benefits which transformed food systems could offer. For example, it has been estimated that in Africa alone, the transformation of food systems, including associated agribusinesses, could deliver up to US$ 1 trillion by 2030.[7]

However, transforming Africa's food systems to help deliver healthy communities, planetary health, and robust economies will be costly: estimates suggest that US$ 76.8 billion per year to 2030 (US$ 614 billion in total), comprising US$ 15.4 billion per year from the public sector and US$ 61.8 billion per year from the private sector will be required.[38] The reality is that even those LMICs committed to following domestically-determined national pathways towards food system transformation are, for the most part, constrained to act. The growing debt crisis – in Sub-Saharan Africa (SSA) Africa public debt has tripled since 2010[39] – combined with weak growth has pushed the median public debt-to-GDP ratio from 32% in 2010 to 57% in 2022 (56% in western and central Africa; 64% in eastern and southern Africa). The number of SSA countries at high risk of external debt distress or already in debt distress now stands at 22 (up from 20 in 2020). Pressure on public finances has also grown as countries have increasingly resorted to subsidies; temporary waivers of tariffs and levies; and income support for the most vulnerable people in an effort to limit the rise of food and fuel prices. These increases have been driven in large part by the impact of the COVID-19 pandemic and the crisis in Ukraine. Stubbornly high inflation, as well as weaker currencies and low investment growth, also continues to constrain African economies.

Importantly, not all required actions to transform food systems are resource-intensive. Much can still be done to take effective steps towards the ultimate goal of transformation where funds are scarce. This brief highlights actions which are either cost-neutral for governments (for example, realigning existing governmental expenditure) or which can be implemented at relatively low cost with a view to large future gains (but see the caveat in Box 2). These were all deemed priorities in the Global Panel's 2020 *Foresight* report,[3] and are primarily intended to help decision-makers in governments, parliaments and the civil service in LMICs, but they are equally relevant to those in high-income nations.[40] Taken together, the actions should not be regarded as a complete strategy for fully delivering food system transformation, but rather as a checklist of low-cost actions which could be readily implemented. As such, they should be embedded within a broader, coherent strategy to transform food systems over the longer term.

Box 2. A caveat on low-cost actions

While the emphasis in this policy brief is on actions that do not involve large financial resources to implement, compared to their benefit, they may involve other costs: for example in terms of administration and human resources, the costs of generating evidence for change, building and sharing capacities, and promoting changes in mindset. There may also be political costs.

2. Food system transformation

The term 'food systems transformation' refers to the combined actions that are needed to ensure that food systems operate differently (better), in the future.[8] The transition process is termed a food system 'pathway'. Some pathways must be defined and pursued at national and sub-national levels, others at the global level.

2.1 The objectives of food system transformation

Food systems are increasingly required to deliver against a growing number of objectives. An important issue concerns what individual governments want their food systems to deliver, and how this might be done. Objectives may include:

- ***Achieving universal access to affordable, healthy diets.*** This concerns addressing undernutrition, including child stunting and child wasting; micronutrient deficiencies; and overweight, obesity and diet-related non-communicable diseases. But this objective is also a prerequisite for addressing deeply entrenched inequalities that affect women and other vulnerable populations. It is also a prerequisite not only for addressing poverty, but for achieving nearly all of the Sustainable Development Goals.

