

The Role of Business in Transforming Food Systems



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The Role of Business in Transforming Food Systems

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A full list of acknowledgments can be found [here](#).

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Key Messages

Global food systems face unprecedented challenges

Food plays a crucial role in all our lives, not only in supporting our physical and mental health, but also the health of our environment, cultures and economies. While our food systems have evolved in an attempt to provide plentiful food at comparatively low prices.

1. This approach has largely relied on chemical agricultural inputs, monocropping and linear rather than circular models, resulting in environmental impacts, including:

- Food systems have a significant environmental footprint, occupying 50 per cent of habitable land, consuming 70 per cent of available fresh water, being responsible for 70 per cent of biodiversity loss and generating between 21 and 37 per cent of global greenhouse gas emissions.
- Seventy-seven per cent of agricultural land is used for meat production, with 13 per cent of global greenhouse gas emissions attributable to livestock production.
- The resilience of food systems is under growing threat from soil degradation, pollinator loss, water scarcity, extreme weather events and increased susceptibility to loss from pests and disease.
- The global population is expected to reach between 9 and 10 billion by 2050, resulting in the need for an additional 50 per cent more food calories to feed this growing and more affluent population.
- A third of all food produced globally is still lost or wasted at some point along the value chain, generating 8–10 per cent of global greenhouse gas emissions.

2. The opportunities for business in transforming food systems are substantial.

There is an exciting opportunity to transform existing food systems into regenerative food systems, which reduce greenhouse gas emissions and pollution, preserve and enhance the livelihoods of people working in the food systems, restore habitat and protect biodiversity.

Businesses have a crucial role to play in enabling this transformation, immaterial of their size or role within a food system. They can realize significant opportunities to deliver business value by making their supply chains and business models more resilient, protecting themselves from both chronic environmental change and systemic shocks, as well as cutting costs by reducing food loss and waste.

Transformation also provides a range of opportunities to create and leverage new business models and to build local prosperity.

3. The key areas of transformation that businesses can contribute to include:

- Support the transition to nature-positive production: To restore the ecosystems upon which humankind depends, while feeding a growing population, we need to rapidly accelerate the transition to agricultural practices that restore and regenerate nature. Farmers and land managers within food systems are ideally placed to deliver ecosystem service outcomes alongside the provision of food, benefiting a range of sectors and increasing community resilience. In a nature positive transformation, providing women and girls with tools and rights over land is needed so that they can become ecosystem champions within local communities in rural areas.

Action: Collaborate with partners across your supply chain and within the landscapes from which you source and operate, to accelerate the application of regenerative practices.

- Contribute to a shift towards more nutritious and plant-rich diets: By shifting the dietary balance towards more nutritious and plant-rich foods, the current environmental impacts of food production and the dietary health and well-being of individuals can be improved.

Action: Reformulate existing product portfolios and develop new product offerings to support a more balanced, plant-rich diet with a lower environmental footprint.

- Act to reduce food loss and waste: By focusing on reducing food loss and waste at every stage, from farm to fork, businesses can help reduce greenhouse gas emissions and use land, water and nutrients more efficiently when producing food.

Action: Adopt a company-wide target in line with Sustainable Development Goal (SDG) 12.3, measure and report food waste using the Food Waste Index, and develop and implement a strategy that targets food loss and waste hotspots, works collaboratively across supply chains to eliminate rather than shift waste, and empowers end consumers to reduce waste at home.

Although these transformations require significant effort by everyone, they provide a range of business opportunities to create and leverage new business models and build local prosperity, help cut costs by reducing food loss and waste and open up new markets.

About GEO for Business

The United Nations Environment Programme [UNEP] and its global partners are proud to offer this series of stimulating briefs about the environmental challenges and business opportunities that demand transformational change at a global scale. These business briefs are meant to communicate the science of the environment to a broad business audience and provide possible pathways and roadmaps that business can follow to address these environmental challenges. The audiences these briefs hope to reach include companies in the supply chains of major multinationals, multinationals themselves as well as small to medium-sized enterprises. The themes of the first six briefs include:

- [how to transform in a time of uncertainty](#),
- how to transform business models towards a fully circular model,
- how to achieve deep decarbonization through electrification,
- how to transform global food systems,
- how to build environmentally sustainable and resilient infrastructure,
- and the role finance needs to take in a transforming world.

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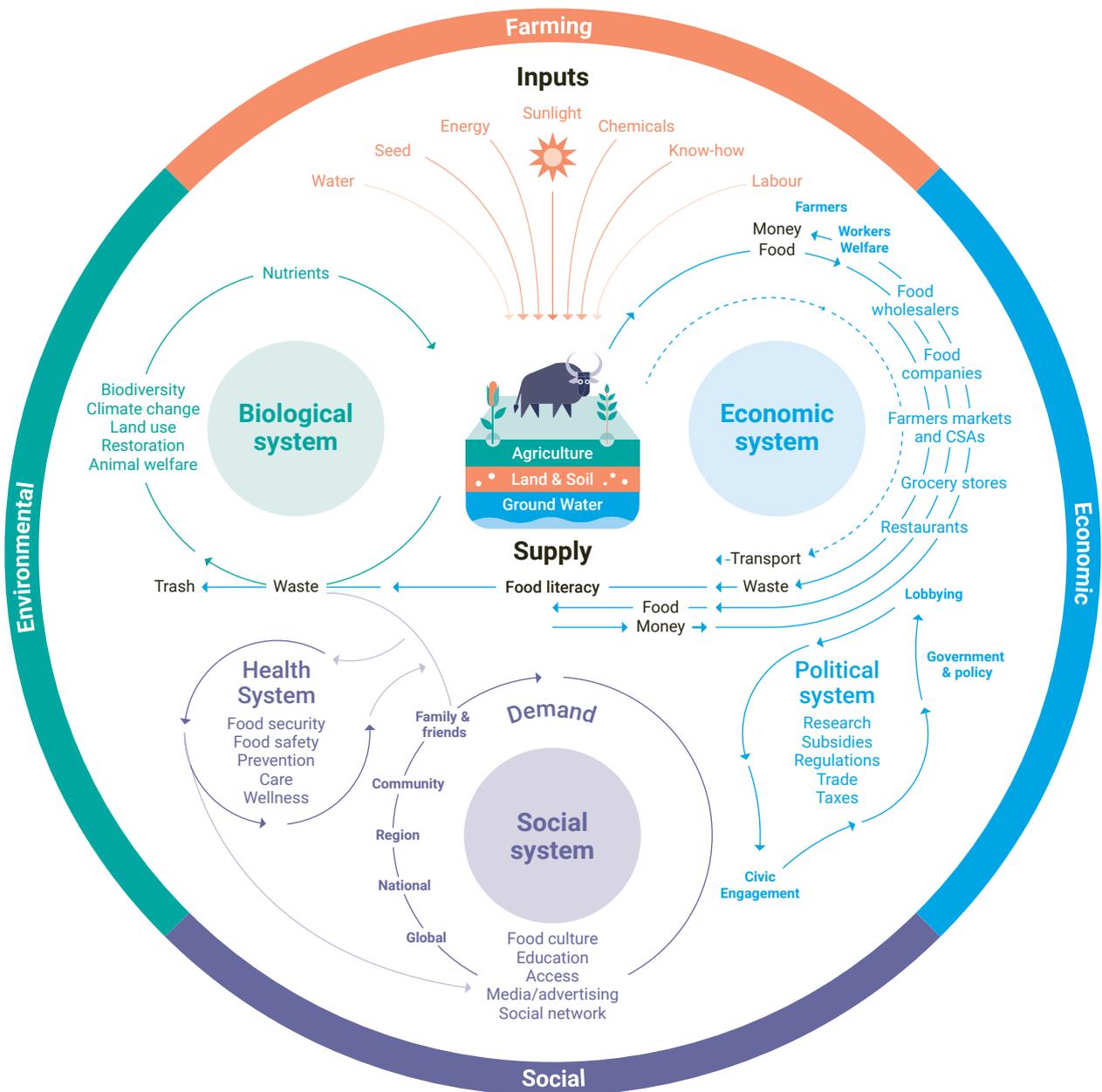
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1. The global food system is complex and interconnected

The global food system comprises all the key elements and actors from farming, forestry and fishing (including inputs), through to consumption and disposal. It has multiple interdependencies with

(and impacts on) other systems, including: biological, economic, political, social and health (Figure 1).

