

## Role of Agroforestry in food and nutritional security

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### Abstracts

Forests and other tree-based systems such as agroforestry contribute to food and nutritional security in myriad ways. Directly, trees provide a variety of healthy foods including fruits, leafy vegetables, nuts, seeds and edible oils that can diversify diets and address seasonal food and nutritional gaps. Forests are also sources of a wider range of edible plants and fungi, as well as bushmeat, fish and insects. To better support food and nutritional security, developments in agroforestry policies are required to reform tree and land tenure for the benefit of small-scale farmers, to reform how smallholders obtain agroforestry inputs such as tree seed and seedlings, and to recognise agroforestry as an important investment option. Research should support tree domestication to improve the yields of tree foods, and seek to enhance the complementarity and stability of food production in smallholders' agroforestry systems.

**Keywords :** Agroforestry, food production, Nutritional security, Small holder farmers

### Introduction

Agroforestry – the integration of trees with annual crop cultivation, livestock production and other farm activities – is a series of land management approaches practised by more than 1.2 billion people worldwide. Integration increases farm productivity when the various components occupy complementary niches and their associations are managed effectively (Steffan-Dewenter *et al.* 2007). Agroforestry systems may range from open parkland assemblages, to dense imitations of tropical rainforests such as home gardens, to planted mixtures of only a few species, to trees planted in hedges or on boundaries of fields and farms, with differing levels of human management of the various components. Agroforestry systems provide a variety of products and services that are important locally, nationally and globally (Garrity 2004); but their role is not always fully acknowledged in development policies and practices, reflecting the difficult-to-measure, diverse pathways by which trees affect people's lives. Women who are unable to afford high-cost technologies due



to severe cash and credit constraints often favour relatively low-input agroforestry options (Kiptot and Franzel 2012).

### **Agroforestry for food production**

Agroforestry practices have the potential of enhancing food production and environmental quality particularly in the era of climate change. According to USDA Forest Service statistics (Oswalt, *et al.*, 2017), approximately 61% of Mississippi land is forested, hence the state offers a unique opportunity to study how agroforestry systems can improve food production and environmental quality. Notably, South west Mississippi is home to many small-scale limited resources farming communities and this experiment will provide new insights about the potential food production and environmental quality benefits of horticultural based agroforestry. For producers with limited resources, diversification of agricultural practices is key to improving sustainability of farm resources. Indeed, diversification has been acknowledged for its role in enhancing sustainable growth compared to monocrop production system in the rural sector (Barghouti, *et al.*, 2004)

### **Agroforestry, fuel and food**

Fuelwood plays an important role in the lives of the poor and rural families, by providing a primary source of energy. Fuelwood has both domestic and industrial uses and is used in rural and urban regions of most economies of the developing world (Dovie *et al.* 2004). Seventy-nine percent (79%) of the total traditional energy (fuelwood, cow dung, biomass etc.) consumed in developing countries is fuelwood and between 60% and 69% of this is in sub-Saharan Africa (Adebimpe 2013). About 70% of the energy consumed in India is met by fuelwood collected from forests and marginal lands.

Agroforestry can make a significant contribution toward the provision of fuelwood. Although accurate estimates are difficult to obtain, it is assumed that agroforestry contributes to fuelwood production anywhere between 20% in Africa to 70% in Asia.

### **Agroforestry contribution to food security and climate change**

These approaches to agriculture production and food security have failed to reduce the absolute numbers of the insecure or to ensure environmental sustainability. But the views on how to improve global food security vary greatly and tend to focus solely on increasing food production (Singh, 2012). Agroforestry science, and its application in development by smallholders throughout the tropics, have a potential and must play an important role in achieving greater food security. The incorporation of multipurpose trees into agricultural systems can increase crop productivity and incomes of smallholder farmers' along with other benefits

## **Potential to Agroforestry in food and nutritional security**

An agroforestry system has more than two components and yield food grain, fruit, vegetable, spices, livestock food products. Agri-silviculture, agri-horticulture, silvi-pastoral, agri-silvi-pastoral and other systems like aqua forestry, apiculture with tree species are the most important agroforestry systems which will play crucial role in countries food security. Agroforestry can enhance food production through their various benefits:

Growing of nutritious fruit and other food crops in agroforestry has many links with improving the health and nutrition of the rural poor people. Fruit plants are the most valuable component of agri-horticulture systems and serve as a rich source of minerals, vitamins and important alkaloids. It can play important role in child nutrition. This is particularly important as indigenous fruit tree resources in local forests are overexploited

### **Challenges for agroforestry in supporting food and nutritional security**

Food insecurity and malnutrition continue to be the most daunting development challenges in most developing countries. Increases in the productivity of cereal grain crops have helped many developing countries achieve self-sufficiency in meeting the energy requirements, but malnutrition still exist. Agroforestry—growing useful tree crops with annual crops—could provide a solution to food security micronutrient malnutrition. The paper develops a conceptual framework for identifying pathways of how agroforestry systems can contribute to nutrition security and its potential as a food-based nutrition intervention. Furthermore, a theoretical framework for studying the interactions of agroforestry and nutrition security is developed. Finally, policy implications and research needs are identified.

### **Conclusion**

Agroforestry systems have played a major role throughout human history in supporting livelihoods as well as meeting the food security and nutritional needs of the global population. The development of agroforestry policy should not be confined to the agricultural or forest sectors; it needs a place of its own. Required reforms include targeting tree and land tenure, how farmers obtain the trees they plant, and the recognition of agroforestry as an investment option for food production.

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