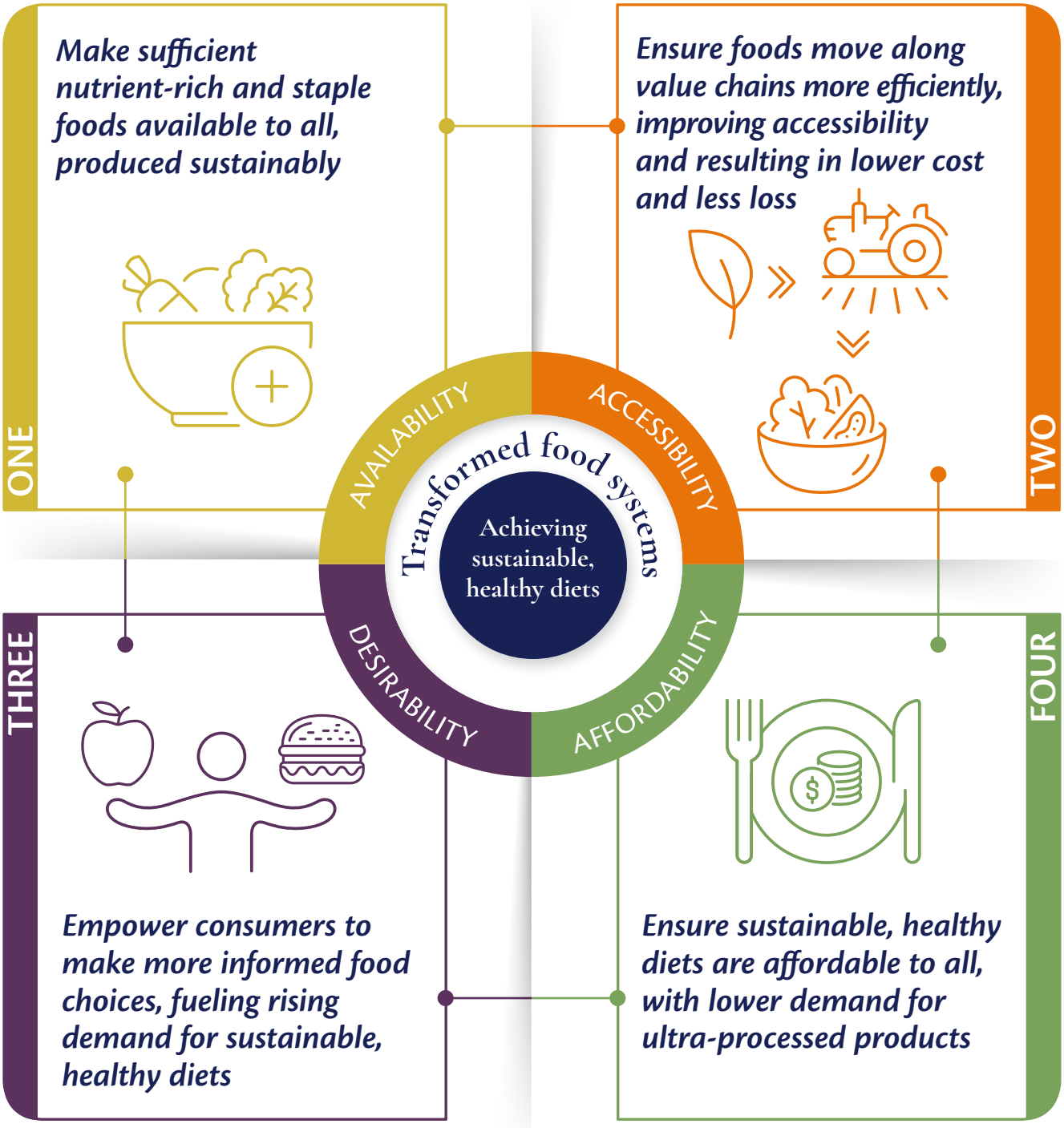
- ***Food systems as engines for driving growth and creating jobs.*** This is a particular priority in Africa, given its young and still rapidly growing population, as set out in the African Union's Malabo declaration[9] which resolved to create job opportunities for at least 30% of the youth in agricultural value chains, with the food sector seen as a major engine for growth. Globally, 1.23 billion people are employed in agri-food systems, with 3.83 billion worldwide living in households linked to agri-food livelihoods.[42]

- ***Ensuring food production – and food systems more generally – are sustainable and operating within planetary boundaries.*** There is no viable future for food systems unless they can become sustainable, and unless the current destruction of environmental services that they are causing is halted, if not reversed.

- ***Substantially reducing the greenhouse gas emissions of food systems.*** HICs have a preeminent role to play in reducing emissions in view of the scale of their contributions.[10] Action by all countries to limit greenhouse gas (GHG) emissions in food systems is important, while recognising that many poorer countries may be severely constrained in doing so because of a lack of resources, and competing priorities. Every incremental temperature increase above 1.5°C will matter in terms of impacts and the risk of tipping points being breached. Overall, LMICs are at the greatest risk of impacts from climate change.

- ***Strengthening resilience while food systems are being transformed.***[36] This is increasingly viewed as a priority for all countries: to be able to cope in a world which is increasingly volatile and uncertain. However, it is especially important for LMICs which may lack the resources to cope with the many crises they are currently facing.

Figure 1: The four 'dimensions' of food system transformation



Source: Based on a Figure in Foresight 2.0 Future Food Systems: For people, our planet, and prosperity

2.2 A roadmap for food system transformation

Food systems are complex, both in terms of their many constituent parts, the national and international networks that they encompass, and the many interactions between their various elements. Figure 1 breaks the complexity of food system transformation down into manageable components. It shows how actions can be grouped, and how they can be aligned to maximise policy coherence. It identifies four groupings: the *availability* (supply) of sufficient staple and nutrient-rich foods in food chains; their *accessibility* (as tangible choices in markets); their *affordability* (economic accessibility); and their *desirability* (there is little to be gained in policy makers delivering access to healthy diets from sustainable food systems, if the citizens are not persuaded to adopt them). All of the actions listed in Section 3 map onto one or more quadrants of this diagram.