Figure 1: Schematic of the global food system



Note: CSA stands for community supported agriculture.

As detailed in the sixth Global Environment Outlook,^[1] the global food system also has significant environmental impacts. It currently:

- occupies 50 per cent of habitable land,
- consumes 70 per cent of global fresh water,
- is responsible for 70 per cent of global biodiversity loss^[2],
- generates between 21 and 37 per cent of global greenhouse gas emissions^[3],
- contributes to deforestation rates that currently stand at about 6.5 million ha/year,
- affects global fresh water and oceans through eutrophication and high chemical loads (through fertilizer, nutrient, pesticide and herbicide use),
- generates the highest levels of ammonia and nitrogen compounds, leading to the production of ground-level ozone.

Globally

- about one-third of food is lost or wasted from farm to fork,
- about 77 per cent of agricultural land is used for meat production and 13 per cent of global greenhouse gas emissions are attributable to livestock production,
- over 29 per cent of soils are considered degraded, in part due to the methods used for food production.

Future trends will also put more stress on the food system and the environment. By 2050:

- global population is expected to reach between 9 and 10 billion,
- 80 per cent of all food produced will be consumed in cities (up from 50 per cent at present), requiring more food to be directed to cities,
- about 50 per cent more food will be needed to feed this growing and more affluent population,
- global average temperature is expected to rise to between 2.5 and 3°C, leading to:
 - more extreme weather events, which could damage crops,
 - longer and more intense droughts, halting food production in some regions,
 - sea level rise and the associated saltwater intrusion into freshwater irrigation systems,
 - changes in precipitation patterns and growing seasons, likely affecting crop yields.

Finally, continued biodiversity loss and chemical pollution could lead to:

- loss of pollinators, affecting the production of key crops,
- loss of genetic diversity in some crops, making them more susceptible to pests and diseases.

These growing environmental impacts and the complex interactions across food systems, combined with a linear, input-focused approach, can result in unintended consequences either within the food system itself or within other interrelated systems. For example, introducing a monocropping system to increase crop yields and reduce the cost of production may adversely affect biodiversity and resistance to pests and disease within that farming system.

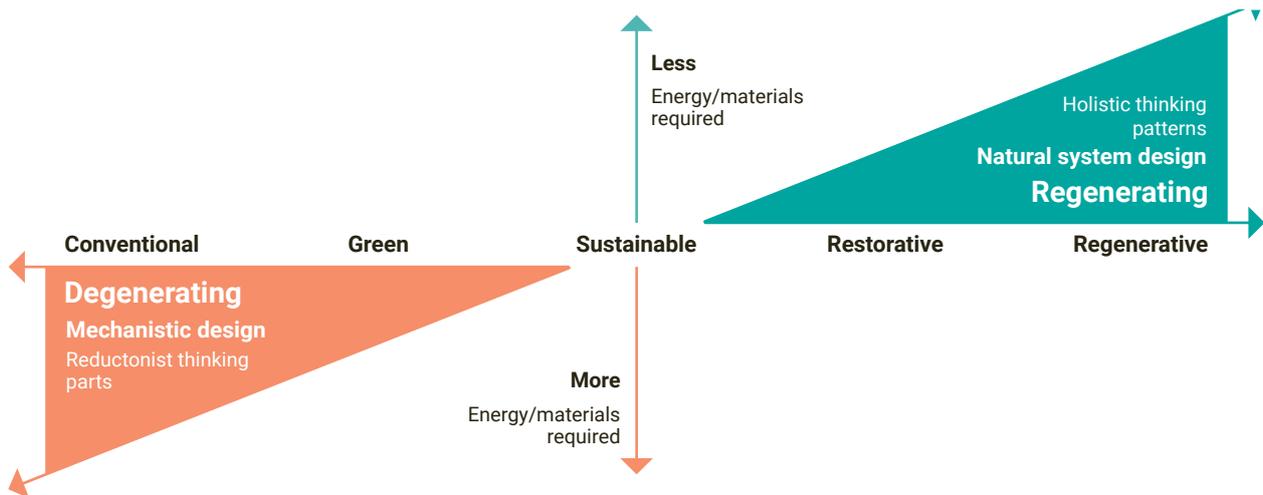
It is important to consider not only the impacts of these subsystems and actors, but also their dependencies. This can help i) improve understanding of these interactions to improve decision-making and ii) enhance the business rationale for action, helping businesses in turn understand their dependencies on these different systems and the risks of inaction.

The many actors across the food system vary dramatically in terms of their size, influence and status (**Figure 1**). To optimize the transformations that are required in the food system, it is important that as many of these actors as possible take action within their own sphere of influence. To ensure a fair and equitable transformation, actors with greater scale and influence have the opportunity to support and enable those who are less able to play their role in this transformation and integrate their voice and interests effectively.

To transform the food system from traditional and conventional approaches towards achieving the principal aims of the 2030 Agenda and its SDGs, the world needs to move to a sustainable food system, defined as “a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised”.^[4] To achieve this, forms of power and privilege must be addressed along the supply chain, and equal spaces and rights must be available to all the actors contributing to the system, including women and indigenous communities.

By taking a holistic approach to thinking about the food system and its inter-relationships, there is an opportunity to transform current food systems into regenerative food systems, which reduce greenhouse gas emissions and pollution, preserve and enhance

Figure 2: Transforming from degenerative to regenerative systems



the livelihoods of those who work in the food system, restore habitat and protect biodiversity.^[5] This transformation reduces the environmental degradation of current practices and enables a more circular food system (Figure 2).

To support effective dialogue and action to transform the food system, five “action tracks” were identified at the United Nations Food Systems Summit 2021, in line with the 2030 Agenda and its SDGs. These are to:^[6]

- ensure access to safe and nutritious food for all,
- shift to sustainable consumption patterns,
- boost nature-positive production,
- advance equitable livelihoods,
- build resilience to vulnerabilities, shocks and stress.

To deliver the pace and scale of transformation required, the journey must be informed by the science of many recent assessments (the Global Environment Outlook (GEO),^[1] the Intergovernmental Panel on Climate Change (IPCC),^[3] the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES),^[7] the World Resources Institute (WRI),^[8] the World Wide Fund for Nature (WWF)^[2] and

delivered through practical immediate actions. As already noted, the food system is complex and it can be challenging for businesses to determine where to focus their action. With regard to the aforementioned action tracks, this brief focuses on three key cross-cutting themes, where businesses – from large corporations or small to medium-sized enterprises (SMEs) – can take individual or collaborative action to accelerate this transformation by:

- shifting global food production towards more nature-positive and regenerative practices,
- reducing food waste at all stages of production, processing, distribution and consumption, and,
- preparing for a shift towards more plant-based diets to reduce the environmental impact of the global food systems.

Business has a role in each of these, but so does government and society at large. Where other actors are needed to help business achieve this transformative change, this brief will highlight the role that these actors could and should play.

