Indian Farmer
Volume 12, Issue 06, 2025, Pp. 322-326
Available online at: www.indianfarmer.net
ISSN: 2394-1227 (Online)

Original article

OPEN ACCESS

Agroforestry and livestock: A winning combination for rural farmers

Dr. Rajkumar Patel[1*], Dr. Utsav Chaudhari[1], Dr. Shailesh Purohit[1], Dr. Tinkal Damor[1] and Dr. M. M. Islam[2]

[1]M.V.Sc. Scholar, Department of Livestock Production Management, College of Veterinary Science & A. H., Kamdhenu University, Anand, Gujarat, India

[2]Associate Research Scientist and Head, Pashupalan Sanshodhan Kendra, VASREU, Kamdhenu University, Ramna Muvada, Gujarat, India

**Corresponding author: rajkumar.patel180702@gmail.com*

Received: 22/06/2025 *Published:26/06/2025*

ABSTRACT

Increasing human population in India and competition for land is intensifying and also increase the demand of fodder for livestock. Agroforestry gives biodiverse farm to us where trees give us shelter in summer and rainy season and their leaves and stem also use as fodder for livestock. In the agroforestry many sources of income like, livestock by-products, crops production and sale of fruits and nuts of trees are beneficial for the rural farmers. In future agroforestry will be very useful for rural farmers to earn more income from less land. This article focuses on how rural farmers can earn more income and profit from agroforestry and livestock.

Keywords: Agroforestry, Livestock, Rural farmers

INTRODUCTION

For thousands of years, keeping animals and growing crops and trees were closely related activities. However, since the middle of the 20th century, the separation of agricultural cultivation and livestock rearing has resulted in environmental problems such eutrophication of water, loss of biodiversity, greenhouse gas emissions into the atmosphere, and deterioration of soil health (Lal, 2020). The demand for green and dry silage will raise from 1012 and 631 million tons by 2050. Presently, to meet the shortage, green silage supply has increased by 1.69% annually (Chaurasia *et al.,* 2021). Seasonal fodder shortages, sharp increases in the price of grain straw in the off-season make livestock rearing more difficult for landless and small farmers. In developing nations, tree-based techniques can help fulfil future greenhouse gas reduction goals by appropriating significant amounts of carbon and cultivating in areas where feed is scarce for smallholder livestock systems (Chaurasia *et al.*, 2021). Common practices include establishing high density tree and shrub plantations in pastures, implementing cut-and-carry systems where livestock are fed with leaves from specific

plantings, and cultivating fast-growing shrubs and trees for use in fencing and windbreak systems (Kumar *et al.*, 2025). According to one estimate, India's agroforestry covers 25.32 million hectares, or 8.2 percent of the nation's total natural area (Chaurasia *et al.,* 2021). The use of standard agroforestry livelihood practices in India has raised farmers' profits from the production of livestock, enhanced crop productivity, and compact labour, especially for livestock

Silvopasture Systems

Silvopasture represents a sustainable land management approach where trees are seamlessly integrated with livestock, such as ruminants, pigs, or poultry, within the same agricultural space. This synergistic relationship yields both economic and ecological advantages for the farming system. (Kumar and Rana, 2024)

Role of fodder, trees and shrubs:

No.	**Category**	**Species Name**	**Benefits & Usage**
1	Grasses	Napier Grass (*Pennisetum purpureum*)	High-yielding, nutritious and good palatable fodder quality (Kumar *et al.*, 2025).
		Guinea Grass (*Panicum maximum)*	High protein, good for dairy cattle (Kumr *et al.,* 2025).
		Brachiaria spp.	High digestibility, good for grazing (Kumar *et al.*, 2025).
2	Legumes	Subabul(*Leucaena leucocephala*)	High protein, rich in calcium and phosphorus.
		Stylo (*Stylosanthes hamata*)	Good for soil conservation and fodder
3	Shrubs	Sesbania (*Sesbania grandiflora*)	High digestibility, fast growing and protein rich diet (Kumar *et al.*, 2025).
		Pigeon pea (Cajanus cajan)	Provides protein and fiber (Kumar *et al.*, 2025).
4	Trees	Neem (*Azadirachta indica*)	Medicinal, pest repellent, fodder.
		Babool (*Acacia nilotica*)	Provides tannins and crude Fiber (Kumar *et al.*, 2025).
		Moringa (*Moringa oleifera*)	Highly nutritious and natural supplement leaves for both humans and livestock.