3. Actions to transform food systems at low cost

There are many factors besides finance that can enable or impede the transition steps involved in food system transformation. This section considers five categories of action which can enable or drive change or address important barriers to change. Some of these are cross-cutting (relevant to more than one quadrant of Figure 1), while others map onto a single quadrant. However, all of the following are either cost-neutral (for example repurposing existing government expenditure), or relatively low cost compared with the likely gains.

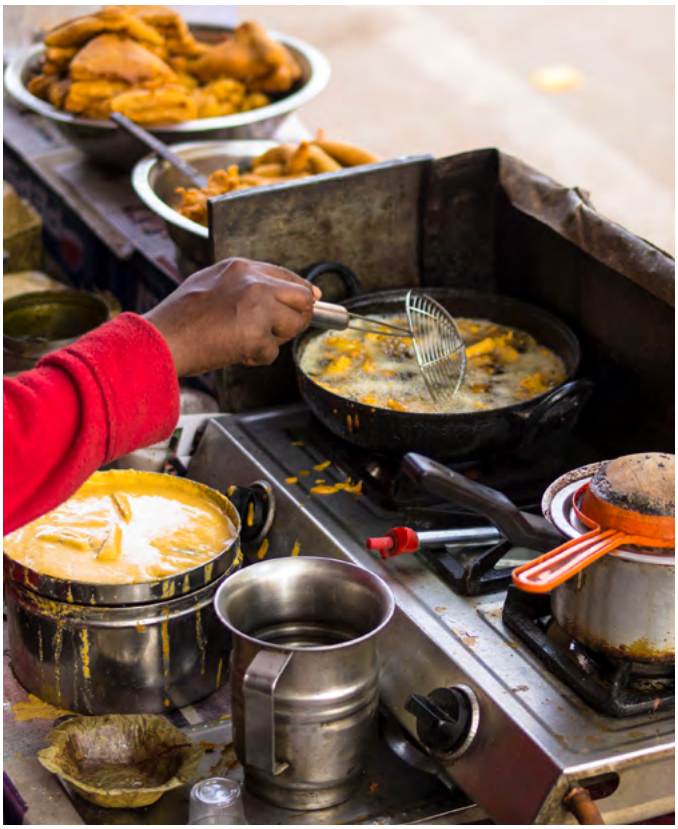
3.1 Improving governance

- ***A shift in policy mindset and responsibility: refocusing food policy agendas from a focus on agricultural output to increasing the efficiency of entire food systems.*** A realignment of food systems towards sustainably produced, healthy diets would entail the most transformative changes across systems.[3] Food systems remain inefficient from many perspectives and adopting a whole-system approach is needed to address inefficiencies. Flowing from this would be a set of actions to refocus support for the agricultural sector and refocus research agendas (see next sub-section). Designating cabinet-level or equivalent responsibility for food systems would be one way to help ensure that this shift in approach drives future policy development.

- ***Ensuring coherence of policy actions across governments supports the transformation of food systems at scale.*** Many parts of government beyond those concerned with agriculture and food systems stand to benefit from the transformation of food systems. A systems approach in decision-making will make clear how changes (targeting better nutrition and environmental sustainability) can contribute very substantially to diverse areas of policy –mitigating and adapting to climate change; promoting health and wellbeing; improving productivity and growth; reducing healthcare costs; and addressing deeply entrenched inequalities. It will also help to identify the trade-offs which must be made.

  The aim is to offer evidence and arguments to policy makers in relevant ministries (for example, agriculture, health, transport infrastructure, and environment) to persuade them to work collaboratively to implement policies which realign policies across all parts of food systems, to ensure coherence across investments, and to reprioritise goals. From the perspective of policy makers concerned specifically with food systems, this action concerns leveraging assistance and resources from right across government.

  A specific suggestion is to empower cross-party and cross-ministerial working groups to identify ways to reconcile trade-offs across sectors (including agriculture, health and environment), as well as balancing short-term gains against long-term losses for different constituencies.[3] Anticipating and resolving such trade-offs, and their associated controversies and political tensions, as well as opportunity costs, should be part of the due diligence process in prioritising actions.



- ***Driving change from the top.*** Getting different parts of government to work together towards a common agenda – in this case around food system transformation – can present challenges. Leadership from the top is essential to break down siloed government departments and agencies, to incentivise decision-makers to work collaboratively, and to encourage different ministries to identify and realise multiple gains by exploiting synergies and common interests.

- ***Setting common targets.*** Improvements in food systems should aim to deliver improvements in nutrition, health, and environmental outcomes. The establishment of cross-government targets could be used to incentivise different parts of government to work within a jointly-owned delivery strategy. Effective monitoring and evaluation of progress would be important.

