# Forests, Food Security and Nutrition

## Basic Knowledge



**Welcome to the module on forests, food security and nutrition. This module is intended for public and private forest and land managers who wish to increase the contributions of forests and trees outside forests to food security and nutrition. The module provides practical knowledge, strategies and tools for using sustainable forest management (SFM) to do so.**

It is estimated that 795 million people are chronically undernourished. Forests make up one-third of the Earth's land area, and another half of the total land area has sparsely scattered trees. An estimated 2.4 billion people worldwide depend in various ways on forests and trees outside forests for their food security and nutrition. For example, more than 50 million people in India depend directly on forests for food consumption and good nutrition. In 2011 it was estimated that 80 percent of people in the Lao People's Democratic Republic consumed wild forest foods daily.

**Food security** can be defined as the state in which "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". Food security is fully achieved when food is physically available (*availability*); economically, physically and socially accessible (*access*); and usable (*utilization*); and when these three conditions are stable over time (*stability*). Each of these dimensions of food security is affected by the health and vigour of forests and trees outside forests; therefore, the role of SFM is vital for sustainable food security and nutrition.

***Availability***

Forests and trees outside forests contribute to the availability dimension of food security by increasing food supply at the national level. Many edible non-wood forest products (NWFPs) gathered in the wild have considerable nutritional value because of the micronutrients they contain. Medicinal plants provide a wide range of health benefits and contribute to the primary health care of many millions of people. SFM can ensure a continuous supply of edible NWFPs, and it also supports agricultural and fishery production indirectly by providing forest environmental services related to pollination, soil health and clean water.

***Access***

When managed sustainably, forests and trees in rural landscapes help increase income by providing multiple renewable resources to meet market demand for food, wood, fodder, fibre, biofuel, shelter and other products, as well as for environmental services. The income generated formally and informally from forests was estimated at US$730 billion globally in 2011. Income earned in the forest sector, including through small and medium-sized forest enterprises, is an important means by which forest-dependent households gain economic access to food.

***Utilization***
Food security and nutrition requires food of adequate quality and quantity prepared and consumed in a healthy environment. The sustainable production of woodfuel is vital for the 2.4 billion people who rely on woodfuel as their main energy source for cooking and water sterilization. Many forest-dependent households have limited access to other sources of energy for food preparation; woodfuel plays an essential role in the preparation of food in a proper and safe manner in such households and therefore in the food security and nutrition of household members.

***Stability***
The availability and usability of, and access to, foods must be maintained over time if food security and nutrition is to be achieved. Especially in times of climatic shocks and livelihood risks, SFM helps maintain healthy, productive forests and thereby provides a functioning safety net for ensuring adequate food security and nutrition.

### Forests, food security and nutrition contributes to SDGs:




### Related modules

- Agroforestry
- Development of forest-based enterprises
- Forest tenure
- Health benefits from forests
- Management of non-wood forest products
- Mangroves restoration and management
- Watershed management
- Wildlife management

## In more depth

The global population is projected to increase from 7.3 billion in 2015 to 9.5 billion in 2050, with most of this growth taking place in the developing world. Ensuring the food security of a population of 9.5 billion people will require an increase in food production of 60 percent globally and nearly 100 percent in developing countries, even without taking into account the ongoing "nutrition transition" in many emerging and developing countries, in which the intake of foods such as meat and dairy products is increasing. The daunting challenge of achieving food security for a growing global population is made even more complex by the looming threat of climate change and an associated increase in the frequency and severity of weather events, as well as by growing water and land scarcity, soil and land degradation, a deteriorating natural resource base, and food price volatility.

Although sustainably managed forests, and trees outside forests, contribute to food security and nutrition in many ways, those contributions are largely misunderstood, underestimated and inadequately considered in policies. The following sections discuss the main contributions of SFM to food security and nutrition.

