

ESG

Food security: environmental meets social

18 May 2022

Key talking points

- Food security is becoming an ESG issue given current geopolitics and climate change risks.
- Lack of food security can lead to higher prices, acute shortages and ultimately social unrest.
- Over 2 billion people face food insecurity. What can be done? We need to cut food waste near term and engage government policy and advance planning solutions for the longer term.

Food security: where environmental and social collide

ESG increasingly sees environmental concerns intersecting with social issues. As a case in point, food security becomes even more urgent when considered against the backdrop of a warming world. Lack of food security can lead to higher prices, acute shortages, and ultimately social unrest. Everyone will be affected but emerging market countries will be impacted the most. Furthermore, the war in Ukraine will likely disrupt already tight agricultural markets. Russia and Ukraine together are responsible for about 25% of the world's wheat exports, 65% of sunflower oil exports, 20% of barley and 18% of corn. Agricultural food prices jumped 36.6% yoy in March after rising 28% in 2021 (World Bank).

Did you know?

- One-third of food produced for human consumption is wasted annually.¹ (Friends of the Earth)
- Over one-third of greenhouse gas emissions come from food systems, including production, distribution and consumption.²
- Food is the No.1 item in America's landfills.³
- The food system is expected to account for most of the carbon budget for a 2 degree temperature increase by 2050. Climate change will alter what can be grown and where, while also increasing extreme weather patterns and affecting the spread of pests and disease. This could lead to food production shocks, food price spikes, food security crises and potential civil unrest.⁴
- Agriculture globally uses about 70% of all fresh water, produces around 1/3 of all greenhouse gas emissions, and can lead to biodiversity loss and soil degradation.⁴
- About one-third of the world's grain is fed to farm animals. If this were fed to people instead, it could feed an extra 4 billion people.¹
- One in three people suffers from some form of malnutrition. This includes hunger, undernutrition and obesity. Poor diets are the most significant cause of global disease.⁴
- Close to 12% of the global population was severely food insecure in 2020, representing about 928mn people – this is 148mn more than in 2019.⁵

Sources: 1 - Friends of the Earth, 2 - United Nations, 3 - US EPA, 4 - Global Food Security UK, 5 - Food and Agriculture Organization of the United Nations (FAO).

Over 2 billion people affected by food insecurity

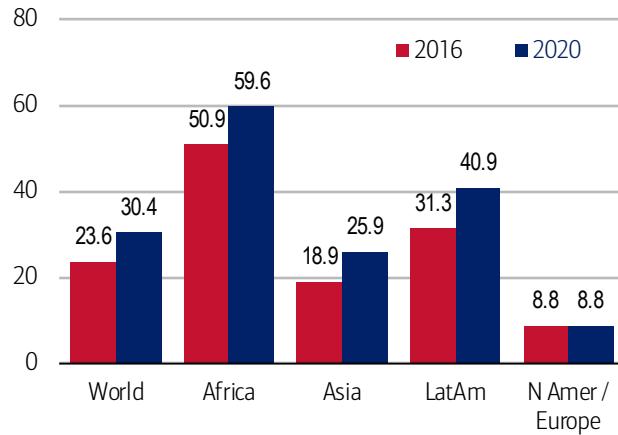
At a time when we talk about driverless cars and virtual reality headsets, it's hard to believe that over 2 billion people face regular food security issues. Over 800 million people around the globe face hunger on a daily basis. Plus, more than 1.4 billion additional people lack vital micronutrients, affecting their health and life expectancy. The Food & Agriculture Organization (FAO) of the United Nations estimates that the pandemic increased incidence of hunger and lack of access to adequate food by close to 500mn people from 2019 to 2020 alone. Reasons include rising cost of healthy diets, income inequality and persistent levels of poverty.

