



Tropentag, September 16-18, 2026, hybrid conference

“Towards multi-functional agro-ecosystems  
promoting climate resilient futures”

## Agroforestry for promoting climate-resilient future and building pathways for food security & sustainable livelihoods

VINDHYA PRASAD TEWARI<sup>1</sup>, RANJANA ARYA<sup>2</sup>

<sup>1</sup>*International Society of Tropical Foresters, India Chapter, India*

<sup>2</sup>*Arid Forest Research Institute, Jodhpur (India), Retd. Group Coordinator Research, India*

### Abstract

With growing environmental challenges, agroforestry systems are emerging as a vital solution for food, nutrition, ecological and economic sustainability. Beyond their role in carbon sequestration, these systems enhance soil fertility, improve water retention, mitigate climate change, and provide diverse livelihood opportunities for farmers. By integrating trees with crops, horticulture, and livestock, agroforestry systems offer multiple benefits by boosting biodiversity, enhancing resilience against extreme weather, and ensuring long-term food and nutritional security towards achieving green growth and net zero transition. These systems build resilient multifunctional landscapes.

Agroforestry, combined with tree-based food systems and horticulture, also offers a transformative solution for drylands which cover nearly 45 % of our planet's land area and are often seen as challenging environments. However, they hold immense potential for sustainable food systems, biodiversity conservation, and climate resilience.

Integrating right trees, crops and animals in functional agroforestry and horticulture reduce vulnerabilities in rainfed agriculture. Resilient tree-based cropping systems diversify farm income and reduce climate-related risks. These systems restore source sustainability by soil health and carbon sponge capacity to hold more green water (rainwater where it falls).

Additionally, agroforestry leverages for achieving Net Zero goals, carbon sequestration, and restoring degraded lands. Further, these systems unlock opportunities for smallholder farmers through tree-based sustainable value chains.

Here we discuss how to harness the infinite potential of agroforestry and tree-based food systems to achieve a green economic transition, ensure good food security, and build climate-resilient landscapes. Land fragmentation, biodiversity loss, species extinctions, transit regulations, revenue regulations and disputes are some of the key challenges that need to be addressed. Additionally, we need to explore innovative solutions like tree tracking, geotagging, and technology driven conflict resolution to support tree growers on agricultural lands while fostering sustainable and profitable land management practices. This article highlights the role of multifunctional agro-eco-systems towards a greener future.

**Keywords:** Agroforestry, climate resilience, economic sustainability, food security, green growth, sustainable livelihoods

---

**Contact Address:** Vindhya Prasad Tewari, International Society of Tropical Foresters, India Chapter, 4/909, Sector-4, Gomti Nagar Extension, 226010 Lucknow, India, e-mail: tewarivp@gmail.com