***The role of woodfuel and non-wood forest products***

A vital way in which forests contribute to food security and nutrition is in the provision of woodfuel as a household energy source. A sustainable energy supply is essential for proper and safe food and water use and therefore for family health. An estimated 2.4 billion people, primarily in developing countries, rely directly on woodfuel for cooking, food processing and water sanitation. Preparing food using woodfuel – such as by smoking or drying – extends the shelf-life of foods and enables their use in lean times. Boiling is by far the most common method for sterilizing water, and an estimated 765 million people (10.9 percent of the global population) rely on wood energy to do this.

The management of the woodfuel resource can indirectly affect the stability, quality and quantity of food consumed. A study in rural Ghana, for example, showed that the proportion of household budgets spent on woodfuel rose from 1 percent to 15 percent over a five-year period during which woodfuel prices increased due to resource scarcity. Money usually spent on food was diverted to woodfuel purchases, leading to a reduction in the number of meals consumed daily in poor households. On the other hand, the sustainable management of a woodfuel resource will deliver a sustainable supply of woodfuel and thereby assist in ensuring food security and nutrition over time.

SFM can deliver important forest environmental services that assist in food security and nutrition. For example, SFM can maintain healthy water catchments, thus reducing the risk that forest-dependent households will be exposed to water-borne diseases (e.g. diarrhoea), which commonly weaken people's capacity to absorb and use their nutrient intake. Many NWFPs are used as medicines to treat ailments: for example, at least 1 billion people are estimated to use herbal and home remedies to treat children's diarrhoea.

***Forestry income and improved access to food***

Income earned from forest activities can improve food security and nutrition for poor rural people who otherwise may lack sufficient money to purchase food. Tropical forests are often home to very poor people because of their remoteness and the lack of external investment. In such areas, the collection, processing and sale of wood and non-wood products (and, in some instances, activities involving non-consumptive uses of forests, such as ecotourism) can generate substantial employment and local income.

Globally, the formal and informal forest sectors generated an estimated US$730 billion in income in 2011. Small and medium-sized forest enterprises, which are generally more likely than large enterprises to be controlled locally, can help forest-dependent people gain economic access to forests. For example, small and medium-sized forest enterprises based on NWFPs play important economic roles in arid and semi-arid areas where agriculture is vulnerable to threats such as drought or extreme weather.

***Enhanced resilience and safety net for stability***

SFM can help reduce the vulnerability of food security and nutrition to climatic volatility and natural disasters. For example, areas buffered by coastal forests such as mangroves were less prone to damage in the 2004 Asian tsunami than areas that lacked forest protection. The restoration and sustainable management of mangrove ecosystems helps protect urban areas and coastal agriculture from the effects of tsunamis and storm surges and can also increase fishery and forestry production, which artificial coastal protection structures cannot do.

Forests perform other environmental services vital for food security and nutrition. For example, they regulate water flows and help keep water catchments healthy. They are home to more than three-quarters of the world's terrestrial biodiversity and thus an irreplaceable genetic resource for the future development of agricultural crops, medicines, fuels and other materials. Forests further support agriculture by providing habitat for pollinators and offering protection against climatic extremes. Agroforestry arrangements can increase the productivity of agricultural lands while also diversifying diets.

Diverse, locally adapted production and resource management systems tend to increase the resilience of rural households in the face of change. Many rural households living in poverty face periodic “lean seasons” – times of the year when crops are growing but are not ready for harvest and when stocks from the previous season are exhausted. Forests can be vital for such food-insecure households in such lean seasons, acting as a safety net when food shortages are greatest.

***Edible non-wood forest products***

The most recognized contribution of forests to food security and nutrition is the direct provision of forest foods, which can support a nutritious and diverse diet. Plants and animals found in forests provide important nutrient-rich supplements, add variety to the bland diets common in rural, food-insecure households, and improve the taste and palatability of staple foods.

Many of the edible NWFPs gathered in the wild have high nutritional value in terms of micronutrients; medicinal plants found in forests can also provide many health benefits important for food security and nutrition. For many people, forests and forest fallows may be their only source of animal protein.