Food security occurs when an entire population can access sufficient safe and nutritious food to meet their needs for a healthy life. Regionally, consumers facing severe food insecurity are found mainly in Asia (471mn) and Africa (347mn) – and the proportions have risen since 2016. Another 728mn Asians and 452mn Africans face moderate food insecurity (which can increase the risk of malnutrition – such as stunting in children – or micronutrient deficiencies in adults).

Many low income economies were facing inflation above 20% in Sept 2021. In fact, 22% of the world faced food price inflation >10% at that time. After covid, the war in Ukraine poses a new and serious threat to the worldwide food supply, although Ukraine is not the only challenge to food security.

Exhibit 1: Prevalence of moderate or severe food insecurity (% of pop.)

Food insecurity has increased in Africa, Asia and LatAm



Source: Haver, World Bank

Exhibit 2: Share of countries recording food price inflation > 10%

Food inflation has been increasing since 2019 – pre-covid



Source: FAO. Latest data point as of September 2021

Grain in Ukraine: war = whiplash for the food supply chain

Ukraine is a country of just over 40mn people that produces food for 400mn. Fully 26 different countries get over half of their wheat from Russia and Ukraine (UN World Food Programme). Russia is also the largest exporter of fertilizers, including 23% of global ammonia exports, 14% of urea and 10% of processed phosphorus and 21% of potash exports (The Fertilizer Institute). Major buyers include Brazil, China, the US and India.

Spring planting season is currently underway in Ukraine, but the war will likely diminish the acreage planted. Ukrainian farmers are unable to access short-term financing that would normally pay for seeds and inputs. Fields are inaccessible, labor is scarce, and equipment and storage facilities have been destroyed, particularly in the western part of the country. Ukraine's Black Sea ports are closed, and freight rates for non-Ukrainian ports have skyrocketed.

Rising fertilizer costs could also contribute to lower crop yields and higher food costs. Western sanctions on Russia have disrupted shipments. In the US, fertilizer bills are expected to jump 12% in 2022 after rising 17% in 2021 (USDA). This could cause growers to plant fewer acres or switch to less fertilizer-intensive crops.

Farmers in less wealthy nations may find themselves with fewer financial resources and fewer options for weathering the storm. Lower food production will likely contribute to higher food costs – and already has in many locations. It's unclear how long the conflict will last, but McKinsey has run scenarios that see 19-34mn tons of export production disappearing in 2022 from Russia and Ukraine alone. This could mean 10-43mn tons of lost production in 2023 (Russia/Ukraine only) – this represents caloric intake for 60-150mn people.

Exhibit 3: Share of Russia & Ukraine in global imports of wheat

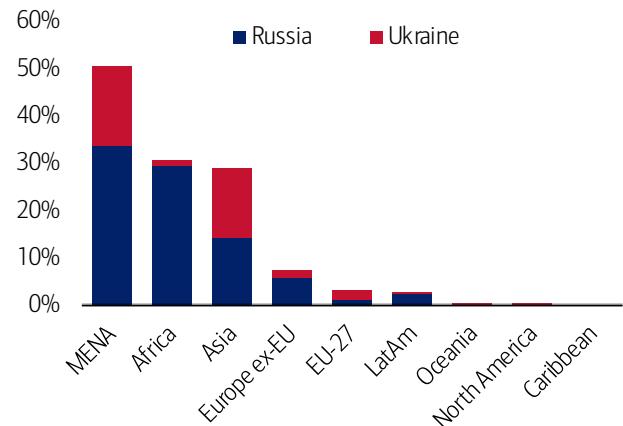
25%-30% of global imports of wheat come from Russia and Ukraine



Source: FAO

Exhibit 4: Who depends on Russia/Ukraine for wheat imports?

MENA, Africa and Asia are heavily dependent on Russia/Ukraine for wheat



Source: FAO. Data as of 2020. Share of Russia & Ukraine in total imports (volumes) of wheat by region. MENA: Middle-East & North Africa.