- ***Promoting pro-poor growth.***[3] While most governments seek to promote growth in their economies, this does not always reduce the gap between rich and poor. Specifically pro-poor growth matters, not just to reduce the vulnerability of poor populations to malnutrition, but also to help them develop resilience to harder times, for example when food prices spike, or when supply chains are disrupted.

- ***Empowering sub-national and city authorities to assume practical responsibilities for the transition of food systems. .***[3,43] Countries as diverse as Ghana, Kenya, Nepal, Pakistan, and Zambia have been devolving some sectoral responsibilities, in both agriculture and health, to elected sub-national authorities. These trends recognise the need for vertical coordinating mechanisms which reconcile variations across sub-national administrative units in capacity, finances, and political influence. It also means that global and regional commitments on climate change and food security need to be balanced by continuing decentralisation processes which aim to prioritise local citizens' needs and priorities.

- ***Adopting the principle of not allowing current crises to prejudice long-term goals.*** As mentioned above, LMICs are now subject to successive crises. In the Horn of Africa, for example, food systems are still being affected by the multiple effects of the COVID-19 pandemic, large rises in the costs of agriculture inputs (notably energy and fertiliser) due to the conflict in Ukraine,[30] and disruption due to local conflict, as well as drought and plagues of locusts. Added to this is a growing debt crisis.

Box 3. Use trade policy levers more effectively to support sustainable, healthy diets[3,41]

Trade mechanisms have not been traditionally designed for diet-related goals. While this has been a missed opportunity in the past, trade presents multiple opportunities for the future.

Several instruments can help shift the mix and relative prices of foods available domestically, including formal trade agreements, appropriate tariffs, and food safety regulations. Regional strategies, such as Africa's Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods, should be encouraged.

Politically viable conclusions should be pursued on outstanding issues concerning multilateral agriculture and food trade agreements. Binding commitments should be made for resolving and avoiding future bilateral impediments to effective trade flows (and retaliatory measures). Where possible, restrictions to trade flows should be strongly resisted at times of food-price volatility and stress in supply chains.

Governments should also resist the imposition of export restrictions at times of sharp food-price spikes. Instead, they should consider lowering tariffs and Value Added Tax to encourage trade flows.

Under such circumstances, it is understandable that countries often divert their focus to crisis management. In doing so, it is important to adhere to some core principles. The first is not to take short-term actions which would close off options for delivering on long-term targets of food system transformation, or which would impede progress at a later date. The second is to have a plan for the long-term targets, and seek to resume progress at the earliest opportunity. The third is to build strengthened resilience into the transition steps for longer-term transformation.

- ***Changing attitudes to the informal food sector.***[3] Informal food markets play an important role in providing diverse food products and crucial livelihood opportunities, as well as nutritious foods in both rural and urban settings. Many urban poor, in particular, lack the time or cooking facilities to prepare their own meals.[11] However, too often the informal sector is poorly tolerated by public authorities, or is penalised, rather than being supported. Taking a more positive attitude to support the informal food sector could provide substantial benefits in urban settings. Basic support for toilets and hand washing would be a relatively low-cost way to improve food safety and public health. Better regulation of the sale of bushmeat and handling of live animals could also help prevent the risk of emerging zoonotic diseases.

- ***Committing to use the best available science and evidence to forge more effective and more coherent roadmaps for the food system transition – at sub-national, national and global scales.*** Being guided by science and evidence will help ensure limited resources are used to best advantage. And it will give confidence to policy makers in LMICs to act boldly and incisively, particularly where the necessary measures are controversial, or opposed by powerful vested interests. The widest possible use of science and evidence should be adopted to inform decisions throughout the food system – for example, relating to geopolitics, demography, technology, behavioural sciences, and environmental science.

  One specific action would be to ensure that the country's food-based dietary guidelines are updated to embody the best science and evidence, and take account of new concerns, for example on the environment and climate change. There also needs to be a commitment to use those updated guidelines, not just to inform consumer choices, but also to guide policy development across relevant parts of government.

3.2 Repurposing and leveraging governmental resources – within and beyond food systems

While repurposing governmental resources to support food system transformation offers considerable potential, it may involve trade-offs which need to be anticipated and resolved. (For example, The State of Food Security and Nutrition in the World (SOFI) 2022 explores the implications of moving subsidies from producers to consumers).[44] With that caveat, an obvious starting point for accessing governmental resources for food system transformation lies in the agriculture sector itself.

- ***Repurposing support for food production and food systems more generally.*** Support provided to farmers is currently heavily biased towards measures which are distorting (thus leading to inefficiency), unequally distributed, and harmful to both human health and the environment.[12] Research commissioned by the Global Panel and others has shown that repurposing these measures in favour of foods with lower environmental footprints and higher nutritional value could engender better outcomes in terms of nutritional health, environmental outcomes, and economic growth – all at effectively zero cost to governments. However, such reforms need to be undertaken sensitively to manage possible trade-offs.[13] More generally, the repurposed support needs to be redeployed right across food systems. Agriculture is but one component of the food system – albeit an important one – which stretches beyond the farm gate to cover transport, processing, packaging, storage and retail. All parts of food systems need to work in concert (see Box 4).

