



# FORESTS, TREES AND FOOD SECURITY

## 1. Key-facts and or key figures:

- Literally millions of people, including 6 million children under the age of five, die each year as a result of hunger. Few are the victims of famines that attract headlines, far more die unnoticed, dying from the effects of chronic hunger and malnutrition.
- Worldwide, 840 million people were undernourished in period 1998-2000.
- This figure includes 11 million in the industrialized countries, 30 million in countries in transition and 799 million in the developing world.
- Undernourished population, 1998-2000 (millions): India 233, Sub-Saharan Africa 196, Other Asia and Pacific 156, China 119, Latin America and Caribbean 55, Near East and North Africa 40<sup>1</sup>.
- The latest figure of 799 million for the developing countries represents a decrease of only 20 million since 1990-92, the benchmark period used at the World Food Summit (WFS).
- This means that the average annual decrease since the Summit has been only 2.5 million, which is far below the level required to reach the WFS goal of halving the number of under nourished people by 2015.

<sup>1</sup> Undernourishment

## 2. Introduction:

In developing countries food security is one of the most pressing needs to be addressed in the next 15 years. Initiatives for the adaptation and dissemination of farmers product innovations; participatory management of natural resources and integration of trees into farming systems can enhance the contribution of forests and trees to food security, specifically, in the provision of food, income generation and services ensuring both the short and long term sustainability of agriculture production.

## 3. Current situation:

The actual and potential contribution of forests and trees to food security and sustainable livelihoods tends to be overlooked by decision and policy makers. This situation is due to a predominance of information on crops and livestock in the agriculture sector and/or a narrow vision on the role of forestry sector.

Foods from forests and other tree systems constitute an important component of household food supply. They include a wide variety of plant and animal products found in markets in both rural and urban areas. In many villages and small towns, the contribution of forests and trees to food supply is essential for food security, as they provide a number of micro- nutrients that staple crops do not provide adequately. Trees and forest foods frequently provide food safety nets in time to famine, crop failure, dry season shortages and to HIV/AIDS affected households unable to crop their land effectively. In many areas, dietary deficiencies and the monotony of the usual diet are reduced or avoided through this "hidden harvest", of leaves, fruits, roots from the forest or from gathered wild plants from the farm. Sauces made to enhance the flavour of staples frequently come from forest foods and wild plants.

However, despite the variety, importance and richness of foods from forests and trees, progress has been very slow in designing and implementing measures to increase the contribution of wild plants and animals to food production and food security through bold application of science and technology.

Forests and trees also contribute indirectly to food security because they have a major role in the sustainability of agricultural production systems. However, they could make a greater contribution to agriculture with more systematic approach to agroforestry with the recognition and adaptation of traditional agroforestry practices and tree planting in agricultural systems.

The starting point for consideration of forests and food security is the agricultural land use situation and how it is likely to evolve with the growing demand for agricultural land to produce food for a rapidly expanding population. The challenge now is to increase land productivity through sound use of the best technological practices, agricultural inputs (including irrigation) and the promotion of more effective food markets. Intensification will not only increase food production but will also ease the pressure on forest resources and other natural landscapes: less forest land will be claimed for agricultural production.

## 4. Technical contents:

Trees and forests are currently used in some way or another, or have the potential to be used, to contribute to food security and nutrition by:

### 4.1 Trees :

#### Improved Integrated Agricultural Production Systems:

Trees under various forms, either as single trees or organized in lines or clusters have a fundamental part in food production. This is particularly true in countries in Africa where agriculture is in transitional stages with low input levels and fragile soil ecosystems.

The benefits of the integration of trees in agricultural production systems are:

- Maintaining land productivity, through drawing nutritive elements from deep in the soil in to the production system; replacing nutrients used by crops; and reducing wind and water erosion, hence buffering degradation processes;
- Diversification of production, wider range of products produced from the farm as a whole, and some tree products can provide income during the dry season also.
- Tree services: Shade, Soil and Water Conservation and Soil Fertility
- Tree products: fodder, food (leaves, roots, fruits, etc.), medicine (leaves, roots, barks, etc.), wood (poles, construction, timber, etc.), fuelwood (firewood, charcoal, etc.);
- Tenure security (on-farm tree planting, boundary planting, etc.)
- Pastoralism: trees in semi-arid lands contribute significantly to pastoral livelihoods: dry season animal fodder; animal and human shelter; leaf based protein (fermented acacia leaves).

