

## Definition

Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components. Agroforestry can also be defined as a dynamic, ecologically based, natural resource 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. In particular, agroforestry is crucial to smallholder farmers and other rural people because it can enhance their food supply, income and health. Agroforestry systems are multifunctional systems that can provide a wide range of economic, sociocultural, and environmental benefits.

There are three main types of agroforestry systems:

- **Agrisilvicultural** systems are a combination of crops and trees, such as alley cropping or homegardens.
- **Silvopastoral systems** combine forestry and grazing of domesticated animals on pastures, rangelands or on-farm.
- The three elements, namely trees, animals and crops, can be integrated in what are called **agrosilvopastoral** systems and are illustrated by homegardens involving animals as well as scattered trees on croplands used for grazing after harvests.

Because agroforestry integrates multiple natural components and is at the crossroads of tradition and modernity, it necessarily brings together people from diverse fields of knowledge: agronomists, animal care specialists, landscape planners, foresters, economists, soil analysts and many more. This diversity of disciplines is certainly a strength, but its complexity also represents a challenge, notably in terms of coordination and communication.

Many different words are used to express realities that connect to each other. Terms like [climate-smart agriculture](#) and [agroecology](#) both incorporate a wide array of practices, and among them is agroforestry. Some practices, such as permaculture, have found a voice in grassroots organizations. In other instances, the emphasis is on integrating trees in agricultural systems, as is the case for [evergreen agriculture](#). These systems all represent a commitment to bringing sustainable development principles to agricultural production. As trees are a fundamental component of many ecosystems, their integration in various farming practices doesn't come as a surprise.

## Why Agroforestry?

### Environmental Importance:

### Environmental concerns and agroforestry solutions

Intensive and unsustainable agricultural practices tend to put a strain on the lands it uses. Moreover, in systems such as monocropping, animals, crops and trees are perceived as

competing rather complementing each other, often leading to the large-scale felling of trees. Despite recent overall progress in reducing **deforestation**, the tropics and subtropics are still witnessing the highest net losses in forest area. Conversion to agriculture is the leading cause of deforestation.

As to **the health of soils**, the Global Assessment of Human-Induced Soil Degradation found that 15 percent of the world's lands have degraded due to human activity. Agriculture and deforestation are two of the main causes of this degradation.

**Climate change** is another highly significant environmental consequence from unviable agricultural practices, such as deforestation, tillage or intensive use of fertilizers. It is estimated that agriculture and deforestation contribute to a third of greenhouse gas emissions.

There is an urgent need to recognize and use effectively the complementary ecological functions of crops, animals and trees.

## **How agroforestry can provide multiple solutions to environmental problems**

### **Agroforestry contributes to climate change mitigation and adaptation**

Integrating trees in agricultural systems can help to reduce impact of climate change on agriculture and, inversely, decrease agriculture's contribution to the phenomenon:

- Sourcing wood products from on farm production decreases the need to cut forest trees, thus reducing the rate of deforestation, which is one of the main factors contributing to climate change.
- Better management of soil nutrients reduces the need to resort to fertilizers, another significant source of GHG emissions.
- Trees planted in agroforestry systems contribute to climate change mitigation through carbon sequestration.
- By using woodfuel from agroforestry systems, people can meet their energy needs in a carbon neutral way.
- By providing shade and a cooler environment to sensitive crops or animals, agroforestry can help maintain or increase yields in the face of climate change, strengthening agriculture's resilience.

### **Agroforestry provides a wide range of environmental services**

The careful and integrated planning of agroforestry systems protects natural resources and therefore provides many services for the local, national and global community:

- The filtering and capturing of water resources by the trees can help improve the quality of water and its quantity, with potential benefits for the entire watershed.
- As trees create suitable environments for a multitude of plants, insects and animals, agroforestry can help increase and protect local biodiversity.
- By using certain trees with nitrogen-fixation functions, agroforestry can restore soil fertility using less, if any, inputs.

- The augmentation of tree cover on agricultural land is an efficient way to do landscape restoration without sacrificing agricultural production.
- By providing shelter to natural enemies and making use of crops and trees' complementary pest resistance mechanisms, agroforestry reduces the need for pesticides.

### **Agroforestry provides practical solutions to global problems**

There are 800 million people still suffering from hunger globally. In addition to the urgency of finding solutions for the hungry living today, the world has to increase food production by an estimated 60% to meet the needs of the 9.3 billion people that are expected to exist by 2050. These figures call for an increase in total output, but also for changes in our food systems management.