2. The impact of global food systems

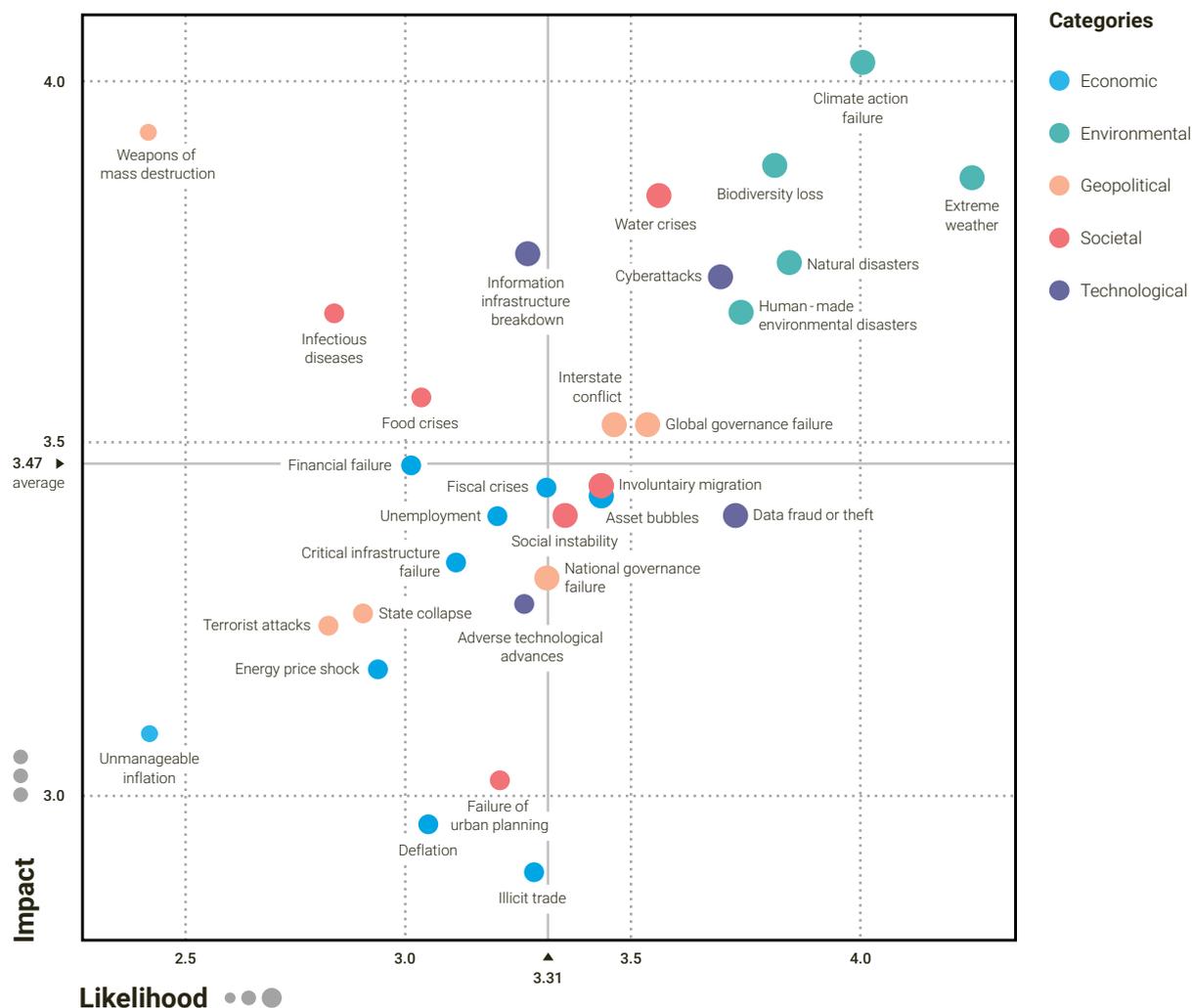
Over the last century, food systems have evolved in an attempt to provide plentiful food at comparatively low prices. This evolution has largely focused on linear, input-driven approaches, resulting in unsustainable resource use and adverse impacts on landscapes, ecosystems and climate change, while large portions of the global population are still affected by social and gender inequality and food poverty.^[9]

These systemic challenges critically impact the food system, which itself impacts the environment, society and the economy. COVID-19^[9] has further amplified these challenges, shedding light on the fragility of the many complex supply networks on which people and planet rely.

According to the World Economic Forum's Global Risks Perception Survey 2019–2020,^[10] climate-related issues dominated the top five long-term risks, all of which have a direct or indirect link to the global food system (**Figure 3**). These challenges are further compounded by existing global inequalities and poverty, the unsettled geopolitical environment, alongside the increasing risk of global economic stagnation.

The global food system also faces challenges in terms of its social impact, needing to feed a global population that is forecasted to reach between 9 and 10 billion by 2050. This increased population is estimated to require a 50 per cent increase in food availability.^[8] This growth must also consider social

Figure 3: Perceptions of global risks



equity and gender equality across the value chain, from smallholder farmers through to people facing challenges with access to healthy, affordable and nutritious food.

It is not just about future risk: many of these environmental risks are already having a growing impact across the world. This is being evidenced in a number of ways, including as follows.

I. Climate change

Climate change will likely reduce yields of maize, rice, wheat and other cereal crops, especially in sub-Saharan Africa, South-East Asia, and Central and South America.^[11] Indeed, there is a significant risk of substantial yield declines in (sub)tropical crops.^[3] These staple crops are key to food and nutrition security as they make a substantial contribution to food supplies and the majority of the world's food energy intake comes from them. According to the Food and Agriculture Organization of the United Nations (FAO),^[12] these grains are staple foods for more than 4 billion people around the world.

Climate change is projected to negatively impact all four dimensions of food security (availability, access, utilization and stability) and their interactions.^[3]

II. Air pollution

Food production and air quality are intricately related and therefore threatened by air pollution. Ozone precursor emissions react to form ground-level ozone, threatening global food security. Plants are penetrated by these ozone components that impair its ability to develop. Ozone has been estimated to affect global crop losses of soy, wheat and maize.^[13] A study in the year 2000 in Europe indicated a 6.7 billion euros loss due to the impact of ozone on 23 selected crops.^[14]

Research on air quality has shown that there are ozone-sensitive crops, particularly staple crops which majority of the world's population depend on, such as wheat and soy. Other crops such as rice, maize and potato, are moderately sensitive, while barley has been found to be ozone-resistant.^[14]

III. Land degradation

About 25 per cent of the total global ice-free land area is subject to human-induced degradation.^[3] For instance, the speed at which soil from agricultural fields is currently eroding is estimated to be 10 to 20 times higher (under no tillage) to more than 100 times higher (under conventional tillage) than the rate at which it can regenerate,^[3] making agriculture a truly unsustainable practice.

Deforestation is a land-use issue that leads to both land degradation and biodiversity loss. An analysis of the 11 most critical deforestation fronts found agriculture to be the dominant, and usually the largest, driver of land-use change.^[15] More than 80 per cent of global deforestation between 2010 and 2030 is likely to happen in just these 11 places – with a combined loss of up to 170 million ha.^[15]

IV. Biodiversity loss

The benefits that humans derive from ecosystems,^[16] known as ecosystem services, are vital, especially for our food systems. For instance, pollination – an ecosystem service – is probably the highest agricultural contributor to yields worldwide, contributing far beyond any other agricultural management practice. Research findings show that pollinators affect 35 per cent of global agricultural land, which support the production of some of the leading food crops worldwide.^[17] Furthermore, crops that are pollination-dependent are five times more valuable than those that do not require pollination.^[18]

The price tag of global crops directly relying on pollinators is estimated to be between \$235 and \$577 billion per year and their quantity is on the rise^[17]. In the last 50 years, there has been a 300 per cent increase in the volume of agricultural production that requires pollinators.^[17]

However, bees and other pollinators are threatened with species' extinction rates between 100 to 1,000 times, which is presently higher than normal due to human impacts. Future biodiversity loss, will majorly be in insects and particularly bees and butterflies will face extinction.^[17]

Fisheries are also affected with various fish habitats such as coral, seagrasses and mangroves being degraded by the creation of "dead zones" caused by nutrient run-off from land-based sources. Up to

20 per cent of human protein consumption comes from aquatic animals globally and fisheries happen to be a major source of income and jobs for many communities around the world.^[19]

V. Increasing scarcity of land and water in agriculture

Agricultural policies have, in most cases, primarily benefited large-scale farmers who have valuable land and access to productive assets and resources such as water, bypassing the majority of small-scale farmers, who are cyclically confronted by high vulnerability, land degradation and climatic uncertainty.^[20] This includes women farmers, who are the most vulnerable to climate change but are often not granted control over land and production inputs.^[21]

As we edge towards 2050, population growth and rising incomes are expected to increase the demand for more food production globally, with up to 100 per cent more food required in developing countries relative to 2009 levels.^[20] Despite this urgency, distribution of land and water resources remain at odds and does not favour countries that can and need to produce more food. It is estimated that on average, availability of cultivated land per capita in low-income countries is less than half that of high-income countries, and the suitability and productivity of these cultivated lands is generally lower.^[20] Some countries with rapidly growing demand for food are also facing high levels of land or water scarcity.^[20]

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countries, and the suitability and productivity of these cultivated lands is generally lower.^[20] Some countries with rapidly growing demand for food are also facing high levels of land or water scarcity.

