



Plant the seeds of a sustainable and secure food future

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Pope Francis, Laudato Si' Encyclical Letter - 'We are not God. The earth was here before us and it has been given to us.'

Recommendations to the World Economic Forum

- The international community must scale up immediate support (e.g., food and development assistance, income safety nets) to least developed countries, and work to minimize the risks of COVID-19-related food insecurity by maintaining open trade to keep the supply of food flowing across the world.
- Longer term, the international community must work to: 1. Increase agricultural productivity and use natural resources more efficiently; 2. Reduce food loss and waste; 3. Shift to healthier and more sustainable diets; 4. Link agricultural intensification with natural ecosystems protection; 5. Protect and restore peatlands; and 6. Accelerate support for technological innovation.
- Leaders from development aid donor and recipient countries should increase ambition and propose significant, science-based, measurable commitments for the Food System Summit 2021 to help the international community achieve the above objectives.

Background

As the coronavirus crisis continues, governments and international organizations are increasingly concerned about the growing constraints on access to food in many parts of the world. The recent World Food Programme '[Global Report on Food Crises](#)' warns that the number of people facing [acute food insecurity](#) could reach 265 million in 2020, a doubling of the 130 million in 2019. Lockdown measures are putting supply chains under pressure, while [prices for key staples are soaring](#) in some parts of the world. The pandemic and social distancing measures combined with rising unemployment and limited access to food could trigger violence, conflict and mass migration towards wealthier countries with stronger social networks. But food security is not only a current, urgent challenge. It is also a long-term challenge.

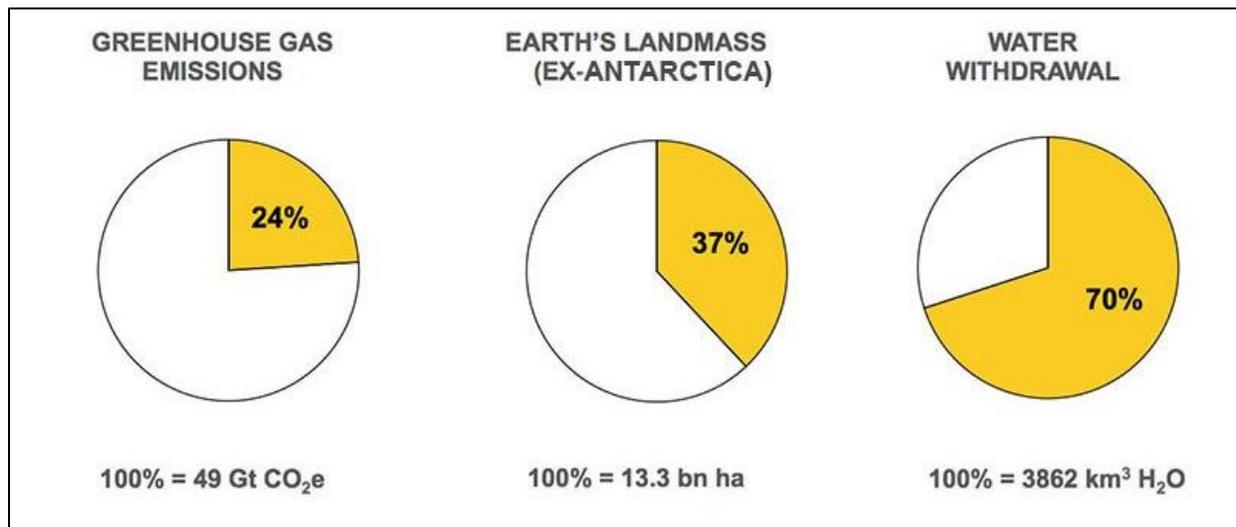
Analysis

As the global population grows toward a projected 10 billion in 2050, and incomes grow across the developing world, overall food demand is on course to increase by more than 50 percent relative to 2010, and demand for more resource intensive animal-based foods by nearly 70 percent. Yet today, [more than 800 million people](#) remain chronically hungry. In Africa, progress to reduce hunger has been modest, with only 9 out of 55 African countries currently on track to reduce under-nutrition to 5 percent or less by 2025, as agreed under the [African Union's Comprehensive Africa Agriculture Development Program](#) (CAADP).

[According to WRI analysis \(Figure 1\)](#), agriculture emits approximately one-quarter of annual greenhouse gas (GHG) emissions (taking into account land-use change), uses half of the world’s vegetated land, and accounts for 70 percent of the world’s freshwater use.

By 2050, under a “business as usual” scenario, the world could clear another 600 million hectares of forests for cropland and pastureland—an area nearly twice the size of India—and agriculture alone could consume the majority of the total allowable annual “carbon budget” to keep global warming below 1.5°C, in line with the Paris Agreement on climate change. Households, power, and industry increasingly compete with agriculture for scarce freshwater supplies. Climate change will further increase water scarcity, especially for rainfed agriculture. Farmers are used to variability of rainfall within a year, seen in the wet and dry seasons, but seasonal variability of water supply will increase in many areas as the climate changes. [WRI Aqueduct Food and water data shows](#) the amount of crop production facing high and extremely high seasonal variability will more than quadruple by 2040 relative to 2010 in a business-as-usual scenario.

