



Food and Agriculture
Organization of the
United Nations

The future of food and agriculture

Alternative pathways to 2050

OVERVIEW

This report presents a foresight exercise undertaken to identify potential strategic options for achieving the Sustainable Development Goals (SDGs) concerning food and agriculture.¹ The overarching concern regarding the future of food and agriculture is whether these systems will be able to sustainably and effectively feed everyone by 2050 and beyond, while meeting the additional demand for agricultural commodities due to non-food uses.

To address this overarching concern, the report analyses potential future scenarios that reflect, to varying degrees, the challenges to move food and agricultural systems towards “a world in which food is nutritious and accessible for everyone and natural resources are managed in a way that maintain ecosystem functions to support current as well as future human needs”, as wished by FAO. The first scenario is “business as usual”, whereby despite the efforts of many countries, several outstanding challenges facing food and agriculture are left unaddressed. The second scenario, “towards sustainability”, embodies proactive changes towards more sustainable food and agricultural systems. The third scenario, “stratified societies”, outlines a future with exacerbated inequalities across countries and throughout different layers of societies.

The evidence contained in this report, based on accurate quantitative analysis and solid qualitative assessments, suggests that it is still possible to move food and agricultural systems along a sustainable, equitable pathway that will meet growing demand. However, a global transformative process and concerted efforts are needed that involve all the stakeholders, comprising governments, international agencies, civil society organizations, private producers and consumers, as well as academic and research institutions. All stakeholders are invited to give due consideration to this report and related material, such as the global web-database of country-level projections. It is hoped that this long-term foresight assessment will be of use to them all as a starting point for dialogues and strategic policy processes aimed at shaping sustainable development patterns at country, regional and global levels.

¹ In this report, “agriculture” comprises all agricultural sectors including crops, livestock, fisheries and forestry.

KEY MESSAGES

Food and agricultural systems are affected by trends that could jeopardize their future sustainability.

Population and income growth drive the demand for food and bring about changes in people's dietary preferences. Persistent poverty, inequality and unemployment constrain access to food and hamper the achievement of food security and nutrition goals. Agricultural production is limited by the increasing scarcity and diminishing quality of land and water resources, as well as by insufficient investment in sustainable agriculture. Climate change is increasingly affecting yields and rural livelihoods, while agriculture continues to emit greenhouse gases (GHGs).

Changing course is critical – “business as usual” is no longer an option.

If food and agricultural systems remain on their current path, the evidence points to a future characterized by persistent food insecurity and unsustainable economic growth. Many countries and regions are already committed to increasing the sustainability of their food and agriculture systems. However, fully meeting Sustainable Development Goals (SDGs) targets, as envisaged by the 2030 Agenda for Sustainable Development, will require additional efforts to address growing inequalities and gender imbalances, sustain peace, reduce GHG emissions, avoid resource depleting farming systems, manage the demand for resource-intensive animal food products, and reduce food loss and waste, among other challenges.

A more sustainable future is attainable, but getting there will not be easy.

To move away from “business as usual”, all societies will be required to renew the assets used to produce goods and services, or capital stock, develop new solutions, and implement innovative technologies. In the spirit of solidarity enshrined in the SDGs, countries and social groups that can reasonably shoulder the costs involved in the necessary transformations have to provide support to those already affected by the negative effects of unsustainable development, and help them prepare a better future for the next generations.

All countries must commit to responsibility-sharing in implementing fundamental changes.

The global transformative process required to improve the sustainability of food and agriculture transcends the divide between “developed” and “developing” countries. All countries will be affected in this process, as “fundamental changes in the way societies consume and produce are indispensable for achieving global sustainable development” (Rio+20. *The future we want*).

Raising consumer awareness will help contain the need to unnecessarily expand food production and reduce the “triple burden” of malnutrition ...

Agricultural production is expected to rise worldwide in response to population growth, dietary changes and increased incomes. Raising consumer awareness about environmentally sustainable and healthier diets, reducing food waste, pricing food to reflect the negative externalities of its production, and limiting the use of grains for biofuel production will all be critical to curb the demand for agricultural products. These actions will also be critical to reduce the “triple burden” of malnutrition that is, undernourishment, micronutrient deficiencies, and overweight and obesity, that often exist within a single country or even community.

... but producing more will be unavoidable, and the way forward is doing so with less.

Those working in food and agriculture must learn how to satisfy a growing demand under more significant resource constraints by improving land and water use, reducing GHG emissions, increasing efficiency in energy production and consumption, and restoring soils and forests. These are just some of the variety of strategic options to consider in search of sustainability.

While moving towards sustainability, food prices might increase ...

If the entire range of production and consumption costs is taken into account, including resource degradation and GHG emissions, evidence indicates that food prices are likely to increase significantly. Such increases could lead to a more careful use of both natural resources and of food itself.

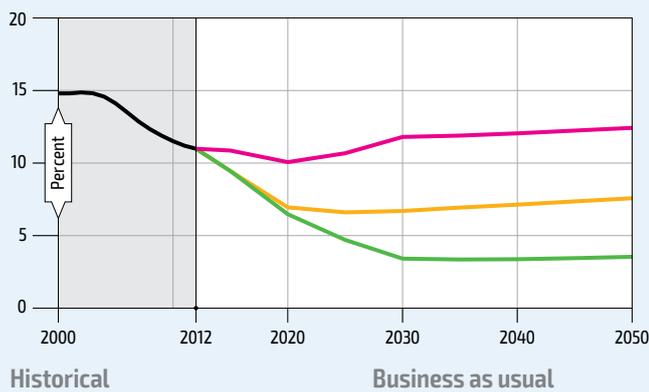
SELECTED FINDINGS

A key message emanating from the rigorous quantitative analysis and qualitative assessments of the scenarios is that, to meet the SDG targets for ending hunger and achieving food security and better nutrition, it will not be necessary to increase agricultural production by even 50 percent from 2012 to 2050. These SDG targets could be met with a much lower expansion of agricultural output as long as production systems are more sustainable, on the one hand, and income and food are more equitably distributed between and within countries, on the other.