VI. Persistent hunger and malnutrition with increasing vulnerability and inequality in the food system

Globally, only half the nutrients that crops take from the soil are replaced.^[22] The global food system is not meeting the world's demand for food as 690 million people – 8.9 per cent of the world population – are still hungry.^[9] Since 2014, the number of people affected by hunger globally has increased and is expected to increase by 10 million each year and by nearly 60 million in five years. As such, the world is not on track to achieve zero hunger by 2030.^[9]

The problem not only pertains to undernutrition, but also largely to malnutrition. Overweight and obesity are also key priorities when it comes to nutritional problems. The world still has accessibility and affordability challenges for health diets. In every region of the world, healthy diets are unaffordable to many people, especially people living in poverty and women. More than 3 billion people worldwide are unable to afford healthy diets according to conservative estimates.^[9]

Food security and nutrition consists of four dimensions:

1. availability
2. access (whether physical or economic)
3. utilization and
4. stability

as well as the nutritional value of the food produced and processed.

Moreover, women in developing countries are generally more affected by climate change and food insecurity than men, despite being responsible for 60 to 80 per cent of food production.^[23] Even though women and girls play a fundamental role in managing resources while producing food and are therefore well placed to be ecosystem champions, often laws and customs prevent women from owning land and making decisions on land use.^[21] The Gender GEO recognizes that “closing the gender gap in access to and control over resources, such as land and

production inputs, and in access to information and technology, would increase agricultural productivity and therefore reduce poverty and hunger.”^[24]

VII. Vulnerability, inequality, and tenure security

Vulnerable groups such as women, youth, indigenous people, refugees, internally displaced people, pastoralists and small-scale farmers in general have had to bear the brunt of environmental degradation and the loss of vital resources. Often, power dynamics (including those related to gender and regardless of the intentions of the actors involved) have made it such that the voices of marginalized groups are not sufficiently heard.

FAO has highlighted that land tenure remains central to livelihoods of key populations around the world. Food security is very often than not, directly linked to tenure security.^[25] Populations that are marginalised and have weak and insecure tenure rights face continued risk losing their sure means to support and feed themselves through the loss of their access to natural resources. Women often fall within this category of weak tenure rights particularly in communities where laws and customs discriminate against them. Tenure systems define who can use which natural resources, for how long and under which conditions. ^[25]

The High Level Panel of Experts on Food Security and Nutrition (HLPE) of the United Nations Committee on World Food Security (CFS)^[26] acknowledges that food systems are at a crossroads and facing profound threats, including a growing world population, urbanization and climate change. These factors are driving increased pressure on natural resources, which is impacting land, water and biodiversity. It foresees a profound transformation of food systems that will greatly influence what people eat, as well as how food is produced, processed, transported and sold.

2.1 The increasing social disconnect with food

In many parts of the world, there seems to be an increasing disconnect between producers and consumers of food. With more people living in cities and a decreasing proportion of the workforce working in agriculture, people are becoming less physically or emotionally bound to food production.^[27] Many

consumers have disconnected from the impacts of their activities, which is affecting their ability to make healthy food choices. These food choices impact both the environment and the health of individuals and populations.

Food systems will increasingly need to cope with multidimensional and increasingly complex challenges.^[28] By 2050, an additional 2 billion individuals will need to be supported. Global diets are shifting towards meat consumption, which places high demands on the Earth’s resources.^[8]

2.2 What is the cost of inaction?

The State of Food Security and Nutrition Report for 2020, asserts that under current food production and consumption patterns, diet-related health risks and costs linked to mortality and non-communicable diseases are projected to increase to well over \$1.3 trillion per year by 2030. Meanwhile, diet-related social costs of greenhouse gas emissions associated with current food systems patterns are estimated to reach more than \$1.7 trillion per year by 2030.^[9] Moreover, the external costs for pollution, pesticides and microbial resistance is estimated at **\$2.1 trillion**.^[29]

At the global level, shifting to healthy diets with more plant-based protein could help lessen health and climate change budgets at a national level by 2030. The adoption of healthy diets with more plant-based protein sources could lead to a reduction of up to 97 per cent in direct and indirect health costs and of 41–74 per cent in the social cost of global greenhouse gas emissions by 2030.^[9] The companies that are able to translate today’s hidden costs into tomorrow’s new markets have huge opportunities, up to **\$4.5 trillion** a year by 2030. ^[29]

2.3 Food loss and waste

Evidence across the food system is consistently and overwhelmingly showing a growing phenomenon of food loss and waste that constitutes a global problem. Approximately one-third of food produced is lost or wasted annually,^[30] affecting the global economy, food security and the environment. Food losses prior to retail amounted to approximately 14 per cent of total food production in 2016, according to FAO’s State of Food and Agriculture 2019 report.^[31] Furthermore, an estimated 931 million tons of the total food available to consumers in 2019 ended up in the waste bins

of households, retailers, restaurants and other food services according to the United Nations Environment Programme's (UNEP) Food Waste Index Report 2021. The same report estimates that 11 per cent of food available to consumers is wasted by households, 5 per cent by food services and 2 per cent by retail activities.^[32] Significantly reducing food waste is recognized as being key to delivering a net-zero carbon future and a food system that helps humanity live within the planetary limits.^[33]

Not only does food waste have a direct effect on greenhouse gas emissions, but it also results in a loss of valuable resources within the food system. Global

food waste "consumes" 25 per cent of all water used in agriculture,^[34] 23 per cent of all fertilizer used on Earth,^[33] as well as one in four food calories available for the planet.^[35] This level of food loss and waste also utilizes an area of cropland the size of China.^[34]

Food loss and waste occur across the entire supply chain. Although the balance of production and consumption levels of food loss and waste may vary by country, the overall levels of global food loss and waste are placing significant pressures on food systems, resulting in environmental and social stress as well as high levels of economic inefficiency.^[32]

3. What are the implications of these impacts for business?

3.1 Pressure from investors and consumers

The scale of the challenges that the food system poses to the global economy and society, and vice versa, has not only resulted in increased activity from governments in the development and application of policy levers (particularly regulatory and fiscal) but also a rapidly growing interest from the investment community. The [Task Force on Climate-related Financial Disclosures](#) (TCFD, whose membership includes financial firms responsible for assets worth more than \$140 trillion) is developing recommendations to help companies understand what financial markets want from disclosure, in order to measure and respond to climate change risks, and encourage firms to align their disclosures with investors' needs. This is being complemented by the current development of a [Taskforce on Nature-related Financial Disclosures](#) (TNFD). The future cost of long-term finance, and the ability to access this finance, for businesses operating in the food system will increasingly be dependent on adoption of these new requirements.

3.2 Changes in agricultural production paradigm

Throughout the last century, the agricultural system transitioned towards a productionist approach.^[36] Under this paradigm, crop research and investments as well as infrastructure, market developments and policy frameworks were successfully steered towards increasing agricultural production. Chronic food deficits in developing countries decreased, while the production of cereal crops tripled in the developing world.^[37]

However, in recent decades the costs of this type of agricultural intensification have become clear. The industrialization of agricultural techniques led to a simplification of farming systems from polycultures to monocultures, increasing the risk of pests and diseases spreading, while reducing biodiversity and genetic diversity in the agroecosystem. Farming productivity became dependent on the application of fossil-fuel based fertilizers and pesticides that harmed

soils and pollinators and drove the emissions of greenhouse gases.^[38]

To break away from linear, input-focused food systems, regenerative agricultural approaches have been emerging as a transformative force aimed at changing the traditional paradigm.^[39] First defined by the Rodale Institute in the late 1980s,^[40] the term "regenerative" has become an umbrella concept that includes agroecology, agroforestry, permaculture, restoration ecology, rewilding, and other approaches focused on active ecosystem improvement by leveraging ecosystem functions.^[41] A regenerative approach applies a holistic view to agricultural production systems, taking into account the relationship with the environment as well as socioeconomic factors. Regenerative farming systems rely on reversing degradation from current production practices and moving towards systems that regenerate natural resources.^[42] This can result in increased availability of ecosystem services such as boosted soil health, the restoration of the water cycle and a positive effect on the climate.^[7] While these benefits are increasingly acknowledged by the scientific community, it is important to understand how regenerative farming practices can be integrated into today's business models.