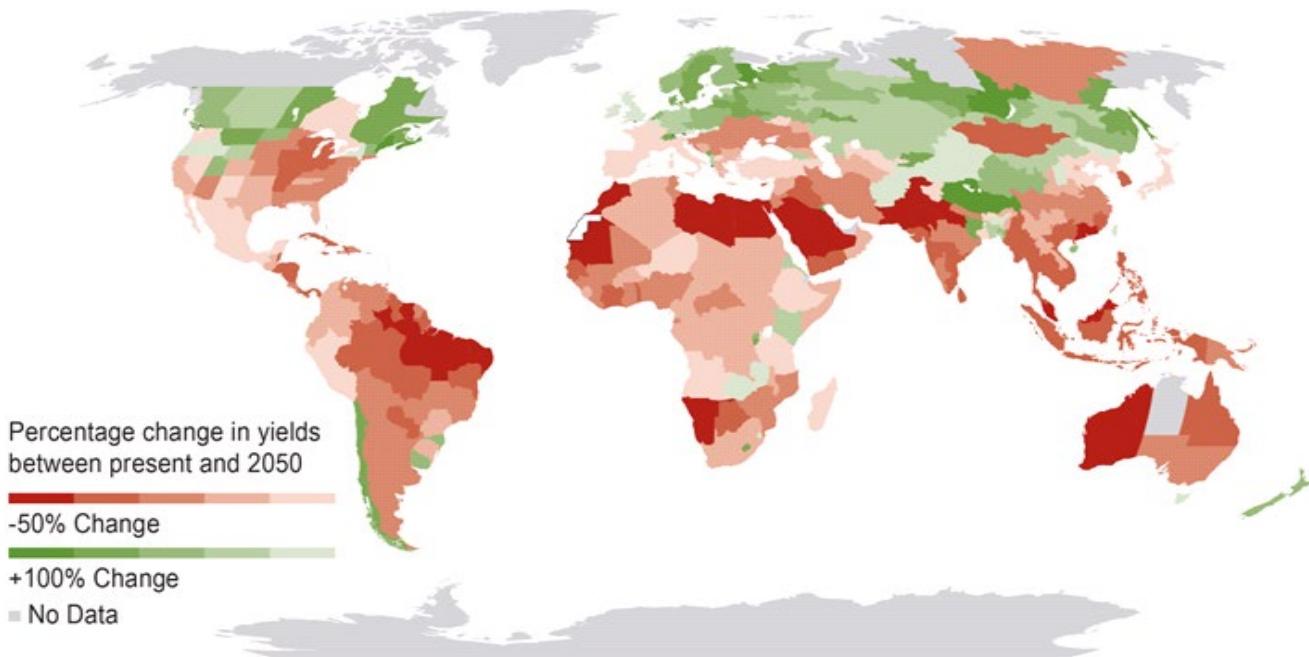
Climate change is increasing temperatures unevenly around the globe

Higher temperatures and changed or unpredictable rainfall patterns make farming more difficult. This is particularly true in more marginal growing areas and/or for farmers who are already struggling to survive.

The concentration of crop production into regional and local breadbaskets makes food production more vulnerable to extreme weather events. For 8 of the first 15 years this century, global grain consumption outpaced grain production due to droughts in key breadbasket regions worldwide (source: NOAA's Center for Satellite Applications and Research).

Exhibit 5: Impact on crop yields of a 3°C rise in temperatures

A 3 degree temperature increase has a huge impact on where crops can be grown in the future



Source: WRI report, Creating a Sustainable Food Future

Loss of farmland due to soil degradation, erosion, development – and biofuels

The UN reports that 120mn hectares (300mn acres) of natural habitats will be converted to farmland in developing countries by 2050. At the same time, the UN also sees a loss of 1.6-3.3mn hectares (4-8mn acres) of prime agricultural land annually in 2000-2030 due to urbanization. Yet agricultural land in use often fails to produce to its full potential. A study by Paul West in the

magazine Science showed that yields are up to 50% lower than what is possible. Closing this gap – rather than clearing additional land – could feed up to 850mn people.

