Can Trees Help Fight Hunger? Role of Agroforestry

Ripul Sharma[1] and Muskan Sharma[2]*

[1,2] *Department of Silviculture and Agroforestry, College of Forestry Nauni, Solan Dr. Yashwant Singh Parmar University of Horticulture & Forestry, Solan, HP, India*

Corresponding Author
Muskan Sharma
Email: muskdav875@gmail.com

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ABSTRACT

Food security remains one of the greatest global challenges, particularly in developing countries where population growth, climate change, shrinking land resources and declining soil fertility threaten agricultural productivity. Agroforestry, the deliberate integration of trees with crops and livestock on the same land, offers a practical and sustainable solution to this challenge. By combining multiple components, agroforestry improves food production, farm income, nutrition and environmental resilience. It directly supports the four pillars of food security: availability, accessibility, utilization and stability. Trees provide fruits, nuts, fodder, fuel wood, timber and medicinal products while improving soil fertility, conserving water and regulating microclimate. Agroforestry also helps farmers reduce risks from droughts, floods, pests and market fluctuations. In India, traditional home gardens, silvipastoral systems and tree-based farming models have long supported rural livelihoods. Therefore, agroforestry has immense potential to strengthen household food security, enhance nutritional diversity and promote climate-resilient agriculture for future generations.

INTRODUCTION

Can trees help fight hunger? The answer is yes. Agroforestry, a land-use system in which trees are integrated with crops and livestock, is emerging as an effective strategy to enhance food security and environmental sustainability. It contributes

directly to the four pillars of food security which are availability, accessibility, utilization and stability as shown in figure 1. Unlike mono-cropping systems, agroforestry creates diversified farms that produce food, fodder, fuel and income throughout the year while improving resilience against climate and market uncertainties.

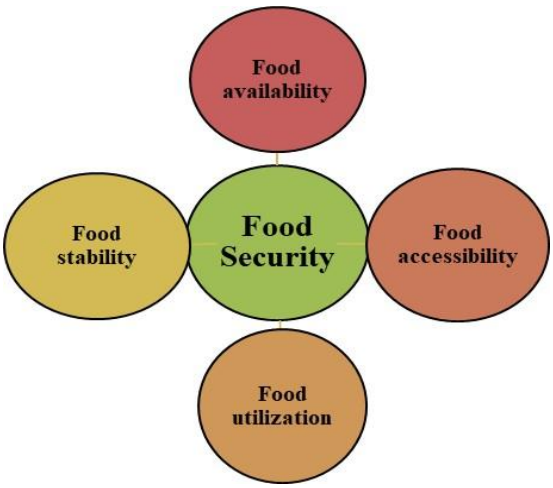

Fig 1: Four Fundamental pillars of Food Security

The integration of trees into farming systems increases food availability through diversified crop production and year-round yields. Income from fruits, timber, fodder and other tree-based products improves household purchasing power and access to food. Trees also enhance soil fertility, conserve moisture and regulate microclimate, which supports nutritious and stable food production. Moreover, diversified agroforestry systems reduce vulnerability to droughts, floods, pests and market shocks, thereby strengthening long-term food security. Studies have shown that agroforestry significantly improves household food security, particularly among smallholder farmers in tropical and subtropical regions. In India, home gardens of Kerala, poplar-based systems of Punjab and Haryana and fodder tree systems of Himachal Pradesh are excellent examples of agroforestry improving livelihoods and food supply (Duffy *et al*., 2021; Octavia *et al*., 2022; Nungula *et al*., 2024).

➢ Agroforestry and Food Security

Agroforestry strengthens food security across its four key pillars, as outlined below:

Table 1: Role of Agroforestry in Four Pillars of Food Security (Das *et al*., 2025)

Pillar of Food Security	Role of Agroforestry
Food availability	It shows the ability of agroforestry systems to provide a wide variety of food products throughout the year. By growing different tree and crop species together, these systems ensure continuous production and help maintain a regular household food supply.
Food accessibility	It explains how families are able to obtain food through physical, economic and social means. Along with access to vegetables, fruits and sufficient food, it also includes traditional systems such as local markets, barter exchange, gifting and community sharing, which help strengthen local food networks.
Food utilization	It shows how well households use the food available to them. This includes food consumption habits, dietary diversity, food preservation methods and access to fuel wood for cooking. Together, these factors indicate nutritional quality, food safety and traditional food practices.
Food stability	It reflects the ability of agroforestry-based food systems to withstand environmental and economic challenges such as floods, market price fluctuations and animal attacks. This shows how reliably households can access food over the long term.

These four dimensions show that agroforestry not only increases food production but also improves nutrition, livelihoods and long-term resilience of farming households.

CONCLUSION

Agroforestry is a practical and sustainable pathway to strengthen food security by supporting all four pillars—availability, accessibility, utilization and stability. By integrating trees, crops, and livestock, it diversifies food sources, increases farm

income, improves nutrition and builds resilience against climate and market shocks. For smallholder farmers and rural communities, agroforestry offers a reliable solution for securing livelihoods while conserving natural resources. Promoting agroforestry can play a major role in achieving food and nutritional security in the years ahead. Wider adoption of agroforestry through policy support, awareness and farmer training can help ensure sustainable food security in the future.

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