#### Income generation can be derived from tree products:

The major social dimension of forestry in the sustainable forest management debate is the possibility of creating more jobs at the local level on a sustainable basis. Some examples are:

##### Employment

- Silvicultural operations of managed forests are continuous throughout the year, with logging providing many job opportunities,
- Well-organized logging companies include social programmes that cater for the well being and food security of their workers.

##### Products

- On-farm plantation and Community woodlots (timber, poles, fuelwood and charcoal) ;
- Non wood tree and forest products (leaves, gums and resins, fruits, honey, roots etc.)
- Scattered trees in parklands and farms (support to animal production systems;)
- Home gardens (fruits)
- Common property trees and woodlands – charcoal, fuelwood and honey.

#### Contribution of forest and tree resources to household energy supply:

Africa has the highest per caput annual fuelwood consumption in the world (0.89 m<sup>3</sup> per year). An estimated 623 million m<sup>3</sup> are taken annually from forest and tree resources. Most of this is used for cooking food; thus, availability of fuelwood is important for household food security and nutrition. However, in fragile areas, such extractions cause severe deforestation, biodiversity loss and reduction of food opportunities from natural vegetation. This means that the supply of wood to meet household energy needs should be properly taken into account in forest policy formulation and planning. Multipurpose trees, with fuelwood byproducts, should also be incorporated into agricultural diversification programmes.

#### 4.2 Forests and protected areas contribute substantively to food security in the following ways:

- Forests protect and enhance watersheds, which contribute to the stabilisation of climate, soil conservation, and downstream agricultural land protection.
- Forests provide environmental services such as carbon sequestration and biodiversity which ensure the long term sustainability of the worlds agriculture resources.
- Wild plants for food, medicine, fruits, etc.
- Wildlife: bushmeat

#### 4.3 How to enhance forests and trees contribution to food security?

##### a) Building awareness at policy level

in order to increase the interest and action to support forest-food security and highlight the relationships between forests and food security. The recognition by policy makers of the role of trees in integrated agricultural production systems.

##### b) The enhancement of agroforestry best practices.

Agroforestry is using trees on farms. The World Agroforestry Centre defines agroforestry as:

*a dynamic, ecologically based, natural resources management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels.*

Some examples of how to enhance agroforestry best practices:

- improve access and knowledge to acquire quality germplasm;
- work with farmers and extension partners to enhance multipurpose tree management;
- build capacity in valuation of tree products and market knowledge of stakeholders.

There are two basic categories of agroforestry systems: simultaneous and sequential. **In a simultaneous system**, trees and crops or animals grow together, at the same time on the same piece of land. These are the systems in which trees and crops compete most for light, water and nutrients. Competition is minimized by spacing and other means. Trees in a simultaneous system should not be growing fast when the crop is growing rapidly, to minimize competition. Trees should have roots that reach deeper than the crop roots. They should have a small canopy, so they do not shade out too much light from the crops.

##### **Samples of simultaneous systems:**

- boundary plantings
- contour hedges
- live hedges and fences
- hedgerow intercropping
- parklands systems (e.g *Faidherbia albida* and millet)
- silvopastoral systems (e.g *Acacia* species in semi-arid zones)
- agroforests (e.g. rubber gardens in Sumatra; coffee gardens in Kenya, Uganda and Costa Rica)
- shaded perennial crops
- windbreaks

**In sequential systems**, crops and trees take turns in occupying most of the same space. The systems generally start with crops, continue with trees and revert to crops. The time sequence keeps competition for nutrients and water to a minimum. Trees in a sequential system should grow rapidly when crops are not growing, recycle nutrients from deep layers, fix nitrogen and have a large canopy to help suppress weeds.