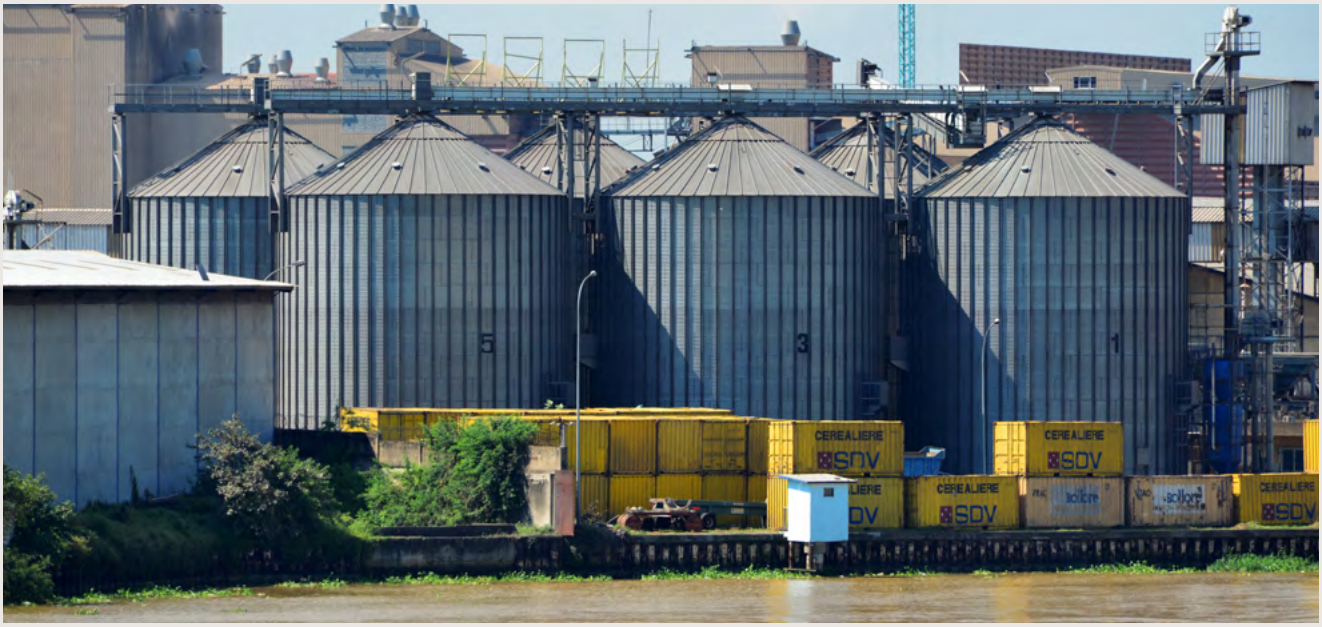
This measure offers considerable potential in view of the size of the subsidies involved, although the level of existing subsidies differs markedly between countries. Support provided to agricultural producers currently accounts for almost US$ 540 billion per year, or 15% of total agricultural production value globally:[12] about US$ 294 billion is provided as price incentives and around US$ 245 billion as fiscal subsidies to farmers. These figures could increase to almost US$ 1.8 trillion in 2030 under a business-as-usual scenario.

It was also argued in Section 2 that diverse parts of government (beyond those concerned with agriculture and food systems) stood to benefit from the transformation of food systems, since the goal of sustainable and healthy diets would contribute to their own policy agendas.[12] Recognising such common interests opens up the possibility of working with other parts of government to realign some of their existing resources in favour of food system transformation – at no net additional cost. The following include examples of benefits which could accrue.

Box 4. A strategy to repurpose support for the agriculture sector

The FAO has proposed the following six steps governments can follow:[12]

- Estimating the support already provided;
- Identifying and estimating the impact of the support provided;
- Designing the approach for repurposing agricultural producer support, including identifying needed reforms;
- Estimating the future impact of the repurposing strategy;
- Reviewing and refining the repurposing strategy, prior to implementation; and
- Monitoring the outcomes of the new agricultural producer support.



- ***Leveraging public-sector food purchases.***[3] Governments typically buy substantial amounts of food for use in institutional settings such as schools, hospitals, the military, prisons and canteens for public-sector workers. Increased demand arising from procurement would encourage increases in the production and processing of nutrient-rich foods. Enhanced nutrition in schools would promote better health in children and reduce healthcare costs, while acting to raise educational outcomes. Better nutrition for workers would also act to raise economic productivity. Environmental gains could also be made, if emphasis was given to promoting consumption of nutrient-rich foods with relatively low environmental footprints.

