



FACTSHEET

Food

In a nutshell

Virtually all ecosystems provide the conditions for growing, collecting, hunting or harvesting food.

1. Role for human well-being

Growing food crops, breeding livestock and fishing contribute to nutrition, agricultural value added and food security. In many developing countries in particular subsistence agriculture, the consumption of bush meat, the harvest of edible forest products and small-scale fisheries ensure sustainable livelihoods. See, for example, the [FAO Technical paper 581](#) to better understand the value chains and distribution of benefits of small-scale fisheries in developing countries.

2. Typical threats

The long-term capacity of (agro-) ecosystems to supply food is harmed by overuse and by unsuitable management practices. Where land use is not adapted to local ecological conditions, this can lead to degradation (e.g. soil acidification or erosion) and desertification of fertile land. The long term effects of heavy use of agro-chemicals are often disastrous.

A lack of sustainable fishing quotas and techniques can lead to the irreversible loss of fish species in freshwater and marine ecosystems. Sustainable aquaculture is a promising alternative. Conventional aquaculture is largely based on the input of wild fish for feeding and often has powerful adverse ecological and socio-economic impacts. See FAO report: [The State of World Fisheries and Aquaculture](#).

In many developing countries the availability of food is negatively affected by climate change. Effects such as extreme events (e.g. droughts or heavy rainfall) and the long-term shift of regional rainfall regimes will worsen in the future. See, for example, the FAO report [Managing climate risks and adapting to climate change in the agricultural sector in Nepal](#).

A major threat to small-scale and subsistence agriculture or extractive use can be uncertain land tenure or use rights. A shift from subsistence agriculture to cash crop production, such as coffee or cocoa, can significantly increase income from agriculture. However, typically most of the profit is not retained at farm level. Conversion to cash crops also brings the risk of threatening a region's food security or increasing malnutrition: as local food production declines, food prices rise. [Foreign investments in developing countries' agriculture](#), large-scale land use changes for intensive export-oriented agriculture or tree plantations, river diversions and the construction of dams are other factors that can threaten small-scale agriculture. Similarly, the establishment of protected areas or other conservation measures which prohibit local people from extracting the plants and animals important to their livelihoods can also diminish this service.

3. Example indicators

- Economic statistics often provide the volume of trade in goods or meat in an area (\$/t) or the income per capita (\$/capita) related to agricultural food production.
- Often statistical bureaus or departments of agriculture/environment provide indicators related to the provision of food, such as the harvest volume removed in an area (kg/ha/yr) or the market price for extracted agricultural goods per area over time (\$/ha/year).





- To assess the importance of subsistence use, it is necessary to look at production and consumption at household level (kg/household/year).
- To measure the contribution of food to human nutrition, total dietary intake of carbohydrates and proteins can be assessed in cereals (Kcalories/person/day) or in meat and fish. For further information see [CBD TCS No 58, p. 87](#).
- To discover the extent to which production and harvesting is being maintained at a sustainable level, the indicator 'maximum sustainable harvest' (kg/ha/yr) needs to be specified for local conditions.
- For wild plants or animals the stock of species (population density/ha) can give information on the sustainability of harvesting levels.
- The potential forage production for livestock can be assessed by the number of hectares required per large stock unit (LSU). For further information see [CBD TCS No. 58, p 92](#).

Global available sources for national data:

- [FAOSTAT](#) offers a range of national statistics for the production and trade of food, e.g. yield/ha, quantity produced and food price/kg.
- [GEOSS Portal](#) offers agricultural data mostly related to remote sensing (hosted by [GEOBON](#)).
- The [World Bank](#) offers indicators such as agricultural value added per worker or threatened fish species.
- The [FAO Fisheries and Aquaculture Department](#) and [FishBase](#) provide data on fisheries especially.

4. Example methods

For **assessing the value** of this ecosystem service:

- [Direct market price](#)
- [Production approach](#)
- [Factor income](#)
- Social assessments e.g. [Health Impact Assessment \(HIA\)](#)

For **assessing the condition** of this ecosystem service:

- Models such as [SWAT \(Soil and Water Assessment Tool\)](#) can be useful to predict a wide range of biophysical variables under different types of agricultural land use.
- By assessing the [areas under sustainable management](#), information is gathered on the extent of resource-conserving interventions with reported positive impacts on social, economic and environmental conditions.
- The [Wild Commodities Index](#) indicates whether wild terrestrial, freshwater and marine animals and plants are used in a sustainable way.
- The free software ADePT-Food Security Module was developed to [analyse food security using household survey data](#). These indicators, derived at national and subnational levels, include the consumption of calories and macronutrients, the availability of micronutrients and amino acids, the distribution of calories and the proportion of people undernourished.





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5. Managing this service

It is crucial to keep in mind that land use decisions relating to the production of food and raw materials – especially intensive forms of production for commercial products – very often involve trade-offs with the provision of other ecosystem services. In most cases, regulating and cultural services are affected. However, intensive production of jatropha or coffee, for example, can also diminish local food production. For an example, see this [video](#) which highlights the intricate trade-offs associated with jatropha production related to a large jatropha plantation in Mozambique and a smallholder jatropha project in Malawi. Tools for management should make trade-offs explicit and include them in land use and management decisions. Typical instruments for managing this service include:

Agricultural techniques less harmful to the environment, e.g. organic-farming, agro-forestry systems or improved irrigation management

- At the [Amu Darya delta](#) and at the foot of [Kilimanjaro, Kenya](#), cooperative irrigation management has helped to increase the provisioning of food in wetlands while providing further benefits for local communities.
- In [Siberia, organic farming in a private protected area](#) yields good returns while maintaining habitats for birds.
- The [Sustainable Land Management Sourcebook](#) by the World Bank provides various good practice case studies for sustainable food production in developing countries.

Restoration of ecosystems, use restrictions and development of alternatives to unsustainable subsistence use

- There are promising [livelihood alternatives to the unsustainable use of bush meat](#).
- In [Argentina](#), conservation strategies are being pursued to avoid the collapse of commercial fish stocks and of the fishing industry. Zoning and compliance with catch quotas are expected to help fish stocks to recover.
- In cooperation with the government and communities in [Sierra Leone](#) a Marine Protected Area has been established and sustainable, alternative livelihood options developed to reduce over-fishing.
- In [Hail Haor, Bangladesh](#) and at [Lake Rupa, Nepal](#), community-based approaches to the management, restoration and conservation of wetlands and lakes have helped to increase fish catches for local communities.

There is plenty of further guidance for sustainable methods of food production. See for example:

- [CBD Good Practice Guide: Pastoralism, Nature Conservation and Development](#)
- The [FAO Corporate Document Repository](#) offers a wide range of guidance reports and management recommendations related to the provision of food.
- Among other useful information related to this service, the World Bank provides [sourcebooks and toolkits for agricultural and rural development](#).

On behalf of:



of the Federal Republic of Germany



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