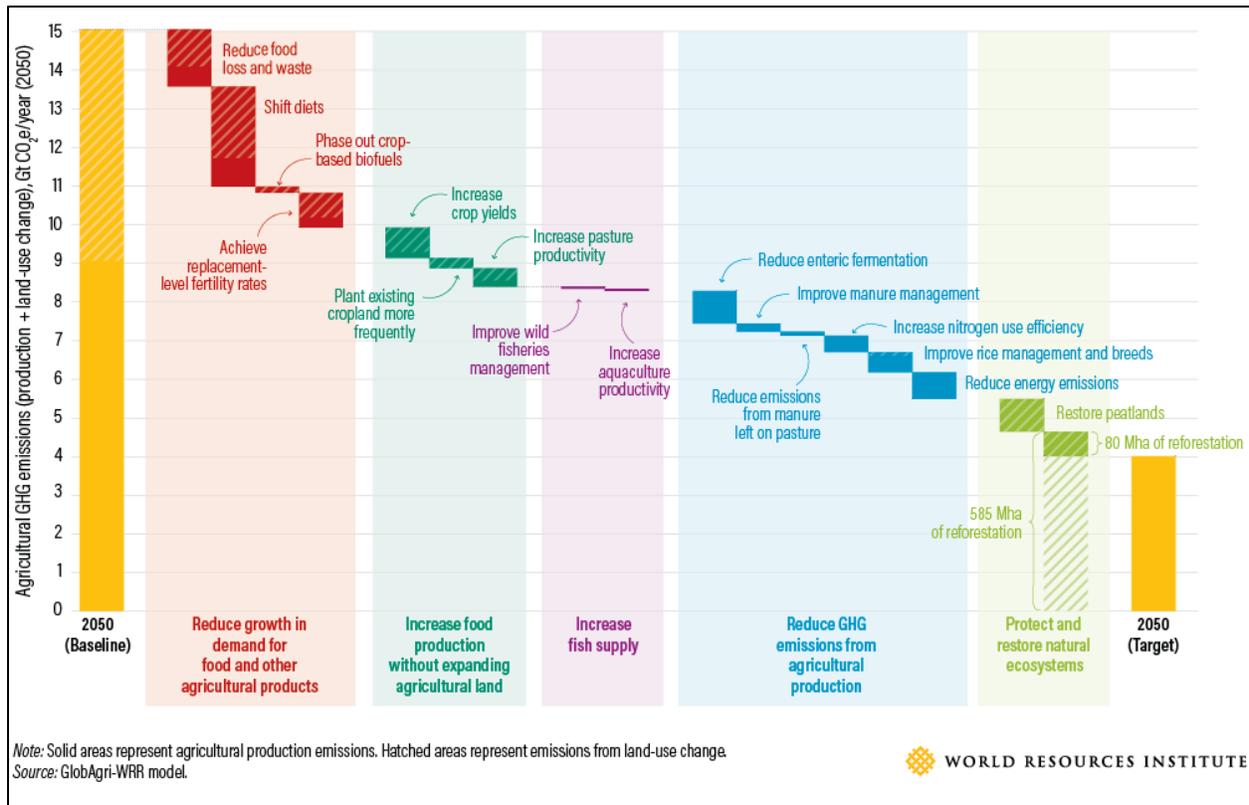
Figure 1: Agriculture’s Share of Global Environmental Impact (2010)



Sources: GlobAgri-WRR model (agricultural production emissions); WRI analysis based on UNEP (2012); FAO (2012a); EIA (2012); IEA (2012); and Houghton (2008) with adjustments (land-use change emissions); FAO (2011) (land use); OECD (2012) output from IMAGE model (water withdrawal).

In the months ahead, world leaders can help minimize the risks of COVID-19-related food insecurity by maintaining open trade to keep the supply of food flowing across the world and scale up support (e.g., food and development assistance, income safety nets) to the world’s most vulnerable populations. In the long term governments and the private sector must invest in creating productive, efficient, and resilient food systems. Such investments can not only create a more sustainable food future, but also contribute to national governments poverty, biodiversity, water, and climate change goals. As countries prepare responses towards the 2021 Food System Summit, this paper proposes high-priority investments and actions that governments and others can take to secure a more resilient, inclusive, and environmentally sustainable food system (Figure 2).

