

# **Feeding the world**

How can we produce enough food for an ever-expanding population without causing irreversible environmental damage?

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ood production through industrial farming, with heavy use of synthesised fertilisers, herbicides and pesticides, has led to detrimental impacts worldwide. Carbon releases have significantly added

to the greenhouse gases (GHGs) present in the atmosphere, possibly magnifying temperature variations and affecting the global climate. The use of heavy machinery compacting soils has led to increased soil erosion and loss of nutrients, and has reduced the ability of roots to penetrate to greater soil depths to absorb water and nutrients.

The planet is losing about 0.3 per cent a year of its capacity to produce food due to soil degradation. Soil erosion poses a major threat to global food security and to the achievement of the Sustainable Development Goals (SDGs). Controlling soil erosion is linked to achieving SDGs 2 (on food security), 6 (on clean water provision) and 15 (on curbing desertification and halting biodiversity loss).

The chemicals employed to eliminate or reduce the presence of weeds, insects and pests also have a major adverse impact on

◄ Tree nursery in Banfora Department, Burkina Faso. As well as making extensive use of trees in agroforestry, Burkina Faso is part of the Great Green Wall project to curb the spread of desertification in the Sahel

beneficial insects, pollinator bees and birds. This in turn affects consumable and other vegetation as well as surface water bodies and groundwater. The total number of insects has plummeted by 60 to 75 per cent in the past 25 to 30 years, and nearly half of insect species are now threatened by extinction. So we urgently need to define more clearly the causes and impacts of using chemicals in industrial agriculture, lawns and gardens.

We need to investigate thoroughly the effects on plant and animal life of the increasing use of genetically modified organisms (GMOs), which enable the application of potent chemicals. The use of GMO crops, which are patented by mega companies, has a negative impact on the ability of farmers to use locally produced seeds. It has also displaced many of the original crop species and varieties that indigenous peoples and their successors had been planting and consuming for centuries. This is a threat to genetic and species diversity, and has serious consequences for human health and cultures.

## Reconciling agriculture with biodiversity

Can nature be part of human-dominated landscapes? Land has traditionally been spared to protect biodiversity. However, the areas of land that are available for this purpose are often not large enough to sustain viable populations of wildlife. We need a complementary strategy in humandominated landscapes: land-sharing.

Reconciling farming and nature is possible in landscapes that truly share space. The Aichi Biodiversity Target 7 of the Convention on Biological Diversity expresses the need to provide the conditions for compatibility between biological diversity and production of goods and services for human society on the same land. In addition, we need to promote biodiversity islands (pockets of protected land in human dominated landscapes) to safeguard the sustainability of current plant and animal species. Agroforestry systems (AFS) that combine trees and crops on the same land can increase productivity in the short and long term, and are also biodiversity friendly. AFS can help farmers as they seek to adapt to climate change, due to the ameliorating effects of trees on air temperatures. Agroecological systems, which include AFS, are also more resilient to hurricanes. Such systems can population growth, land productivity in agriculture and forestry must increase. If we calculate based solely on monocultures, the sum of areas needed to achieve the SDGs at current production levels exceeds what is available on the planet.

But with the appropriate combinations of trees, crops and livestock, agroforestry – a system that integrates forest and

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create an opportunity to rethink land-use practices, to make land more resistant and resilient to the increased intensity and frequency of storms and other disturbances.

Sound agricultural management – including agroecological practices, agroforestry, regenerative agriculture and conservation agriculture – can also increase soil quality and decrease or halt soil erosion. These techniques are being developed and promoted by the UN (including through its Food and Agriculture Organization) and several international, regional and local institutions.

Recommended practices to maintain soil quality include:

- adding organic matter;
- adding ashes from wood burning;
- minimising soil disturbance (for example, practising 'minimum tillage');
- conserving soil and water;
- improving soil structure;
- enhancing biological activity.

This can be accomplished by using integrative nutrient management (for example, composting, mulch farming, planting cover crops), diversifying cropping systems and using mixed production systems such as agroforestry.

### How AFS can help achieve the SDGs

If the SDGs are to improve wellbeing for large numbers of people in developing countries, then given current human agriculture – can offer a range of goods, benefits and services simultaneously. It can therefore provide nutritious food, renewable energy and clean water while conserving biodiversity. By allowing efficient, multifunctional land use, agroforestry supports 'sustainable intensification'.

AFS can make a significant contribution to several of the Global Goals: SDG 2 (on hunger), SDG 5 (on gender equality), SDG 6 (on clean water), SDG 7 (on affordable, clean energy), SDG 10 (on reducing inequalities within and among countries), SDG 13 (on climate action) and SDG 15 (on halting biodiversity loss).

And because of the interconnected nature of the SDGs, AFS make contributions to achieving an even wider range of goals than immediately apparent, including SDG 1 (on poverty), and SDG 3 (on good health and wellbeing). AFS can promote diverse SDGs simultaneously for an enhanced combined contribution to the post-2015 sustainable development agenda.

# Increasing sustainable food production

Neither a world free of hunger nor of poverty can be achieved by 2030 without a substantial increase in capital flows in agriculture and food systems. Public and private, as well as domestic and foreign, investment must increase to reach these goals, particularly for the small-scale producers who grow about 70 per cent of the world's food. Increased funding for agriculture needs to include financing energy alternatives. This is especially true when people's lives are in peril from health hazards caused by inefficient cooking and heating devices, whose use accounts for nearly 50 per cent of roundwood (unprocessed timber) consumption worldwide.

A relatively modest expenditure to promote the use of more efficient cook stoves and alternative fuels would have a major impact on decreasing tree cutting, reducing GHG emissions, increasing carbon sequestration and saving millions of lives.

In addition, safe water supplies for consumption and food production must be secured and promoted worldwide.

Several international programmes and projects, non-governmental organisations and many academic and government entities are conducting research for development aimed at decreasing rural poverty and hunger while maintaining landscape integrity and ecosystem services. These programmes work on topics such as:

- identifying the most suitable systems and management techniques that can contribute to achieving SDGs in target regions;
- how to integrate the traditional knowledge of smallholders with scientific knowledge on environmental and agricultural strategies to promote the most suitable systems for each situation;
- how smallholders can access markets for their products, allowing them to capture more of their value, especially for people who are socially or economically marginalised;
- how AFS and other sustainable food production systems can be scaled up from local situations to regional and international applications;
- how to ensure land tenure and ownership for indigenous people that have used and occupied lands for hundreds of years.

We must ensure these efforts are well supported. The risk to ecosystems worldwide from protecting monocultures with high doses of potent chemicals is clear. To be able to feed all the people, we must urgently switch to sustainable food production systems and practices.



# 151 151 million 51 51 million 38 million Stunting Wasting Overweight

After a prolonged decline, world hunger appears to be on the rise again. Conflict, drought and disasters linked to climate change are among the key factors behind this reversal

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

> Aid to agriculture in developing countries totalled \$12.5 billion in 2016, falling to six per cent of all donors' sector-allocable aid, from nearly 20 per cent in the mid-1980s



Source: The Sustainable Development Goals Report 2018, UN

### Share of the population that is undernourished

This is the main FAO hunger indicator. It measures the share of the population that has a caloric intake which is insufficient to meet the minimum energy requirements necessary for a given individual. Regional aggregations are based on World Bank regions and exclude high-income countries. They may therefore differ from UN FAO regional figures.