Regenerative approaches to food, feed, fuel and fibre production focus on reviving the soil and its fertility, supporting life above and below ground by storing carbon, protecting watersheds and increasing the ecological and economic resilience of a farm.^{[43][44]} While regenerative land management can be described in many ways, there are a number of essential practices that are common:^{[45][46]}

1. **Limit soil disturbance** through minimal use of mechanical and chemical technologies as well as farming production practices. Repeated tillage dismantles soil structure integrity that nature builds to safeguard the micro-and other organisms that form the basis of natural soil fertility.
2. Bare soil is an anomaly and there is always a need to **keep the soil covered**. Through natural regeneration, nature works to cover bare soils by providing a natural protective coat from wind and water erosion while at the same time providing

nourishment and habitat for macro- and micro-organisms.

3. **Nurture biodiversity.** Diversity of both plant and animal species should be preserved as they all live and thrive in harmony with each other when this balance exists. The different root systems - shallow, fibrous, tap – provide for the distribution of nutrients and moisture to different organisms that ensure soil health. Each of them has a role to play in maintaining soil structure integrity.
4. **Maintain living roots in the soil** throughout the different season of the year. Seeing green growing plants above ground is a sign of living roots below its surface. Living roots play a critical role in feeding soil biology by providing basic food source such as carbon which in turn, fuels the nutrient cycle for plant health.
5. **Integrate animals.** Nature does not function without animals. In silvopastoral and integrated cropping systems, livestock grazing stimulates plants to pump more carbon into the soil. This drives nutrient cycling by feeding soil biology. In every healthy functioning farm or ranch, there is home and habitat for wildlife, pollinators, predator insects, earthworms, and all of the microbiology that drives ecosystem function.

A regenerative approach to agricultural production is the foundation for the agroecologically-inspired transformation towards resilient food webs that promote food security and nutrition.^[25] Moreover, the interaction between locally rooted regenerative enterprises, globally interconnected through markets and technology, can give rise to translocal nature-positive food systems.^[47]

3.3 Changes in what people eat

The World Resources Institute estimates that 30 per cent of the global population would need to shift towards vegetarianism and another 50 per cent would need to eat mainly chicken and pork-based protein by 2050 for the agriculture sector to meet its “fair share” of the Paris Agreement targets.^[8] This would dramatically impact business in the beef production sector. This and other trends are pushing markets towards plant-based and cultured meat protein products.

Currently, plant-based sources dominate the world’s protein supply, constituting 57 per cent of the protein that humans consume globally.^[48] Vegetable proteins include legumes, cereals, soy, roots, nuts and seeds,

many of which can also provide alternatives to ingredients such as texturizers, gums and emulsifiers.

In Europe, in order to generate alternative proteins for the global plant-based food sector, the European Union is sponsoring the [Smart Protein project](#), conducted by ProVeg International and more than 30 external partners, including universities, research institutions, corporations, SMEs, and non-governmental organizations (NGOs). Smart Protein is looking to develop foods that are cost-effective, resource-efficient and nutritious. In this project, alternative protein sources such as legumes and side-streams from beer and pasta production are used to generate food ingredients and plant-based meat, seafood and dairy products, as well as baked goods.

Innovations, developments and investments in plant-based protein and food are increasing, and data suggest that the food sector is transforming. It is estimated that the global plant-based protein market will grow from \$10.3 billion in 2020 to \$14.5 billion by 2025.^[49] Given its huge market potential, plant-based protein is a hot area for research, development and investment.

Although more and more plant-based products are being developed and consumed, global meat consumption is also steadily increasing, with a projected increase of 76 per cent by the middle of the century.^[50] This means that complementary to plant-based food businesses, methods of producing animal-based products in a sustainable way are urgently needed. Cellular agriculture, which is the production of animal-based products from cell cultures rather than directly from animals, has the potential to solve some of the most pressing problems caused by factory-farming.^[51] Cultured meat, produced via cell cultivation, removes the need to rear and slaughter animals for consumption, thus offering a more environmentally and ethically conscious way of meeting the world’s consumption demands in the future. Although cultured meat is not yet on the market, cellular agriculture and cultured meat represent huge market potential. According to consulting firm Kearney, traditional meat consumption will begin to decline and cultured meat could constitute as much as 35 per cent of global meat consumption by 2040.^[52]

Business and investment opportunities in cellular agriculture are growing. Top companies, including Tyson Foods, Cargill, and the Bell Food Group, have already realized the positive potential of cultured meat and invested in the field. Cultured dairy products,

using fermentation processes similar to those that have been used for many years in the food industry in order to produce enzymes such as rennet in cheese, also present strong business opportunities and are likely to be the first cellular-agriculture products widely available in the coming years.^{[53][54][55]} For example, Perfect Day's ice-cream products are already available for purchase in the United States, with the company's fermented-whey protein accredited in 2020 with the "generally recognized as safe" designation from the U.S. Food and Drug Administration (FDA).^[56]

3.4 Changes in targeting food waste

Food loss and waste occur across the entire supply chain. These issues affect the global economy, food security and the environment. In response, governments around the world are increasingly measuring food loss and waste and developing national reduction strategies. Recognizing the crucial importance of managing food loss and waste, [SDG target 12.3](#) seeks to reduce food waste at the retail and consumer levels by 50 per cent by 2030 and to reduce food losses along supply chains, including post-harvest losses.

Australia has set itself a target of reducing food loss and waste by 50 per cent by 2030^[57] by investing in food rescue organizations, the largest research and development organization in the world focusing on food loss and waste ([the Fight Food Waste Cooperative Research Centre](#)) and new Sector Action Plans, and by promoting a voluntary agreement programme ([the Australian Food Pact](#)) to reduce food waste and food insecurity, support behaviour change in homes and businesses, and develop markets for upcycled food. Moreover, "As of September 2020, countries and regional blocs representing approximately 50 per cent of the world's population have set specific targets in line with SDG 12.3" for reducing food loss and waste, according to the Champions Progress Report.^[34]

In the developing world, food loss and waste programmes have typically been focused on improving or introducing post-harvest management (PHM) by both private and public sector players. For example, the Food, Agriculture and Natural Resources Policy Analysis Network ([FANRPAN's](#)) has set a target of halving post-harvest losses by 2025.^[58] To support Mozambique's ambition to halve its post-harvest losses from 24 per cent to 12 per cent, it has set up a working group to help develop national strategies and

policy frameworks. In the private sector, initiatives that include enhancing and harnessing cold chain supply chains can be found in Africa.^[58]

The [UNEP/ Waste and Resources Action Programme \(WRAP\) Food Waste Index Report](#) identifies opportunities to address food loss and waste that businesses and governments are deploying with increasing impact. For example, the UK's Food Waste Reduction Roadmap, which encourages organizations to adopt a "target, measure, act" approach (aligned with SDG target 12.3), already has over 171 business signatories, with 45 members reporting a 17 per cent reduction in 2019 (180,000T). Combined with action delivered under WRAP's voluntary Courtauld Commitment, the UK has reduced food waste by 27 per cent (1.7 Mt/y less food waste) across the food system and reduced edible food waste by 31 per cent in homes.^[59]

According to the non-profit organization Project Drawdown, "After taking into account the annual adoption of plant-rich diets, if 50–75 per cent of food waste is reduced by 2050, avoided emissions could be equal to 10.3–18.8 Gigatons of carbon dioxide. Reducing waste also avoids the deforestation for additional farmland, preventing 74.9–76.3 Gigatons of additional emissions." Food waste reduction is the number one climate solution identified by Project Drawdown.^[60]

4. How can business lead transformative change?

As seen in the first issue of the GEO for Business briefs, [Adapt to Survive: Business transformation in a time of uncertainty](#), to systemically and sustainably address the challenges facing the world, we need to adopt a nature-positive approach. A nature-positive food system is regenerative, efficient and collaborative and values growth only if it contributes to social progress and environmental protection.^[47]