A third of the world's soil is moderately to highly degraded, which affects food supply and increases carbon emissions. This degradation is the result of factors including industrial farming, deforestation, over-grazing and global warming. Soil degradation increases the risk of flooding, as soils lacking in organic matter cannot absorb and retain water effectively.

Urban development of fertile agricultural land results in a permanent loss of arable land, which has an outsized impact on subsequent crop production. This happens as urban sprawl pushes farmers to cultivate less productive land – land that is 'still available' rather than prime agricultural land.

Biofuel production competes for food production for natural and agricultural resources because its main feedstock is agricultural product. Increasing biofuel production will therefore impact world agricultural commodity prices. The pandemic obscured the impact of rising global biofuel mandates on food and energy due to collapsing transportation fuel demand and prices. More recently, global mobility has been normalizing, and the pressure from biofuel demand on the agriculture market has become clearer and is contributing to the rise in grain, oilseed, and food prices. Biofuel demand is expected to hit a new record this year, unless more countries start to dial back blending mandates. The US, which consumes more than 1mn b/d of biofuels, should use around 140mn mt of corn this year for its ethanol production, or about 5x the size of Ukraine's corn exports (S&P Global Platts).

Water stress – competition for water is increasing with population growth, urbanization and climate change

Irrigation accounts for about 70% of global water withdrawals and up to 90% of water consumption (P West). Only about 20% of cultivated land is irrigated, although this land contributes about 40% of the total food produced globally. Competition for water resources is increasing with population growth, urbanization, and climate change. The World Bank estimates that agricultural production will have to expand by about 70% by 2050. Future demand for water (from all sectors) will require 25-40% of water to be re-allocated from lower to higher productivity area. Much of this re-allocation will have to come from agriculture given its high proportion of water use.

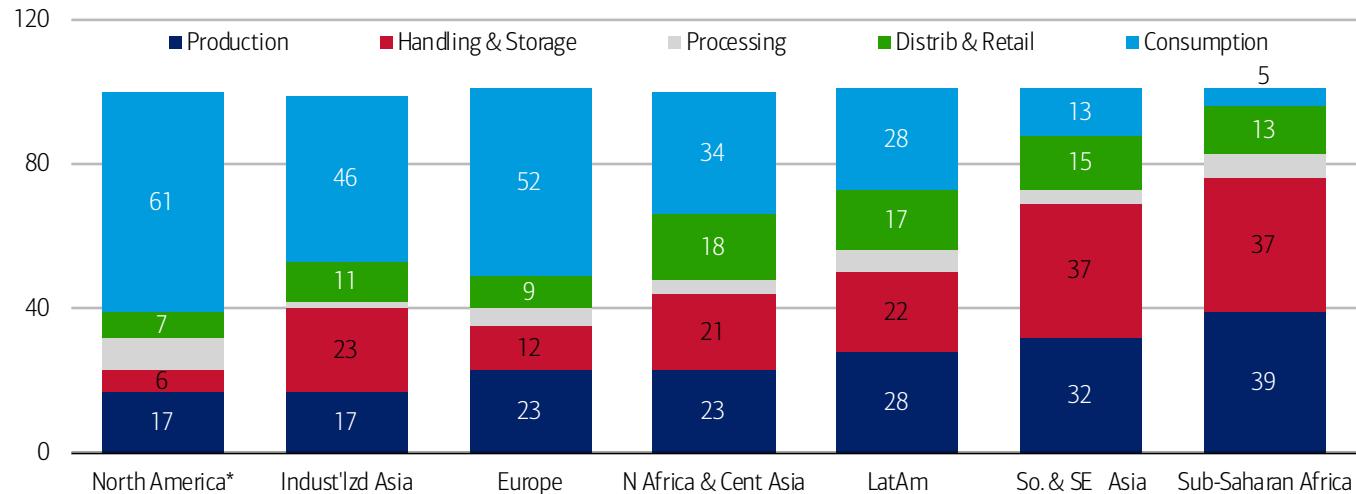
First step for food security: cut food waste