Wild animals consumed by humans include birds (and their eggs), fish, insects, mammals and reptiles. Although often seasonal, caterpillars are a common food item among forest-dependent communities: they are abundant and easy to gather, and they have higher protein and fat content and provide more energy per unit than meat or fish. Wild meat – defined as non-domesticated terrestrial mammals, birds, reptiles and amphibians harvested in the wild for food – is the main source of animal protein in many tropical forest regions, especially the Amazon and Congo basins. The rate of wild-meat consumption depends on the availability and abundance of such animals, which varies greatly between regions and according to national policies and regulations governing the hunting and consumption of wild animal species.

SFM can play an important role in managing diverse species of forest foods and medicinal plants and enabling their sustainable harvest. SFM can ensure that the abundance and diversity of forest species are maintained, and it can also assist in enforcing forest laws to avoid the overharvesting of species.

The following are examples of edible NWFPs:

- **Wild leaves** (either fresh or dried) are consumed globally, often as a base in soups, stews, and the relishes that accompany starchy staples (such as rice or maize). Leaves can be excellent sources of vitamins A and C, proteins, and micronutrients such as calcium and iron, which are among the most common nutritional deficiencies in food-insecure populations.
- **Fruits** are commonplace in diets worldwide, with thousands of species of wild fruits typically consumed raw. For example, more than 150 species of wild fruits and other plant foods are consumed in Senegal. Fruits provide a large variety of minerals and vitamins and in some cases significant calories.
- **Seeds and nuts** are vital sources of calories, edible oils (fats) and proteins for diets globally. The purchase of edible oils is commonly a major household cost, especially in developing countries, and consequently many households find it difficult to buy sufficient quantities to provide adequate nutrition. Among the numerous nutritionally important nuts and seeds gathered in forests are Brazil nuts, pine nuts, cola nuts and chestnuts. Coconut oil is a key component of many cuisines; in 2011 coconut contributed 7 percent of global fat consumption.
- A variety of forest plants have **edible roots and tubers** that provide minerals and carbohydrates and are good sources of calories. Edible roots and tubers are highly sought-after; they are often referred to as “drought and famine foods” because they can persist in the face of reduced precipitation and can serve as a vital source of food during droughts and in areas of low or unstable rainfall. Edible roots and tubers are important ingredients in many traditional medicines.
- **Mushrooms** are a highly valued food often collected in forests and woodlands; in some cultures they provide a substitute for meat. Mushrooms are often only available in the wild in short seasons, but they can be dried and traded and are therefore suitable for year-round consumption.
- **Honey** is an important ingredient in many diets and traditional medicines and is an important source of sugar. Trees and other plants growing in forests are critical for honey production, providing year-round fodder for bees. Honey production provides many people with their livelihoods: in Zambia, for example, beekeeping and honey production provide up to 25 percent of the total annual income of tens of thousands of people, and honey supplements the diets of at least 250 000 households.

***Indigenous peoples***

Indigenous peoples and other local communities know a great deal about forest foods and the management of food-producing species, and they are also highly adaptable to changing agroecological conditions. Indigenous peoples and local communities have a wealth of knowledge on forest ecology, traditional forest and agroforestry management practices, and the nutritional, medicinal and other properties of diverse forest products. The knowledge and traditions of indigenous peoples are important assets in optimizing the role of forests and SFM in food security and nutrition.

***Gender***

Both men and women are vulnerable to the constraints inherent in forest dependency, but the value chains of forest products tend to be gender-specific (although there are regional differences). Women tend to engage in low-technology activities at the level of local markets and earn lower incomes than males in their communities, who tend to engage in more capital-intensive and lucrative tasks and deal with national and export markets. There is evidence that the differentiated roles of women and men can be complementary, however.

