



Role of Agroforestry in Wildlife Conservation and Farm Sustainability

Ashutosh Kumar

SMS, Horticulture Vegetables
KVK Narkatiyaganj,
RPCAU Pusa



Open Access

*Corresponding Author

Ashutosh Kumar*

Article History

Received: 15. 4.2026

Revised: 20. 4.2026

Accepted: 25. 4.2026

This article is published under the terms of the [Creative Commons Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/).

INTRODUCTION

Modern agriculture often leads to habitat destruction, biodiversity loss, and environmental degradation due to monocropping and intensive farming practices. In contrast, agroforestry systems mimic natural ecosystems by incorporating trees and shrubs into farmland. These systems not only provide economic benefits to farmers but also serve as important habitats for wildlife, thereby bridging the gap between conservation and agriculture.

2. Concept of Agroforestry

Agroforestry is a land management system where woody perennials are deliberately combined with crops and/or animals in spatial or temporal arrangements. Common agroforestry systems include:

- ✓ **Agri-silviculture** (trees + crops)
- ✓ **Silvi-pasture** (trees + livestock)
- ✓ **Agri-silvi-pastoral systems** (trees + crops + livestock)
- ✓ **Home gardens**

These systems are designed to optimize resource use efficiency, enhance productivity, and maintain ecological stability.

3. Role of Agroforestry in Wildlife Conservation

3.1 Habitat Provision

Agroforestry systems provide diverse habitats for various species of birds, insects, mammals, and reptiles. Trees and shrubs offer nesting sites, shelter, and food resources, making farms more wildlife-friendly.

3.3 Ecological Corridors

Agroforestry landscapes act as ecological corridors connecting fragmented forests. These corridors allow wildlife movement, gene flow, and reduce habitat isolation.

3.4 Conservation of Native Species

Planting indigenous tree species in agroforestry systems helps conserve native flora and fauna, maintaining ecological balance and resilience.

3.5 Reduction of Human-Wildlife Conflict

Agroforestry buffers can reduce direct interactions between wildlife and cropland by acting as protective barriers, thereby minimizing crop damage.

4. Role of Agroforestry in Farm Sustainability

4.1 Soil Health Improvement

Trees improve soil structure and fertility through:

- ✓ Leaf litter addition
- ✓ Nitrogen fixation (leguminous trees)
- ✓ Enhanced microbial activity

4.2 Climate Change Mitigation

Agroforestry contributes to climate resilience by:

- ✓ Sequestering carbon in biomass and soil
- ✓ Reducing greenhouse gas emissions
- ✓ Moderating microclimate (temperature, humidity, wind)

4.3 Water Conservation

Tree roots enhance water infiltration and reduce runoff. Agroforestry also helps in:

- ✓ Preventing soil erosion
- ✓ Maintaining groundwater levels

4.4 Diversified Income

Farmers benefit from multiple outputs such as:

- ✓ Timber
- ✓ Fruits
- ✓ Fodder
- ✓ Fuelwood

This diversification reduces economic risk and increases livelihood security.

4.5 Pest and Disease Management

Biodiverse systems naturally regulate pests through biological control, reducing dependence on chemical pesticides.

5. Agroforestry and Ecosystem Services

Agroforestry provides multiple ecosystem services, including:

- ✓ **Provisioning services:** Food, fuel, timber
- ✓ **Regulating services:** Climate regulation, pest control
- ✓ **Supporting services:** Nutrient cycling, soil formation
- ✓ **Cultural services:** Aesthetic and recreational values

6. Challenges in Agroforestry Adoption

Despite its benefits, agroforestry faces several constraints:

- ✓ Lack of awareness among farmers
- ✓ Limited access to quality planting material
- ✓ Long gestation period of trees

- ✓ Policy and institutional barriers
- ✓ Market limitations for tree-based products

7. Future Prospects

To enhance the role of agroforestry in wildlife conservation and sustainability:

- ✓ Promote farmer awareness and training
- ✓ Develop supportive policies and incentives
- ✓ Encourage research on suitable species combinations
- ✓ Strengthen market linkages for agroforestry products
- ✓ Integrate agroforestry into climate-smart agriculture programs

CONCLUSION

Agroforestry represents a holistic approach to sustainable agriculture that harmonizes productivity with environmental conservation. By providing habitats for wildlife and enhancing farm resilience, agroforestry contributes significantly to biodiversity conservation and sustainable livelihoods. Its adoption is crucial for achieving ecological balance, food security, and climate resilience in the face of global environmental challenges.

REFERENCES

- Choudhary, A. K., Srivastava, D., & Lamba, V. (2025). Strategies to Increase Green Cover for Climate Change Mitigation. *Ecology, Environment & Conservation (0971765X)*, 31.
- Kumar, A., Bargali, H., Bisht, K., & Pant, K. (2025). Role of bamboo-based agroforestry in climate change mitigation and livelihood: Indian Himalayan Region perspective. In *Climate change impact on Himalayan biodiversity* (pp. 479-500). Cham: Springer Nature Switzerland.
- Kumar, A., Kumar, R., Gond, G. K., & Panwar, G. S. Integrated Farming System: An Approach for Climate Resilient Agriculture.
- Kumari, N., Pandey, A. K., Singh, A. K., & Singh, A. (2024). A Review of Present Advancement in Climate Smart Agriculture Techniques: Adaptation

- for Sustaining Crop Production under Climate Change. *Archives of Current Research International*, 24(7), 52-63.
- Singh, N. R., Singh, A., Devi, N. P., Kumar, Y. B., Sangma, R. H. C., Philanim, W. S., ... & Bhutia, P. L. (2024). Agroforestry for soil health. *Agroforestry*, 255-283.
- Sonker, R., Kumar, P., & Sharma, A. K. (2010). Wildlife and Conservation Strategies in Current Environmental Scenario. *Swaranjali Publication: Ghaziabad, India*.
- Tewari, S., Bhatt, P., Negi, H., Dubey, A., Chavan, S. B., Chichaghare, A., & Kaushal, R. (2022). Land use and biodiversity conservation through agroforestry. In *Augmenting crop productivity in stress environment* (pp. 367-390). Singapore: Springer Nature Singapore.
- Yadav, A., Gendley, M. K., Sahu, J., Patel, P. K., Chandraker, K., & Dubey, A. (2019). Silvopastoral system: a prototype of livestock agroforestry. *The Pharma Innovation Journal*, 8(2), 76-82.