There is enough food produced globally to feed everyone. If just 25% of the food currently lost or wasted globally was used, it could feed almost 900mn hungry people. Wasted or lost food costs the global economy over \$1 trillion annually. (FAO)

Growing food that is ultimately not consumed uses a land mass larger than China – annually. This land also accounts for 25% of all fresh water consumption globally (Olio). Food waste occurs at all steps in the value chain, but there are telling regional differences. In more developed countries, the lower relative cost of food increases the incentive to waste. Food is abandoned for cosmetic reasons, such as odd shapes or sizes that don't meet regulatory requirements. Up to 40% of fruit and vegetable crops are discarded for being 'ugly' or misshapen (Too Good to Go). Large portion sizes contribute to food loss in the hospitality sector. In less developed parts of the world, more food is lost in the production phase, or due to lack of infrastructure to move it to market effectively or to keep food fresh.

Exhibit 6: Where in the value chain food loss occurs varies by region

Shown in % of calories lost or wasted – developed countries see more waste at the consumption stage



*Includes Oceania. Source: WRI report, *Creating a Sustainable Food Future*

It should be possible to reduce food waste by bringing improved production and storage techniques to developing countries and launching initiatives to reduce waste at the consumption level in developed countries. Growing more food on an existing land base limits pressure on natural ecosystems; reducing food waste would save on water usage, labor and greenhouse gas emissions. Scientists are exploring ways to increase land productivity, including 1) more efficient use of fertilizers and pesticides, 2) improved irrigation and encouraging crops that use less water, 3) targeting food for direct consumption (rather than animal feed, for instance), 4) reducing food waste. Here are just a few examples of improvements:

- The UK launched a successful campaign to reduce food waste in 2007: by 2012, household food waste was down 21%, for a national reduction in total food waste of 14%. The UK has since become the first country to get halfway to its 2030 target of a 50% reduction in food waste.
- In Senegal, moving from hand threshing of rice to a mechanized threshing tool in the late 1990s reduced losses from 35% at harvest to just 1%.
- In developing countries, limited refrigeration and food processing lead to large storage losses, yet innovative, cheap alternative storage systems provide powerful technical options to reduce handling and storage losses.

Food waste is closely linked to UN Sustainable Development Goal (SDG) 12 – Responsible Consumption and Production. The World Resources Institute has identified various approaches that show the most promise for near-term gains across the food system value chain.

Exhibit 7: A wide range of approaches could reduce food loss and waste (not exhaustive)

Improvements at any stage of the value chain could reduce food waste, saving food, but also energy, water, labor, and emissions

Production	Handling & Storage	Processing & Packaging	Distribution & Retail	Consumption
During or immediately after harvest	After leaving the farm for handling, storage & transport	During industrial or domestic processing / packaging	During distribution to wholesale / retail markets	In the home or business, incl restaurants / caterers
<ul style="list-style-type: none"> Improve harvesting techniques Improve access to infrastructure & markets Convert unmarketable crops into value added products Improve agriculture extension services 	<ul style="list-style-type: none"> Improve storage technologies Introduce energy-efficient, low-carbon cold chains Improve handling to reduce damage Improve infrastructure (roads, electricity access, etc) 	<ul style="list-style-type: none"> Improve supply chain management Improve packaging to keep food fresher for longer, optimize portion size Re-process or re-package food not meeting specifications Re-engineer manufacturing processes 	<ul style="list-style-type: none"> Change food date labelling practices Amend cosmetic standards to facilitate selling imperfect foods (due to shapes or blemishes, etc) Provide guidance on food storage and preparation Review promotions policies 	<ul style="list-style-type: none"> Reduce portion sizes Conduct consumer education campaigns (general public, schools, hospitality) Improve consumer cooking skills Consumer imperfect produce
Improve forecasting and ordering				
Facilitate increased donation of unsold food				
Increase financing for innovation and scaling of promising technologies				
Create partnerships to manage seasonal variability (bumper crops, etc)				
Increase capacity building to accelerate transfer of best practices				