Forest enterprises can empower women. In West Africa, for example, the collection, processing and marketing of shea nuts and shea butter accounts for about 80 percent of the income of women involved in these activities. Developing value chains on the basis of a wider distribution of benefits, such as by altering and promoting the status of women in the sector from "actors" to "co-owners" as part of SFM, can help communities fully realize the benefits of SFM for food security and nutrition.

It is crucial to highlight the role played by women in ensuring that food, fuel and water from the forest are available for the family's well-being. Men tend to allocate forest products to profitable markets, whereas women direct them towards their family's nutritional needs. Wild leaves, fruits, roots, tubers, seeds, nuts, and mushrooms are some of the forest products women collect to nurture the family and community. As well, food variety from the forest allows women to diversify their children's diets, improving overall nutrition. This highlights the crucial part women play in making the most of the forests – particularly, during crises periods including seasonal food shortages, scarcities due to extreme weather events, natural disasters, human?made conflicts and other shocks.

It also highlights why it is extremely important that the voice of women is given equal value as the voice of men in determining forest policy. While men's work in forests tends towards the commercial or market aspects of forest use, women's work is of equal or greater value in ensuring family survival. Moreover, it is important to underline that the collection of raw materials for women may be a fundamental source of income for the household, especially considering that women have fewer alternatives than men to earn from the forest.

***Sound policy, legal and institutional framework***

Smallholder farmers and forest-dwellers need better access to information, technologies, finance, markets and other resources to improve their forest management practices and to build successful enterprises. Often, forest-dependent people lack sufficient rights to use and manage forest resources and thereby to make full use of the potential of forests to provide food security and nutrition.

There is a need to address the wide range of obstacles that hinder forest-dependent people in their efforts to use and manage their forests sustainably and to meet their dietary needs. The policy, legal and institutional frameworks for SFM and food security and nutrition should be integrated to the greatest extent possible at the local and national levels to ensure that forest policies and programmes contribute most effectively and efficiently to food security and nutrition. Developing capacity and providing support for cross-sectoral forestry and food-security policies and programmes is vital for unlocking the significant benefits of forests for food security and nutrition.

To that end, many local institutions need more capacity to support smallholders in managing and controlling their forests (and trees outside forests) and marketing the goods and environmental services they produce. Moreover, smallholders and other local forest-dependent people need a greater role in the development of enabling policies and programmes aimed at improving food security and nutrition through SFM.

***Practical steps for implementing SFM practices for improved food security and nutrition***

An enabling environment is needed in which forest management objectives are coordinated and complementary with those of food security and nutrition. A starting point in providing such an environment would be to identify and involve in the process the full range of stakeholders, such as forest communities, forest industries, civil-society organizations, and representatives of the agriculture, food security and nutrition, rural development, fisheries, health and water sectors.

With such multistakeholder participation, an approach to SFM can be developed that will optimize the contribution of forests to food security and nutrition. Among other things, the process will require a clear analysis of the existing food security and nutrition situation that assesses the four dimensions of food security, paying close attention to the physical and social structures of forest communities and the intra-household dynamics of forest-dependent people. Various participatory rural appraisal tools exist that could be used in developing such analyses. SFM plans that are compatible with food security and nutrition objectives would then be formulated and implemented in line with priorities set by stakeholders. The outcomes of SFM should be monitored and evaluated over time to ensure that food security and nutrition objectives are met, and to adjust plans as conditions and priorities change.

**Steps in developing optimal SFM approaches for food security and nutrition:**

1. Identification of stakeholders

2. Situation and multistakeholder analysis
3. Food security and nutrition situation analysis
4. Assessment of food security and nutrition needs and priorities
5. Development of SFM plans for achieve food security and nutrition objectives (among others)
6. Implementation of SFM plans
7. Monitoring and evaluation (food security and nutrition impacts)

## Further Learning


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## Credits

This module was developed with the kind collaboration of the following people and/or institutions:

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This module was revised in 2017 to strengthen gender considerations.

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