Nature-positive food systems are born out of a deep awareness of the interconnected nature of life. Humans, and all the other living species to which we are inextricably bound, exist within a series of nested ecosystems[†], and economic activities are just one form of human expression. A hierarchical relationship therefore appears in the 2030 Agenda and its SDGs, where the environment itself shifts from being perceived as an externality, to becoming the very foundation upon which all living beings exist. Nature-positive business models are built on this awareness of the importance of nature to humanity: a one-way relationship that cannot be interpreted otherwise.^[61]

A nature-positive lens extends and integrates regenerative approaches to land management within the very fabric of global food systems. Regenerative practices applied to current food-producing landscapes allow existing natural ecosystems to be protected from conversion to food and feed production, while simultaneously restoring or rehabilitating degraded land, bringing it back to health and function.^[62] Scaling up regenerative nature-positive production, one of the aims of the 2021 United Nations Food Systems Summit, contributes towards multiple SDGs, from the more environmental (SDG 12, Responsible Consumption and Production, SDG 13, Climate Action, SDG 14, Life Below Water, and SDG 15, Life on Land), to the more socioeconomic (SDG 1, No Poverty, SDG 2, Zero Hunger, SDG 5, Gender Equality, SDG 8, Decent Work and Economic Growth, and SDG 10, Reduced Inequalities).^[63]

To deliver the pace and scale of change required across the global food system and address the aforementioned risks, it is crucial that we move beyond

shared ambition and intentions towards genuine collaborative action and investment. This collaborative action needs to be both within the food sector and with other sectors that have a dependency on the food system or the landscapes in which it operates.

The following sections identify key opportunities where businesses can act either individually or collaboratively to accelerate the development of a resilient, healthy, climate- and nature-positive, and just food system. This will not only benefit society and the environment, but will also help secure the future of the businesses themselves in these uncertain times.

4.1 Act strategically, measure and track progress

There is a need for reshaping how agri-food businesses measure and value their relationship with nature, people and economy. This requires business to make their corporate externalities measurable, economically quantifiable and disclosable. It therefore goes beyond the traditional concepts of Environmental, Social and Governance (ESG) reporting by including a valuation of the impacts and dependencies on nature, expressed in quantitative, monetary and qualitative terms. Such efforts can also increasingly build upon the natural capital data from national statistical systems (eg. [UN System of Environmental-Economic Accounting – Ecosystem Accounting SEEA EA](#)).

Businesses increasingly commit to integrating their impacts and dependencies on nature in decision-making, risk management, supply chain management and external disclosure (eg. [Business for Nature's policy recommendations](#); [EU Code of Conduct on Responsible Food Business](#); [case study database on corporate valuation assessments](#)). However, for this to scale-up, increased efforts are required in establishing a standardized way to include corporate valuation assessments in financial accounts.

[†] Nestedness is a measure of order in an ecological system, referring to the order in which the number of species is related to area or other factors. The more a system is "nested" the more it is organized.

To optimize impact, organizations must have clarity in terms of their purpose and their strategic plan to address risks and leverage opportunities. There needs to be a clear understanding of the core interests and expectations of stakeholders, with the strategic plan reflecting these and evidencing how they will be addressed.

As with any business plan, it is crucial that leading measures are identified and performance-tracked to ensure delivery. Making these plans and progress transparent can also help engage employees more effectively in delivery, increase credibility with external stakeholders and help identify opportunities for collaborative action.

To drive the required changes and ensure business resilience, it is crucial that these activities are not treated as bolt-on opportunities. Rather, they should be regarded as truly transformative integrated parts of the business strategy, with a clear understanding of the value they deliver for the business itself as well as society.

Aligning business targets and progress with the SDGs is one way of providing clarity around how strategic plans will meet the United Nations' call for transformative action to end hunger and poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. The [United Nations Global Compact](#) focuses on mobilizing a global movement of companies and stakeholders to drive business awareness and action in support of achieving the SDGs by 2030. Many food organizations report their progress against the SDGs on an annual basis.

4.2 Move to regenerative agriculture approaches

Despite the obvious environmental benefits of regenerative or nature-positive approaches, scepticism about their financial viability remains, especially in regard to high conversion costs and economic risks. Nevertheless, the long-term perspective on economic returns reveals the tremendous potential of these approaches.^[64] For example, in regard to regenerative farmland management, Project Drawdown estimates that regenerative annual cropping could provide between \$2.3 and \$3.5 trillion in lifetime operational cost savings and a lifetime net profit gain of between \$135 and \$206 billion on an investment of \$79 to \$116 billion.^[65]

While it is estimated that farming annual crops under regenerative principles could sequester/reduce 14.52–22.27 Gigatons of CO₂ equivalent,^[62] a major benefit is its contribution to financial resilience. In light of climate change and increasingly difficult growing conditions for crops, increased soil fertility as well as crop diversification are becoming important safeguards for future productivity. Although specific effects and trade-offs vary locally, the overall trend is clear: agricultural diversification and regenerative systems can protect yield while delivering a broad array of ecosystem benefits, such as greater biodiversity, pollination, pest control, nutrient cycling, regulation of the water cycle and other key ecological functions.^[66] While weather patterns are becoming increasingly unstable and previously humid areas increasingly dry, the principles of regenerative agriculture create a more resilient farming system, thereby ensuring long-term productivity.^[47]

Given the evident long-term benefits, it is worth investigating practical steps that can be taken in the near future. Led by UNEP and FAO, [the United Nations Decade on Ecosystem Restoration: 2021–2030](#) must enable the transition towards regenerative agricultural production systems.

4.2.1 Build new relationships between farmers and stakeholders

Successful transformation of food systems will entail costs for alternative farm inputs and materials, labour and additional machinery, will require the relevant measurement, reporting and verification processes to be put in place and will potentially involve obtaining organic or regenerative certification. Furthermore, agricultural yields may decrease during the transition period, depending on the type and degree of intervention. Another risk is linked to the fact it is difficult to forecast yields for a newly diversified farm. Therefore, to drive this transition, it is essential to identify risk mitigation mechanisms.^[45]

Multi-stakeholder sourcing is an approach developed to address this issue. By definition, regenerative farming methods encompass the diversification of crops, plants and animals, providing for multiple income streams. This diversity provides possibilities for shared investment models in which sourcing partners, investors and/or consumers invest in the same project but target different commodities that result from this diversification. This way, a farmer is able to acquire the necessary funds for the

transition, while the financial risk is shared by the aforementioned stakeholders. Businesses can play a key role in initiating these propositions and acting as anchor organizations to support scale and efficiency. Many of these agricultural interventions also deliver other ecosystem services which can benefit a number of other sector interests, for example:

- reduced flood risk
- reduced water treatment costs and
- carbon sequestration.

This provides the opportunity for farmers to sell not only the goods they produce but also the service-based outcomes, thereby increasing the resiliency of their business model.

To enable such collaboration, communication channels to connect investors and investees are needed. At the farm level, there must be clear strategies to structure the transition process, design the farm and develop a feasible business strategy. However, many farming projects that intend to adopt regenerative farming practices lack the visibility and organizational structure to become bankable^[67]. To overcome this obstacle, farmers require institutional support to gain the necessary capabilities. Furthermore, platforms are required to provide projects with the relevant feasibility studies. This would provide an opportunity for investors to identify shared interests and align investment strategies accordingly.^[45]

The [Landscape Enterprise Networks model](#),^[68] developed by 3Keel, has enabled organizations (including food manufacturers, water utilities and housebuilders) to co-invest in regional landscapes through farmer and land manager collaborations that implement regenerative agricultural practices. These practices deliver their required ecosystem outcomes, including reduced water treatment costs, increased supply resilience and restoration of habitats.

There are various opportunities to accelerate the development of new collaborations that enable the transformation to sustainable agriculture. These include:

- a. Creating local and circular food systems within cities (circular systems can be small- or large-scale. Large-scale should be used for cities of a certain size)
 - i. Risk reduction.