Source: WRI report, *Creating a Sustainable Food Future*, Hanson & Mitchell (2017)

Longer term responses to food insecurity

No single action will solve the food waste challenge, and some improvements require longer term, large-scale infrastructure development. Changes in technology, policy, and consumer behavior are all needed. In addition, governments need to address food security in the longer term with advance planning, budget measures and policies for SDGs #1 (Zero Poverty) and #2 (Zero Hunger). The 2021 edition of the UN report, *The State of Food Security and Nutrition in the World*, contains six recommendations for increasing food security including lowering the cost of a healthy diet, scaling up climate resilience in food systems, tackling poverty and structural inequalities, and changing consumer behaviour.

Development & peace-building efforts in conflict areas

The majority of the chronically food insecure and malnourished live in countries impacted by insecurity and conflict. The UN highlights the need for policies address reductions in immediate food insecurity as well as conflict mitigation. Conflict disrupts food systems, as we've discussed in the context of the invasion of Ukraine, and may also disrupt clean water, quality health services and sanitation.

Development efforts in conflict-ridden areas need to emphasize sustained positive change, or moving populations away from a future need for humanitarian intervention. This may happen in tandem with emergency food assistance programs, but it should also address development of sustainable livelihoods, consistent access to food systems and improved nutrition. The agriculture sector can serve as a driver.

Exhibit 8: Key policy areas and goals for integrating humanitarian, development and peace-building efforts in conflict-affected areas (not exhaustive)

Policies need to target sustained positive changes that reduce the need for future intervention

Policy area	Goals
Peacebuilding efforts linked to livelihood support	<ul style="list-style-type: none">➤ Ensure that conflict-sensitive policies and actions at a minimum do no harm.➤ Reduce/avoid conflict over access to and use of natural resources, while maintaining productive capacity.➤ Prevent destructive coping mechanisms (sale of assets).➤ Meet immediate food security and nutrition needs.
Nutrition-sensitive social protection and food production and supply programmes	<ul style="list-style-type: none">➤ Livelihood support and social protection measures to ensure food security and nutrition and a robust recovery.
Maintaining key functions of food supply chains	<ul style="list-style-type: none">➤ Re-engage smallholders, both during and in the aftermath of conflicts, to ensure a rapid stabilization of food supply for own consumption and commercialization.
Community-based approaches in post-conflict policies	<ul style="list-style-type: none">➤ Foster trust and social cohesion for reduced uncertainties, reinforced positive aspirations and improved well-being.

Source: FAO, State of Food Security and Nutrition in the World 2021, IFAD, UNICEF, WFP & WHO. 2017

Scaling up climate resilience across food systems

Agriculture as we know it today won't be as successful in a warmer world. Adaptation of crops, including more drought-resistant strains of seeds, for example, will be just one change demanded. In some regions, crops grown will have to change altogether in response to warmer and/or drier climates. Where seawater inundation raises the salinity in water sources, rice production may shift toward aquaculture.

Climate change will also bring new technologies and methods to agriculture. For example, in India, low-cost plastic greenhouses protect produce from more severe storms. These 'polyhouses' also enable cultivation of a wider range of vegetables and facilitate more efficient water usage.

Governments will need to plan for climate change and integrate adaptation research into policies, budgets and funding plans. This will mean encouraging changes in types of crops to pursue (or reduce), what production systems may need relocating (and where), and creating incentives to facilitate investments.