- ***Embedding nutrition into strategies for improving health and wellbeing***. Undernutrition, including child stunting and wasting and micronutrient deficiencies, can affect physical and mental development, as well as health, through life. The rising levels of overweight and obesity are also leading to an epidemic of non-communicable diseases, such as diabetes and cardiovascular disease, and placing health systems under increasing pressure. Taking diabetes as an example, approximately 80% of the 463 million adults living with diabetes worldwide are in LMICs.[14] The absolute global economic burden of diabetes could increase from US$ 1.3 trillion in 2015 to more than US$ 2 trillion by 2030.[15]

There is a strong case for health ministries to support food system transformation insofar as this will target health outcomes. Examples might include: mounting a campaign to promote the use of food-based dietary guidelines in the population; public information campaigns to persuade people to choose more nutritious foods; and novel ways to promote the consumption of healthy diets, for example via social media, enlisting the support of social media influencers and celebrities, and through animated TV series for children.

- ***Rebalancing research (national and international)***. Public agricultural research and development should be rebalanced from a narrow focus on commodities to one that favours a food systems focus – research relating to food production needs to be balanced by research on post-farmgate parts of the food system and focusing on nutrient-rich foods. One aim would be to find solutions that deliver universal access to affordable healthy diets. Another would be to ensure that all parts of food chains are coherent, rather than supporting improvements in one narrow (albeit important) aspect.

Specific priorities include:

- Actions that would increase the supply of nutrient-rich foods through sustainable and resilient farming systems.[3]
- Research into 'what works' in terms of delivering food system transformation aimed at delivering of the multiple targets embedded in the '1.5+' agenda (which addresses climate change alongside challenges associated with other planetary boundaries). [4] This research needs to be context-specific, recognising that individual countries face different challenges and constraints, and may need to resolve different trade-offs.
- Research to identify the most effective ways to influence dietary choices of consumers in LMIC settings.[16]

Box 5. Regulation of the marketing of ultra-processed foods to children – an opportunity to improve child nutrition in LMICs[34]

According to the Global Food Research Program (2022), Peru, Mexico and Turkey remain the only middle-income countries that regulate the marketing of ultra-processed food to children. No low-income countries currently do so. This is despite compelling evidence showing that self-regulation of such marketing by businesses in the food sector is very ineffective.

3.3 Leveraging food industry and business resources

Influencing the behaviour of business offers the opportunity to leverage very substantial resources – the global food system is projected to grow from US$ 2.5 trillion in 2022, to nearly US$ 5.2 trillion by 2029.[17] However, this should not just be seen as an opportunity but also as a necessity. There remain deep rooted tensions between the business models operating today within the food system, and the changes that are necessary in food systems – relating to the provision of healthy, affordable diets, and the sustainable production of food. Unless addressed, these tensions will constitute an unacceptable inhibitor to the transformation of food systems.

Box 6. A low-cost solution for reducing cassava losses in Nigeria[32]

Post-harvest physical deterioration of fresh cassava has long been a major issue for smallholder producers in cassava value chains where up to 40% of the crop has been lost to spoilage. Following a global competition run by the Rockefeller Foundation, Natural Resources Institute (NRI) and its partner the Federal University of Agriculture, Abeokuta, a simple bag was devised which helps manage cassava from farm to factory. The NRICassavaBag has been developed and tested in the field in Nigeria and proven to be effective at maintaining root quality for at least eight days at a minimum cost. This bag has the potential to benefit to nearly 30 million smallholder farmers in Nigeria alone.

Businesses are increasingly voicing their commitment to change, as evidenced at the UNFSS[18] and more recently in COP27.[19,20] However, the private sector needs to be held to account on those commitments – past evidence for action in the absence of regulation is mixed, at best.[3] For example, large food companies continue to focus too much of their business on ultra-processed foods. Businesses in the food sector should be encouraged – or compelled – to publish progress towards clear and meaningful targets. That needs to be a key consideration as governments weigh the balance they should strike between incentives and regulation, for example in areas such as marketing of ultra-processed foods to consumers in general, and children in particular (see Box 5).

Some countries are already calling for greater coherence between the public and private sectors – for example, Ethiopia, Rwanda, and Bangladesh in their food system pathway documents produced for the 2021 UN Food Systems Summit. These need to be built upon. In developing a new working relationship between government and the private sector, clear principles of engagement between the two parties should be defined and agreed. These should set out the expectations placed on the private sector in promoting sustainable, healthy diets, and reducing the current emphasis on foods which are affecting people's health.[3]

There are, however, many instances where the interests of businesses coincide with the need to transform food systems to be more efficient, productive, resilient and sustainable (see, for example, Boxes 6 and 7). Governments should consider how the development of these kinds of innovations might be encouraged, and how they might help in their roll-out at scale. More generally, there is considerable scope to encourage innovations in much wider fields beyond agriculture, such as in IT, education (including video and remote opportunities), and the development and spread of renewable energies.