- ii. Supporting the city's ability to bring back nutrients to farmland (food is not produced close to the large population centres).
- b. Rethinking the role of farmers
 - i. Connection with technology – seeing farmers as managers of agroecosystems (“stewards of the land”) aided by technology (“technology serves ecology”).
 - c. Land sharing or land sparing
 - i. Increased production on farmland will lead to a reduction in expansive practices that require more land (land sparing).
 - ii. Diversified production on farmland will lead to improved ecosystem services (biodiversity, climate, water).
 - d. Introducing policies and platforms to balance the relationship between farmers and food companies and retailers
 - i. Land-use policies can be used to balance the relationship across different actors.
 - ii. Policies on product labelling can also help identify nutritional content, farming practice for food production and also origin of a food product.

4.2.2 Address tenure risk

The private sector also has a significant role to play in reducing tenure risk that creates dispute between private capital investors and indigenous people over land or natural resource control and use, a problem that is prevalent in emerging markets.^[69] Tenure disputes create ‘lose–lose’ results for all stakeholders - while stripping emerging markets of opportunities and developmental benefits in responsible land investments.

There are many ways in which the private sector should be aware of land tenure risks and take them into account as part of its sourcing decisions. Multiple frameworks and tools exist, but aligning with the Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) is a good place to start.^[70]

4.3 Plan for growing changes in dietary patterns

Restaurants and their chefs are essential to bringing about sustainable food behaviours. For example, the [Chefs’ Manifesto](#) brings together more than 1,000 chefs from 90 countries who are committed to bridging the gap between farm and fork. The initiative empowers chefs through a framework linked to the

SDGs that suggests simple and practical actions that can be implemented in kitchens all over the world.

Another example is Feed the Planet, a sustainability education programme founded by Worldchefs in 2012 and powered by the [Electrolux Food Foundation](#) and the Association for the International Exchange of Students in Economics and Commerce ([AIESEC](#)). Its [Sustainability Education for Culinary Professionals](#) curriculum teaches chefs how to think and act sustainably, to lead positive change for the planet and increase profitability in the kitchen. Designed for culinary schools across the globe, Feed the Planet is also used as a seminar by national chefs' associations and approved schools. It is a good example of how businesses can transform the food system and enhance their customer satisfaction. In 2021, ProVeg International will collaborate with Worldchefs and an array of food and food service companies to launch the first New Cuisine: Sustainable Foodservice & Culinary Summit in China, which aims to bring sustainable culinary education to chefs in Asia.

As eating behaviours and habits are formed from an early age and taken into adulthood, food education at the primary level can have a long-lasting impact on food choices and, consequently, on the environment. In the United States, the U.S. Department of Agriculture (USDA) helps schools to connect with local farms in order to educate children about nutrition.^[71] By 2015, USDA had supported 74 Farm to School projects, spanning 39 states. In the 2020–2021 school year, the Farm to School Grant Program will support 159 grants, serving 7,610 schools and more than 2.5 million students around the country.^[72] At the global level, while governments and agriculture departments are starting to introduce food education in national school systems, local start-ups and businesses can also partner with or support local governments in promoting food education. This has been shown to lead to healthier food choices and a more sustainable impact on the environment.

FAO has been supporting the promotion of school-based food and nutrition education that teaches educational strategies and learning activities that are supported by a healthy food environment whilst at the same time assists school going children, young adults and communities, at large, to improve their dietary choices. This process helps to build the capacity of these young people to become change agents.^[73] Another example is the partnership between UNEP and the [Edible Schoolyard Project](#) that resulted in the development of lesson plans to access

intergenerational wisdom on reducing food waste. An interdisciplinary food education aligned with the SDGs should be part of the formal education curriculum. Agriculture and food businesses can get involved in food awareness education and co-create the food of the future with their consumers.

The expansion of school-based food and nutrition education will lead to increased demand for healthy and plant-based foods. Therefore, food catering businesses should switch their focus towards promoting and marketing plant-based proteins, targeting schools and institutions.^[74] [The Cool Food Pledge](#), for instance, helps organizations to commit to, and achieve, the target of reducing the climate impact of the food they serve.

Food retail and food service businesses can switch their consumer targets to youth in primary and secondary schools to support school-based food education. Food retail businesses can include new launches of healthier products that are usually consumed by students at an early age, such as healthier child-friendly snacks and sweets. Restaurants can also switch their focus to healthier child-friendly menus, such as by creating interesting and attractive dishes using more fruits, vegetables or whole grains, and with reasonable levels of sodium and fat.

The general public's awareness around nutrition has also increased. For instance, Meatless Monday is a general public-awareness movement that started in 2003. Today it is known in over 40 countries and has adaptations in 22 different languages.^[75] Furthermore, many universities have started launching campaigns on sustainability, and raising awareness around environment and health. For instance, University College London has launched the campaign [UCL: Powered by Plants](#) to promote plant-based eating.

4.4 Act to reduce food loss and waste

4.4.1 Take action at the production, processing, distribution and retail levels

The following action areas can help businesses address food waste in line with the hierarchy shown in **Figure 4**.

Drive operational efficiencies: Materials form a key cost of any business in the food supply chain. Focusing on reducing food waste can have a direct, positive impact on the profitability of the business.

The supermarket chain ALDI uses sales data to carefully manage the volume of orders, works closely with suppliers in order to utilize as much of their crops as possible, designs its packaging methods to deliver optimum freshness and prevent wastage associated with damaged stock, and stocks a smaller range of products, encouraging higher stock turnover.^[76]

Audit business processes / supply chains: The levels of food waste and their causes may not be immediately obvious. A structured assessment of the operation can provide clarity and prioritize action.

Implementing waste-tracking and analytics systems allows retailers to change packaging sizes and prices in response to fluctuations in demand and supply. **Tesco** is among the retailers worldwide that

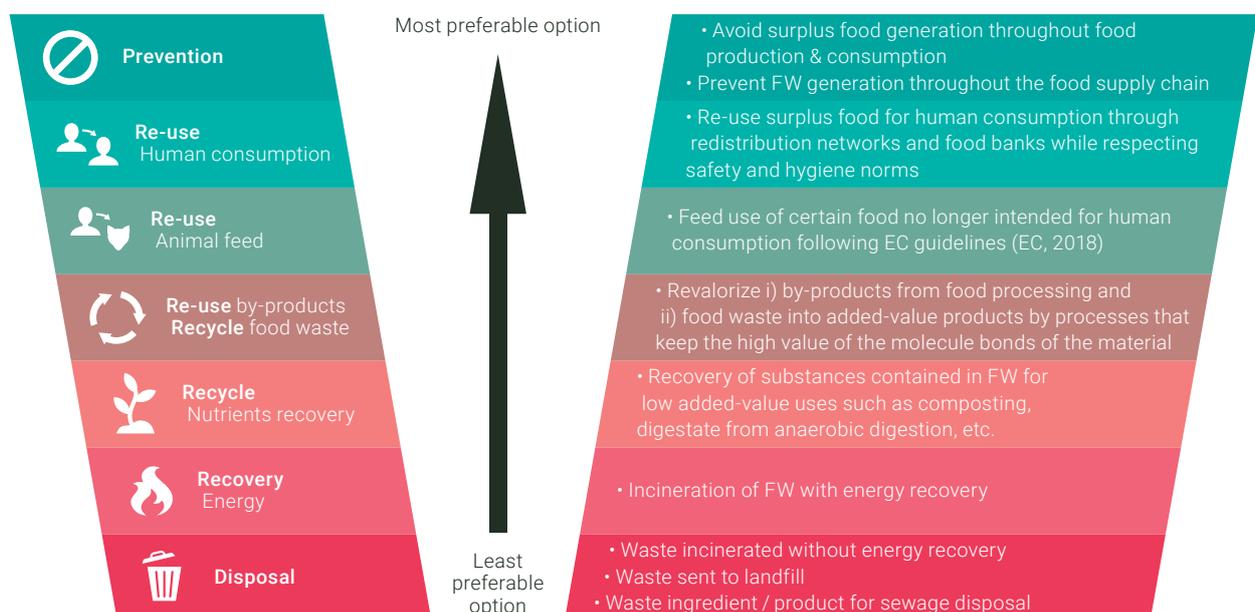
are leading the trend of tracking and reporting food waste, with services provided by US-based companies **Leanpath** and **Winnow**.