Adopting a long term vision for tackling food insecurity issues necessarily means adopting more sustainable farming practices. This is where agroforestry comes in. Using the ecological functions of trees, animals and crops has the potential of increasing food production while simultaneously reducing agriculture's footprint on the environment. Perhaps even more important is to make these solutions work for the poor, whose lives are the most affected by environmental degradation.

**Agroforestry contributes to addressing the problems the world is facing today. From an environmental standpoint, it helps to reduce agriculture's contribution and vulnerability to climate change, while also improving water's quality and availability, among other services. In terms of economic well-being, agroforestry can increase and diversify farmers' incomes and allow them to have access to more nutritious food. As to the social benefits, agroforestry can empower women, validate indigenous knowledge and improve rural livelihoods. Environmental concerns and agroforestry solutions**

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## **Economic Importance:**

### **Economic stress and agroforestry solutions**

Despite the progress observed in alleviating or reducing hunger in many countries, there remains approximately **800 million people who are still chronically undernourished**. However, just looking at these figures would be overlooking another highly important component of food security, which is the quality of the diet. **Micro-nutrient deficiencies** affect roughly 2 billion people worldwide, most of them being children or women.

Most of the world poor live in rural areas. Moreover, in 2010, **35% of people in rural areas lived in extreme poverty**, mostly in Africa and in South Asia, and an important share of them are subsistence farmers, pastoralists or landless agricultural workers. When they are involved in commercial activities, farmers often rely on the production of a single commodity, which makes them vulnerable to price fluctuations. Productivity of the land and of labor is also frequently low, which is an impediment to exiting poverty.

**There is a need to improve access to nutritious food and sustainably increase productivity.**

## **Economic and livelihoods benefits of agroforestry**

### **Agroforestry improves food and nutrition security**

Particularly in developing countries, planting trees together with crops or on pasture lands can help fight hunger and malnutrition, as trees are a source of food, fuel and non-wood products that can be either directly consumed/used or sold:

- Growing trees which produce food (fruits, nuts, leaves, etc.) provide an easy accessible nutritious food for households.
- The trees felled or their residues can be used as wood energy for cooking and/or heating.
- Leaves, and other parts of trees, can serve as forage for livestock.
- By capturing, filtering and storing water, agroforestry systems may play an important role in regulating water supply.
- Trees and plants grown on farms are important sources of medicines and natural remedies, which help improve people's health.

### **Agroforestry helps reduce poverty**

The economic value of tree products has great potential to support agroforesters working their way out of poverty:

- By reducing agricultural inputs and thus production costs, or by increasing productivity, agroforestry can increase household income.
- With the production of agricultural and forest goods with higher value, farmers and foresters can receive a better return for their labor.
- The development of value chains for the newly-produced tree products may also create new opportunities for small scale forest-based enterprises and employment.
- The recognition through incentives of the environmental services provided by agroforestry can provide a new source of income for the rural or urban poor.

## **Social Importance:**

### **Social issues and agroforestry solutions**

**People living in rural areas** are often the most poor and the most marginalized. Limited and declining possibilities for a decent life in the countryside often leads to migration of men or **Women** often having more limited access to resources than men, they are more vulnerable than men to land degradation and natural disasters. This is especially the case of women-headed households. Women are usually responsible for gathering firewood, a task which may take several hours.

**Indigenous peoples** are another highly vulnerable sector of society; they make up 5% of the world population, but count for 15% of all the poor.

**There is a need to improve living conditions in rural regions and address the specific needs of vulnerable groups.**

## **How agroforestry can contribute to solving these problems**

### **Agroforestry can improve gender equality**

Women make up a significant share, and in many cases, the majority, of both the agricultural and forest/tree labor force. Including trees in agricultural systems can help empower them. For example:

- When trees are more closely accessible, women, who are often responsible for the collecting of fuelwood or fodder, save precious time and energy.
- By selling fruits, fodder or fuelwood coming from the trees on the land, women can increase their access to cash.
- Because of women frequently have a more difficult access to resources, financial or other, agroforestry is a low-input solution to restoring soil fertility and increasing agricultural output.

### **Agroforestry can help local communities and cultures thrive**

Agroforestry systems are frequently part of traditional land management techniques and, as such, their maintaining holds cultural and social importance:

- By working together with indigenous people and local communities, modern agroforestry specialists can help ensure the long term sustainability of traditional systems while respecting local beliefs and culture.
- Preserving indigenous working techniques and species is a way of protecting humankind's agricultural heritage.
- The recognition of indigenous agroforestry systems contributes to cultural diversity.
- By providing decent rural livelihoods, agroforestry can contribute to maintaining thriving rural communities.
- Using species that have strong spiritual significance for the people can help maintain local spiritual beliefs.

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