3.4 Harnessing the power of consumers

- ***Using policy-based behavioural nudges to influence dietary choices.***[29] Influencing consumers to make better food choices and to reduce waste is relatively low-cost for governments but can also be a potentially powerful way to drive change in businesses involved in the food system – towards delivering affordable foods which are nutrient rich, have lower carbon

Box 7. Leveraging mobile phones in Uganda to strengthen the resilience of food systems[33]

Mobile operators and the Ugandan National Meteorological Authority have been brought together in association with the Trans African Hydro-Meteorological Observatory to provide low-cost, on-demand early warning alerts for severe weather. This system is benefiting local communities and vulnerable agriculturists across Uganda, particularly in the drought-prone Cattle Corridor, the accident-prone areas of Lake Victoria, Kyoga, and Wamala, and Uganda's flash flood-prone highlands. The system provides weather alerts to more than 16 million Ugandan mobile phone users, and free access to eight million Airtel subscribers.

footprints, and are more environmentally sustainable. It has been estimated that a shift towards healthy diets from sustainable food systems would help reduce health and climate change costs by up to US$ 1.3 trillion globally.[24] The resulting dietary improvements can also contribute to much wider benefits – notably in terms of better population health, more productive workforces, lower healthcare costs, higher educational attainment, and equality.

While most 'behavioural nudges' have so far been pursued in middle- and high-income settings, there is an opportunity to realise benefits in resource-poor countries facing multiple burdens of malnutrition. However, while such avenues of action are promising, there remains almost no empirical evidence of successful interventions in LMIC settings. This is an important information gap which needs to be filled (see Section 3.2).

Examples of specific actions include: public advertisement campaigns to convince people that obesity is as large a threat to health as cancer (UK); encouraging less food waste, and greater fruit and vegetable consumption by offering imperfect perishable foods in supermarkets (France, Canada); initiatives to improve food package labelling (Chile); and requiring full-service restaurants to include nutrient and environmental facts on menus. Promoting the use of up-to-date food-based dietary guidelines and improving the nutritional quality of foods supplied in institutional settings (for example, schools) would also act as behavioural nudges.[3]

A more assertive form of intervention would be to use consumer-level taxes and subsidies on key food categories. The aim would be to shift relative prices in favour of nutrient-rich foods needed in healthy diets, and away from foods that are less nutritious, such as those that are ultra-processed.

Reducing food loss and waste.[3] One-third of the food produced in the world is lost or wasted.[48] This means having to grow the same food again, with all the implications for economic inefficiency and the waste of environmental resources. Reducing food loss and waste would also mean that fewer nutrients would be wasted. Food waste is concentrated in the home and occurs mostly in HICs.[21] However, this measure may nevertheless be worth considering in LMICs.

In contrast, food losses in the food chain may be large in LMICs.[3] While some actions to reduce food losses are likely to be cash intensive (for example, investing in cold chains), other are less so. One example concerns encouraging and establishing circular loops that repurpose wasted food as valuable products within the food chain. An example here is InsectiPro, a Kenyan firm which is turning damaged fruit and vegetables from Nairobi markets into animal protein (see Box 8). Another example concerns better planning to ensure full, rather than partial, use of refrigerated facilities.

Box 8. InsectiPro – converting food waste into animal protein[22]

InsectiPro is a Kenyan start-up business which rears black soldier fly larvae for animal feed. In the 10 days it takes for them to grow, the larvae need to be fed, and fruit waste from factories and food markets in the capital, Nairobi, provides an ideal feed. In effect, the business turns green waste from Nairobi into high-value animal protein. The farm processes around 20 to 30 tonnes per day of fruit waste and produces 2 to 2.5 tonnes of larvae, which are then dried and turned into animal feed. Any remaining waste is used as manure, some of it on their own farm, and the rest is sold to neighbouring farms.

3.5 Improving LMIC access to finance to catalyse transformation

- ***All development partners should redouble their efforts to work together to press for increased international finance for climate change adaptation and countering biodiversity loss.*** In the case of climate change adaptation, it has been estimated that an additional US $4.6 billion per year is needed for Ethiopia alone to fund measures aimed at achieving a transformation to deliver a sustainable food system, with more needed to build resilience for the longer term.[23] HICs have already committed to provide US$ 100 billion per year to LMICs for climate change mitigation and adaptation. Although a substantial amount, this remains a fraction of what is required, and the fund is still under-delivering by around US$ 17 billion each year.[24] There is therefore a clear case for LMICs to press for existing commitments to be honoured, and the total amount for climate change adaptation for LMICs to be substantially increased. More funding is essential, not least as the global temperature rise is projected to exceed 1.5°C within a few years, with potentially devastating consequences for food systems in some countries.