Consider specifications: Consider widening product specifications to help reduce associated post-harvest losses. Where specifications cannot be widened, consider alternative processing options or product offerings, where the specification requirements are wider.

Some companies now sell imperfect products to save food that would otherwise be wasted. For example, **Imperfect Foods** and **Misfits Market** exclusively sell imperfect produce that grocery stores cannot sell to consumers. In 2020, Imperfect Foods saved more than 22 million kilograms of food. Its website states that “By purchasing imperfect foods, our company and our customers help reduce waste and financially support the hard working people who feed our country.”^[77] A number of new business-to-business (B2B) marketplace models, such as **Full Harvest**, are also being developed to support producers and manufacturers to find alternative end markets for surplus product, that would otherwise go to waste.

The launch of a “wonky veg” campaign in major food retail chains is also helping reduce food waste.^[78] **Asda** sells “wonky veg boxes”, **Tesco** sells “wonky” cucumbers, pears, parsnips, potatoes and strawberries, **Morrisons** does a “wonky vegetables selection box” and **Lidl** introduced “wonky flowers”.

Figure 4: Practical application of the waste hierarchy for food



Note: FW stands for food waste.

Farm box/basket models can also help in providing seasonal, imperfect produce direct to the consumer, not only reducing post-harvest losses, but also increasing consumers' link with the provenance of their food and supporting local economies. The *Association pour le Maintien d'une Agriculture Paysanne* [Association Supporting Smallholders – [AMAP](#)] system, which originated in localities in the south of France, is now widespread across France.

Optimize storage: Providing the right levels and types of storage across the supply chain can protect food from pests and spoilage. Nestlé has worked with its dairy farmers in India to provide direct milk collection, investing \$12 million in storage, chillers and veterinary support. This change in transport and logistics has helped reduce milk losses to 0.6 per cent.^[79]

Smart packaging is emerging, where a smart thermostat communicates the temperature of the product in real time, so that business owners and supply chain managers can keep tabs on the temperature of their items to make sure they do not spoil and go to waste before reaching the shelf.^[80]

Redistribute for human consumption: Food is a precious resource that should be retained within the human food cycle wherever it is safe to do so. Commercial and charitable redistribution solutions can help direct safe and nutritious food that is at risk of going to waste to people, including those who may be in most need.

Launched in Denmark in 2015, the Too Good To Go app helps consumers buy food at a heavily discounted rate in order to prevent waste from restaurants, bakeries, cafés and supermarkets.^[81] This app is now operating in England, France, Germany, the Netherlands, Norway and Switzerland, saving millions of wasted meals.^[82]

National policies are also concerned about food waste in food retail chains. Globally, France is one of the first countries that has banned supermarkets and other food retail stores from throwing away unsold food stuffs that are approaching best-before dates. This food must instead be donated to needy communities.^[83]

Think carefully about animal feed: In line with the food waste hierarchy, where food cannot be retained within the human system, its use within the animal feed system should be actively considered, rather than diverting to options further down the hierarchy.

Progress up the hierarchy: Due to the environmental and social impacts of food waste, clear efforts should be placed on continuing to reduce food waste at source and opportunities to move waste streams up the hierarchy should be explored. This approach can also deliver increasing economic benefits to the business itself.

4.4.2 Enable action at the consumption level

In addition to tackling food loss and waste within production, processing and distribution, businesses can also play a key role in enabling reductions in consumer food waste. Consumer food waste is typically caused by poor planning, overbuying, inappropriate storage and spoilage, portion size miscalculations and misunderstanding of date labels. Key areas where businesses can help enable food waste reduction include:

Optimize packaging and portioning: Redesigning packaging can help optimize consumption, avoid residual container waste and minimize spoilage. With concerns regarding the environmental and social impact of packaging, it is important to optimize the balance between packaging and the risk of food waste and to leverage innovation in active and intelligent packaging.^[84]

With this concern in mind, businesses using biotech to preserve food products and minimize food waste are emerging. Start-ups such as [Apeel Sciences](#) and [Hazel Technologie](#) are finding ways to extend the expiry date of products by keeping the product in its ideal environment. Apeel Sciences created a plant-based edible coating which slows down water evaporation and allows the product to bypass its original expiry date. Hazel Technologie created a small packet which conditions the storage atmosphere to delay the produce's degrading process.

Review date labelling: Consumers are often confused by the differing date labelling protocols and their meanings. In the United States of America (USA), it is estimated that 80 per cent of consumers dispose of food prematurely, due to confusion over date labels.^[85]

Too Good To Go's labelling campaign encourages manufacturers to change "use by" labels to "best before" on products with flexible consumption dates, remove best-before dates where they are not needed and use the 'Look, Smell, Taste, Don't Waste' messaging in combination with best-before dates to

encourage consumers to use their senses to check products before disposing of them.

Flexible business models: By adapting business models, positive consumer food waste behaviours can be encouraged.

In the food service industry in the USA, providing smaller plates can reduce food waste left on the plate by 17 per cent in general^[86] and by 20 per cent for buffet arrangements.^[87] This reduces not only environmental impact but also the variable costs for the service operator.

Approaches towards taking home leftovers from food services vary worldwide. While in China taking home leftovers ordered in restaurants to avoid waste is widely accepted, in other countries discussions about whether to let eat-in consumers take home their leftovers are still in progress.^{[88],[89]} In France, restaurants, cafés and bistros are obliged to supply diners with “doggy-bags” if requested from July 2021, under a new law to reduce food waste.^[90]

Support and amplify campaigns: Consumer campaigns on food waste can shine a light on the scale of the problem and how consumers can reduce their own food waste.

Germany’s Ministry of Food and Agriculture launched the Too Good for the Bin campaign in 2012, which aims to reduce food waste among consumers and the entire supply chain and halve wasted food by 2030.

[91] In 2016, the Danish Minister for Environment and Food conducted campaigns to educate consumers about best-before and use-by labels in order to reduce food waste.^[92]

On the other side of the globe, the Clean Your Plate campaign in China was first launched in 2013 by a group of volunteers called N_33. It aimed to develop a lifelong habit of respect for food and remind people to stop wasting food, stop ordering extra food in restaurants and stop cooking extra food at home.

^[93] In 2016, the Chinese Government introduced a sustainable development plan which includes cutting food waste by 50 per cent by 2030, with local governments requiring all restaurants to have Clean Your Plate stickers and posters in order to promote the campaign, and increase food waste reduction awareness among local restaurant staff and consumers.

By taking an integrated approach to addressing food loss and waste, economic value can be released back into the business, alongside significant environmental and social value for society. This approach can also inspire innovative new business models and products.

In alignment with SDG target 12.3 of halving per capita global food waste by 2030, businesses leveraging food waste will likely grow, paving the way for more responsible consumption and production in the future.

5. Conclusion

Food plays a crucial role in all our lives, supporting not only our physical and mental health, but also the health of our environment, cultures and economies. Despite this, many of our food systems are degenerative and vulnerable to collapse, with the ensuing adverse social, environmental and economic impacts.

The global food system is complex, with many interdependencies with other systems. On the face of it, this can make it difficult for businesses to identify where to start and to take the initiative to deliver the changes required. This challenge can be further amplified by the different local contexts within which the food system operates and the complexities that they present.

In response to these challenges, this brief has provided three key areas in which a business can start taking action:

- Support the transition to nature-positive production.
- Contribute to a shift towards more nutrient-rich and plant-based diets.
- Act to reduce food loss and waste.

These action areas have been identified as being able to help enable transformative change within the food system and have the broadest application for businesses across it.

The world cannot afford for our food system to degrade nature, accelerate damage to the climate system, exacerbate malnutrition or increase social and gender inequity. Irrespective of our size or role within the food system, all people can all take action to support the changes needed. Together, we must drive genuine collaborative action to enable transformation to a nature- and people-positive food system that is economically sustainable, in line with the United Nations 2030 Agenda for Sustainable Development.

References

A link to all of the references can be found [here](#).

Glossary

A link to the glossary can be found [here](#)

Annex

A link to the annex can be found [here](#).