Exhibit 9: Key policy areas and goals for scaling up climate resilience across food systems

Governments and policymakers need to undertake climate-adaptation planning well in advance

Policy area	Goals
Reducing climate-related risk and adapting to climate change	<ul style="list-style-type: none">➤ Increase resilience to climate events along the entire food supply chain to fewer disruptions in food production and supply.➤ Protect smallholders against climate events that could affect their livelihoods, including through climate risk insurance.➤ Create an enabling environment for promoting sustainable investments in agriculture.
Establishing climate risk monitoring and early warning systems	<ul style="list-style-type: none">➤ Reduce impact of different hazards, including climate extremes, in both food systems and livelihoods.
Improving access to, and management of, natural productive resources	<ul style="list-style-type: none">➤ Sustainable increase in agricultural productivity (with positive effects on natural resources and the environment), including through climate-smart agricultural practices.

Source: FAO, State of Food Security and Nutrition in the World 2021, IFAD, UNICEF, WFP & WHO. 2018.

Strengthening resilience of the most vulnerable

In 2020, the covid pandemic caused global GDP to plunge. Governments globally reacted with social assistance, employment and social insurance programs and other emergency measures to support and protect populations. The UN suggests that social programs must continue to increase food security among vulnerable populations, first by supporting household incomes, but also by improving access to affordable, healthy diets.

Climate-related events (droughts, flooding, fires) can contribute to a rise in social instability and trigger conflict. Droughts are particularly threatening, displacing populations and forcing competition for scarce resources.

Exhibit 10: Key policy areas and goals for strengthening resilience of the most vulnerable to economic adversity

As governments move past covid, it is important that public spending on health and social protections remains adequate

Policy area	Goals
Strengthening agri-food productivity and market linkages along the food supply chain	➤ Improve income opportunities for smallholders and other actors of the food supply chain.
Curbing rises in food prices and excessive price volatility and/or mitigating their effects	➤ Reduce the vulnerability of poor households and net food buyers in accessing food.
Boosting job creation and expanding social protection schemes	➤ Avoid undesirable coping strategies during periods of extreme food price fluctuations. ➤ Minimize short-term impacts of economic shocks among vulnerable households through nutrition-sensitive social protection programmes. ➤ Stabilize incomes and food consumption.

Source: FAO, *State of Food Security and Nutrition in the World 2021*, IFAD, UNICEF, WFP & WHO. 2019.

Reducing the cost of nutritious foods

Healthy diets cost 60% more than diets that only fulfil requirements for essential nutrients. In fact, more than 57% of the populations of sub-Saharan Africa and Southern Asia cannot afford a healthy diet. The high cost of healthy diets is linked to greater food insecurity, malnutrition, child stunting and adult obesity. These conditions in turn limit an individual's future prospects and impact on communities and economies.

Policies that look across the food chain can realize efficiency gains and reduce loss and waste. Incentives should favour more nutritious foods over heavily processed food choices. Nutritional quality of foods can be enhanced with post-harvest fortification: we have near universal iodization of salt, and wheat and corn flours are often fortified with iron, folic acid or vitamins. Fortifying foods including rice, corn and wheat can help to address micronutrient deficiencies in large portions of a population. Policies can also encourage food manufacturers to re-formulate products to reduce or remove elements like added salt or sugar or trans-fatty acids.

Exhibit 11: Key policy areas and goals for intervening along food supply chains to lower the cost of nutritious foods

Policies should focus on increasing nutritious food choices and reducing loss and waste across the food chain

Policy area	Goals
Increasing investments for a more productive and diverse agriculture sector	➤ Increase the supply of safe and nutritious foods, lowering their cost.
Increasing the efficiency of food value chains	➤ Improve functioning of value chains to realize efficiency gains in storage, processing and marketing of food, thus reducing the cost of nutritious foods. ➤ Reduce food loss and waste through a coherent set of policies and investments in food production, harvesting, handling, packaging, storage, transportation, processing and marketing
Creating an environment that promotes nutritious foods along the supply chain	➤ Adjust fiscal and other policies to influence relative prices of nutritious foods and of foods high in fats, sugars and / or salt.
Enacting mandatory food fortification in line with international guidelines	➤ Increase supply of fortified foods as part of a programme to address micronutrient deficiencies.
Promoting biofortification in line with international guidelines and regulations	➤ Increase production of foods with higher micronutrient content to address micronutrient deficiencies.