Figure 2: Recommended Actions to Sustainably Feed 10 Billion People by 2050



Policy Priorities

1 - Accelerate improvements in agricultural productivity and use natural resources more efficiently (land, water, nutrients, etc.) to meet food needs and environmental goals. This requires sustainable intensification: increasing crop yields at higher than historical rates, and dramatically increasing output of milk and meat per hectare of pasture and per animal—particularly cattle. It also requires moving to “climate-smart” forms of crop production, livestock rearing, fisheries, and aquaculture, that boost farmers’ incomes, reduce GHG emissions, and render food production more resilient to climate and water shocks. Crop and livestock breeding, improvements in soil and water management (e.g., agroforestry, rainwater harvesting, drip irrigation), and improvements to livestock feeding and grazing practices can all increase food production on existing agricultural land while minimizing additional resource use. Furthermore, management measures already exist to significantly reduce GHG emissions from agricultural production, including enteric fermentation by ruminants, manure, nitrogen fertilizers, methane from rice paddies, and more efficient and low carbon energy use.

2 - Reduce food loss and waste. Producing enough food for nearly 10 billion people while reducing environmental impacts will be difficult, if not impossible, without slowing the rate of growth in demand. A high priority should be reducing food loss and waste: approximately one-third of food produced annually by quantity is lost or wasted between the farm and the fork. This contributes to poverty and economic loss, food insecurity, resource inefficiency (land, water, nutrients) and avoidable GHG emissions. A

number of strategies can reduce postharvest losses and increase farmer incomes and resilience, including improved harvesting and food storage techniques and equipment, energy-efficient cold chains, and more agroprocessing. Improved infrastructure (e.g., roads, electricity) and access to markets can also reduce food losses. In developed countries, reducing food waste relies more on “nudges” that change consumer behavior, such as simplifying product date labels or reducing portion sizes. Governments can incentivize retailers to donate unsold food to charities and support the formation of small farmers cooperatives that would have more capacity and resources to purchase and own more advanced technologies.

3 - Shift to healthier and more sustainable diets. While 800 million of the world’s poorest people remain chronically hungry, higher income levels generally lead to higher consumption of sugars, fats, refined grains, and animal-based foods. Although some consumption increases can initially be beneficial for nutrition, a further shift toward unhealthy diets has led to more than 2 billion adults being overweight or obese, increasing the burden of diet-related noncommunicable diseases on already resource-stretched healthcare systems. Furthermore, convergence in diets among developing nations toward high meat consumption levels common in wealthy countries makes it even harder to feed 10 billion people, while reducing GHG emissions. Animal-based foods – and ruminant meats, like beef and lamb in particular – [are resource-intensive](#), with beef requiring 20 times the amount of land, 5 times the water, and emitting 20 times the GHGs, per gram of protein compared with beans. In high-income countries, a shift from high-meat diets toward a nutritious mix of plant-based foods can be beneficial for human health and the climate. These shifts can be encouraged by investing in development of meat substitutes, improved marketing of plant-based foods and plant-rich dishes, changing government food procurement policies, and changing food subsidies and taxes.

4 - Link agricultural intensification with natural ecosystems protection. Agricultural land is not merely expanding but shifting from one region to another (e.g., from temperate areas to the tropics) and within regions. The resulting land-use changes increase GHG emissions and loss of biodiversity. To ensure that food production is increased through yield growth (crop and livestock intensification) and not expansion into remaining natural ecosystems, and to avoid productivity gains from encouraging more shifting, governments must explicitly link efforts to boost crop and pasture yields with legal protection of forests, savannas, and peatlands from conversion to agriculture.

5 - Protect and restore peatland. Rewetting lightly farmed, drained peatlands that occupy only around 0.3 percent of global agricultural lands provides a necessary and cost-effective step toward climate change mitigation, as does reforesting some marginal and hard-to-improve grazing land. Reforestation at a scale necessary to hold temperature rise below 1.5°C (i.e., hundreds of millions of hectares) is potentially achievable but only if the world succeeds in reducing projected growth in demand for resource-intensive agricultural products and boosting crop and livestock yields. Furthermore, [recent FAO research show](#) that degradation of ecosystems, such as primary forests, rangelands and wetlands, often facilitate the spreading of zoonotic diseases.

6 - Accelerate support for technological innovation. Fortunately, researchers have demonstrated good potential in every necessary area above. Opportunities include crop traits or additives that reduce methane emissions from rice and cattle, improved fertilizer forms and crop properties that reduce nitrogen runoff, solar-based processes for making fertilizers, organic sprays that preserve fresh food for longer periods, and plant-based beef substitutes. A revolution in molecular biology creates new

opportunities for crop breeding. Progress at the necessary scale requires large increases in R&D funding, and flexible regulations that encourage private industry to develop and market new technologies.

Conclusion

There is no one silver bullet. Feeding 10 billion people in 2050 in a way that ensures healthy nutrition for all while ending poverty, halting deforestation, securing freshwater supplies, and greatly reducing GHG emissions is one of the paramount challenges facing humanity. The COVID-19 crisis highlights underlying fragilities in the food system, providing an opportunity to reform and lay the ground for positive change. Although a formidable challenge, a sustainable food future is achievable if governments, the private sector, and civil society act quickly and creatively, approaching the challenge from both a production and consumption perspective, and making the links to other national goals (e.g., health, poverty and rural development, water security, climate, and biodiversity).