  In the case of biodiversity, the COP15 Biological Diversity Convention has a target to mobilise, by 2030, of at least US$ 200 billion per year in domestic and international biodiversity-related funding from all sources – public and private. It also aims to increase total biodiversity-related international financial resources from developed countries to developing countries, as well as countries with economies in transition, to at least US$ 20 billion per year by 2025, and to at least US$ 30 billion per year by 2030[17,25] However, these figures remain small compared to an estimate of the overall biodiversity finance gap, estimated at US$ 700 billion per year.[35]

- ***Encouraging banks and other financial institutions to rethink how they finance food system innovations***. This concerns the reconsideration of conventional approaches which focus on collateral, physical plant investments, and financial accountability, and moving towards shared risk and reward, ease of access to finance for start-ups, and a shift in focus from the agriculture sector to value chain participants in the food system.

- ***Using innovations to promote better access to finance for women farmers, with the aim of addressing discriminatory practices that prevail in many contexts***.[26] Possible actions include: i) leveraging the strong role played by rural village loan and savings associations to strengthen the financial inclusion of women smallholder farmers, ii) encouraging digital financial products and services which are designed from a gender and intrahousehold perspective, and iii) leveraging existing digital financial service providers so that they better target women smallholder farmers.

  Discriminatory legal frameworks, norms, and practices affecting women should be addressed. These have been documented as a key constraint to women's financial inclusion and economic participation, and act as a brake on innovation and entrepreneurship within food systems. In one study it was found that, on average, women have just three-quarters of the legal rights afforded to men. Women's limited property rights, in particular, can substantially affect their ability to offer collateral for loans.[27,28]

- ***LMICs working together to persuade the donor community to rebalance some of its investments to support food system transformation***. Such a shift in donor funding would produce substantial gains, as the goal is critical for delivery of so many policy agendas embodied in the Sustainable Development Goals which relate to hunger; poverty and growth; equity; health and wellbeing; climate change; and the environment.[4]

- ***Establishing linkages with the World Bank and other multilateral agencies to collaborate on modifying international poverty line and purchasing power parity calculations***.[3] The aim would be to update the calculation of national poverty lines in ways that pay attention to the affordability of healthy diets, as recommended by national guidelines and based on current national food prices. The new (higher) poverty thresholds would be used to enhance the value of income and other resource transfers through safety nets, minimum wages, and pro-poor growth policies to ensure that millions more people can afford at least minimally adequate diets.

- ***Making better use of available financial assessment tools***. For example, the 3FS tool, co-developed by IFAD and the World Bank, seeks to provide governments, donors and stakeholders with much-needed evidence for smart investment decisions.[45] It helps to answer questions such as how much financing goes towards the food system. A report being led by IFAD on financing flows for food systems, and an excellent model and tracking system launched at the recent UNFSS +2 Stocktaking Moment in Rome are both valuable and timely resources for policy makers.[46] The latter considers questions concerning, for example, which parts of the food system are being financed and whether or not finance targets the areas and people most in need of food systems transformation.

4. Conclusions

Most LMICs are facing significant financial constraints which limit their ability to take the necessary steps to deliver their commitments on food system transformation. This brief has sought to demonstrate that much can still be achieved at little or no cost to governments as part of the overall effort to transform food systems which will require very substantial investment both on the demand and supply side.Three comments are particularly worthy of note.

First, many actions are possible which are cost-neutral or low cost. Moreover, some of these have the potential to leverage very substantial amounts of finance and resources in either the public and private sectors – in some instances amounting to many billions in dollar terms.

Second, a number of the suggested actions have the potential for multiple gains, either by helping to deliver in more than one quadrant of the food system shown in Figure 1 (these are: availability, accessibility, affordability and desirability) or by delivering on more than one policy agenda (for example health, the environment, climate change, jobs and growth, and equity).

Third, cost-neutral and low-cost actions need to be considered at different scales. At one end of the spectrum there is considerable potential for LMICs to work together to press for international finance to help them adapt their food systems to climate change and other environmental threats. But at the other, there are opportunities to devolve certain powers to sub-national bodies.

Leadership from the highest levels of government will be essential to drive forward many of the actions suggested in this brief, not least to ensure that government departments and agencies at national and local levels that need to work in concert are incentivised and empowered to do so. With that support and direction, policy makers in LMICs (and HICs) can drive substantial progress in transforming their food systems despite financial constraints. Together, these will form an important component of a broad and coherent strategy for change.

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Support from funders of the Global Panel on Agriculture and Food Systems for Nutrition is gratefully acknowledged

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