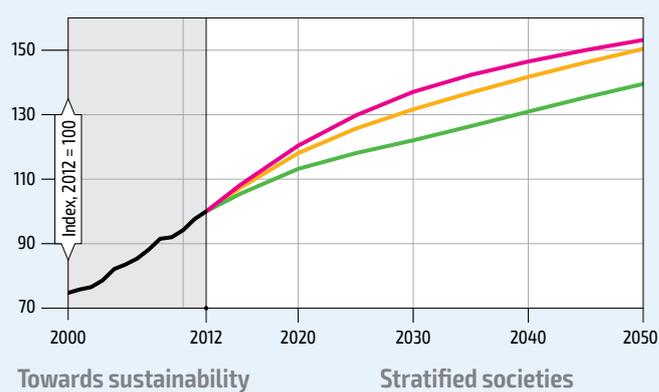
Clear and consistent results from the scenario analysis, globally and across country groups, are that “business as usual” leads to significant undernourishment by 2050, even if gross agricultural output expands by 50 percent from 2012 to 2050, which would in turn contribute to increasing GHG emissions. These negative trends are further exacerbated in the “stratified societies” scenario, as shown in the three figures below.

In the “towards sustainability” scenario, on the contrary, undernourishment shrinks drastically even if agricultural production increases only in the vicinity of 40 percent, while GHG emissions are significantly cut. Undernourishment is drastically reduced because income and food are more fairly distributed between and within countries. More balanced diets in high-income countries, likely to bring beneficial impacts on overweight, obesity and related non-communicable diseases, also contribute to curbing the expansion of livestock activities, which is in turn a key factor to achieve the more limited expansion of agricultural output and arable land, and the significant reduction in GHG emissions. Overall, consumption and production patterns are more sustainable.

Prevalence of undernourishment



Gross agricultural output



Source: FAO. 2018. *The future of food and agriculture – Alternative pathways to 2050*. Rome.

Projected agricultural greenhouse gas emissions for different scenarios



Note: Greenhouse gases are expressed in gigatonnes (billion metric tonnes) of carbon-dioxide equivalent (GtCO₂eq).

Source: FAO. 2018. *The future of food and agriculture – Alternative pathways to 2050*. Rome.

... yet environmental sustainability and food security can still go hand in hand.

While moving food and agricultural systems towards sustainability may drive up food prices and restrain global agricultural output, the per capita food availability and access to food in low- and middle-income countries can improve substantially if a more equitable distribution of income within and across countries is pursued.

A more equitable income distribution is a must ...

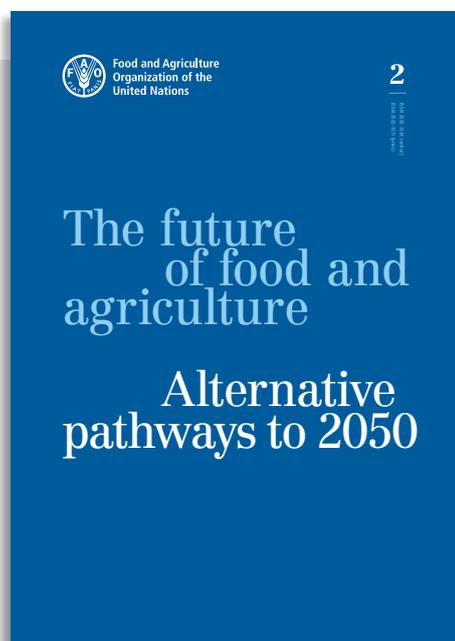
Ensuring a more equitable distribution of income within and across countries is indispensable in the quest for food security, better nutrition and environmental sustainability of food systems. Among the strategic options to achieve this goal are: promoting sustainable technologies; facilitating the access to markets for family farmers; building stronger institutions to ensure competitive, transparent and fair markets for agricultural inputs and outputs; implementing effective social protection schemes and equitable fiscal systems; and reducing illicit financial flows that drain resources from low-income countries.

... and requires strengthening access to assets for vulnerable groups.

Secure and equitable access to assets such as land, water, capital and credit will, together with improved information and enhanced skills and know-how, significantly improve the earning potential of the poorer segments of society. This is true for both people who will remain engaged in agricultural activities and for those who will move out of agriculture to engage in other productive sectors.

Food and agricultural sectors are key, but are no longer enough on their own to ensure equitable access to food.

Crops, livestock, fisheries and forestry continue to be important for employment and income generation in low- and middle-income countries. However, these sectors alone no longer provide enough jobs or income-earning opportunities. On the one hand, agriculture and family farming in particular, must be more firmly linked to the broader rural and urban economy. This can be done by developing agro-industries and setting up infrastructure to connect rural areas, small cities and towns. On the other hand, strong institutions supported by efficient fiscal systems, are needed to ensure economy-wide income-earning opportunities, effective social protection, and competitive and equitable domestic and international markets for inputs and outputs. All these aspects are critical to improve the efficiency and equity of economic systems and facilitate their structural transformation. In addition, interventions to reduce GHG emissions in agriculture will not pay off significantly if efforts to boost energy-use efficiency are not simultaneously undertaken on an economy-wide basis.



The publication *The future of food and agriculture – Alternative pathways to 2050* is available at:
www.fao.org/3/I8429EN/i8429en.pdf
www.fao.org/publications/fofa

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