Source: FAO, *State of Food Security and Nutrition in the World 2021*, IFAD, UNICEF, WFP & WHO. 2020.

Tackling poverty and structural inequality

Poverty rates are three times higher in rural areas than urban areas; in fact, 80% of the extreme poor are rural. The UN advocates reducing extreme poverty in part through accelerated food systems transformation, something well-suited to the more rural setting for many poverty-stricken populations. This might include improving access to finance and productivity-enhancing technologies, increasing market integration for small farmers, and introduction of public-private-producer partnerships.

Food insecurity is 10% higher for women than for men (2020). Greater opportunities for women often improve outcomes for diet quality and family health. Policies that support women in the economy should also aim for better income and resource distribution.

Exhibit 12: Key policy areas and goals for tackling structural inequalities, ensuring interventions are pro-poor and inclusive

Tackling structuring inequalities includes reducing inequalities within households – including opportunities for women

Policy area	Goals
Empowering vulnerable and historically marginalized populations	➤ Reduce inequality within households, with positive effects on food security and nutrition outcomes of women, children and youth.
Reducing gender inequality in food security & nutrition, supporting women's economic activities in food value chains	➤ Increase productive capacity of men and women by ensuring equitable access to productive resources. ➤ Implement financial services support mechanisms targeting women's economic activities as producers, processors, traders and entrepreneurs.
Enacting reforms with a gender lens to enable more equal distribution of resources and access to social services	➤ Improve access to key agricultural productive assets. ➤ Increase access of vulnerable populations to essential services, primary healthcare and expanded social protection mechanisms. ➤ Improve income distribution within countries.

Source: FAO, *State of Food Security and Nutrition in the World* 2021, IFAD, UNICEF, WFP & WHO. 2019.

Food environments and changing consumer behavior

Obese people now outnumber the underweight – that's food security, right? Not quite – a quarter of obese people are also malnourished. Changes in food systems in recent decades have increased availability of ultra-processed foods linked to weight gain, but lacking in necessary micronutrients.

The policies recommended for changing consumer behaviour rely on a combination of taxes and policies to curb consumption of less nutritious foods together with policies to support more healthy choices. Healthy choices would be supported through more nutritious school/hospital meal programs and better product labelling, while taxes on less nutrient-rich foods could encourage product reformulations and make nutritious foods more affordable.

Exhibit 13: Key policy areas and goals for strengthening food environments and changing consumer behavior to promote health and the environment

Policy recommendations include taxation of foods high in fats, sugars and/or salt

Policy area	Goals
Implementing healthy public food procurement and service policies	➤ Ensure that food sold or served in schools, hospitals and other public institutions contributes to healthy diets.
Improving trade standards with a nutrition-oriented focus	➤ Enhance the role of trade for increasing the availability and affordability of healthy diets.
Taxation of energy-dense foods high in fats, sugars and/or salt and subsidizing healthy foods	➤ Lower consumption of food with negative impact on human health. Ensure nutritious foods are more affordable than energy-dense foods.
Enacting legislation on food marketing	➤ Protect all people, and in particular children from birth to 18 years, from harmful impacts of food marketing.
Enacting labelling rules, including interpretive front-of-pack nutrition labelling	➤ Help consumers to shift their preference towards nutritious foods, in using interpretive nutrition labels on the front, as well as nutrition information panels on the back of food packaging.
Regulating industrially produced trans fats	➤ Eliminate industrially produced trans fats from the food supply chain.
Reformulating food products and beverages	➤ Reduce levels of salt/sodium, sugars, calories and/or saturated fat in highly processed food.

Source: FAO, *State of Food Security and Nutrition in the World* 2021, IFAD, UNICEF, WFP & WHO. 2020.

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