**Samples of sequential systems:**

- shifting cultivation
- relay intercropping
- improved fallows
- taungya systems
- multistrata systems e.g. indigenous fruit trees, coffee, shade trees, fodder trees, and rubber combined in the same space; the trees use different levels of the canopy to access light above ground, and access to nutrients below ground. (this system can also be simultaneous).

**c) Greater emphasis on the integration of forest and watershed management**

- protection of the agricultural environment for sustainable food production;
- erosion control and fertility improvement

**d) Recognition of the greater role of wildlife in rural food security:**

Wild animal resources contribute greatly and in a very diversified manner to food production and household food security. The meat of wildlife, the so-called "bushmeat", is an important complement to household food supply and nutrition. In addition to hunting by adults, the capture and direct consumption of small wild animals by children provides a great deal of protein. A study in Senegal has shown that the use by children of small rodents, reptiles and fowl contributed an average of 400 g of protein per person per month to children's intake (Vincke, Sournia and Wangari, 1987) - enough to meet about a half to one third of the daily protein requirement of a seven- to ten-year-old child (WHO, 1985).

Hunting still provides a sizeable part of meat consumption for many societies, but also cash income that contributes to food security. Hunting is, however, likely to disappear as a factor in food security in Africa unless it is organized. There are good examples where the setting up and proper management of game reserves have provided many opportunities for local populations by creating jobs, including servicing tourism and organized hunting.

New trends towards full-fledged community-based natural resources management schemes, especially in southern Africa, are emerging and will help organize and modernize the wildlife sector, allowing increased use of wildlife resources for food and income and thus contributing to diversification of food production and to sustainable food security and nutrition. In West Africa, especially in the Bight of Benin region, the use of game meat provides a substantial amount of proteins, and initiatives for raising small rodents and antelopes are promising.

**6. Contacts:**

**6.1 Technical Officers**

Michelle Gauthier  
Forestry Officer (Trees outside Forests)  
Forest Conservation  
E-mail: [Michelle.Gauthier@fao.org](mailto:Michelle.Gauthier@fao.org)

Dr. Syaka Sadio  
Forestry Officer  
Forest Conservation  
E-mail: [Syaka.Sadio@fao.org](mailto:Syaka.Sadio@fao.org)

Douglas Williamson  
Forestry Officer (Wildlife and Protected Areas)  
Forest Conservation  
E-mail: [Douglas.Williamson@fao.org](mailto:Douglas.Williamson@fao.org)

**6.2 Radio Factsheets Series Coordinator (Forestry):**

Christine Holding Anyonge,  
Forestry Officer (Extension)  
Forest Policy and Institutions  
Forestry Dpt. FAO HQ  
E-mail: [Christine.HoldingAnyonge@fao.org](mailto:Christine.HoldingAnyonge@fao.org)

**6.3 Overall Factsheets Series Coordinator (SDRE):**

Jean Pierre Ilboudo  
Communication for Development Officer  
Research, Education and Extension  
Sustainable Development Dpt. FAO Headquarters, Rome  
E-mail: [JeanPierre.Ilboudo@fao.org](mailto:JeanPierre.Ilboudo@fao.org)

Improved organization of the wildlife sector will require:

- reorientation of wildlife management and use towards more community-sensitive programmes;
- more research and development in wildlife domestication and husbandry;
- organization of markets and introduction of related regulations.

**5. Further information:**

- **FAO web page:** <http://www.fao.org/forestry>



- ◆ **Trees outside forests website:** <http://www.fao.org/forestry/foris/webview/forestry>
- ◆ **Forest extension website:** <http://www.fao.org/forestry/foris/webview/forestry>
- ◆ **Non-wood forest products website:** <http://www.fao.org/forestry/FOP/FOPW/NWFP/new/nwfp.htm>
- ◆ **HIV/AIDS and forestry website:** <http://www.fao.org/forestry/foris/webview/forestry2/index>