How agroforestry helps livestock to improves their production?

- In the agroforestry animals like cattle and buffalo can rub up against out with the trees for the maintain their coats and take care of their skin this is helping them to shed old hair and dead skin that may be bothering them, keeps their stress levels low and increasing the production (Yoxall, 2021).

- In the agroforestry trees provide a natural shelter in summer for the animals and decreases the heat stress of animal and offer shelter in winter season protecting them against the extremely cold winters. This helps them to reducing energy loss for maintain their body temperature and focus them on their growth and productivity (Yoxall, 2021).
- In the agroforestry many trees and shrubs containing the high protein, this serves as supplementary feed for livestock due to this also increase the animal's production.
- Silvopastoral systems enhance animal welfare by reducing physiological stress, lowering disease prevalence, and improving overall livestock health and longevity (Kumar *et al.*, 2025).
- Many varieties in agroforestry that gives livestock with broader range of nutrients including medicinal properties from certain tree species which can improves the animal health and production
- Agroforestry can be very helpful during times when livestock feed is scare by integrating trees and shrubs in to pastures farmers can provide additional food sources for their animals.

How to livestock helps agroforestry and farmers?

- The manure from livestock acts as natural fertilizers it provides essentials nutrients that help both trees and crops (Notenbaert *et al.*, 2021).
- Livestock can also provide draught power for operations that would otherwise require heavy and debilitating manual work or the use of expensive machinery (Gassner *et al.*, 2022).
- In agroforestry poultry help control pests naturally. Chickens and ducks can reduce the need for chemical pesticides. This pest control method is environmentally friendly and supports the health of the ecosystem.
- Poultry also offers a source of protein for farmers and their communities. Raising chickens, ducks or turkeys provides eggs and meat that can improve nutrition.
- Sheep and Goats, they graze on grass and other plants which helps manage pasture health. Their grazing habits can prevent overgrowth and promote the growth of desirable plant species.

How to agroforestry and livestock helps rural farmers?

Economics benefits:

- In the agroforestry not only one source of income fruit trees, nut trees, fodder trees, and woody plants provide additional income for the farmers.
- Agroforestry promotes the biodiversity that will gives the healthy and clean environment for the livestock that will increase the production of animals and increase the farmers income also (Notenbaert *et al.*, 2021).
- Farmers also earn income from day-to-day sale of eggs and dairy products is very important for managing the recurring expenses, such as food, transport, any medical costs or school or tuition fees of children's (Gassner *et al.,* 2022).

- Use of livestock for the draught purpose also reducing the expenses for agriculture (Gassner *et al.*, 2022).
- Farmers use livestock manure as fertilizer in their farms so they do not have to buy any others chemical fertilizer for the farms and this will also be reducing the cost of farmers for farm production.
- Mainly trees in the agroforestry can enhance crop yields by improving soil health (Notenbaert *et al.,* 2021).
- In this system also decrease the cost of fodder the livestock in the dry season and scarcity.
- The coexistence of various plant species sustains beneficial microbes and insects, contributing to biological pest management. This reduces the need for chemical pesticides, creating a healthier farming environment (Kumar *et al.*, 2025).
- Farmers also earn income from the sale of poultry for the meat purpose.

Environmental benefits:

- Improved the soil quality by reduced 50% of soil erosion, increased 10% soil organic carbon, due to the higher & more diverse microbial populations and activity increase resistance to draught, disease and pests, by the use of manure as fertilizer increased the nutrient cycling and also increased the water retention capacity soil (Notenbaert *et al.,* 2021).
- Improved the biodiversity by the less pressure to deforest, to accommodate livestock and crops, regenerate the degraded land and more diverse farming (Notenbaert *et al.,* 2021).
- They are also useful for the climate benefits by reduced enteric fermentation from cows due to this reduced methane emissions (Notenbaert *et al.*, 2021).
- Silvopasture practices helps in livestock production by reducing wind chills, protecting crops, providing wildlife habitat, reducing noise pollution, and mitigating odour from concentrated livestock operations (Yadav *et al.*, 2019).

Challenges to Adoption: -

- Lack of technical knowledge and training
- Policy and institutional support
- Technology and infrastructures.
- Land management and space constraints
- Initial high investment
- Animal waste management

(Kumar B and Rana R. (2024)

By the extension work, supportive policies and training centres can help farmers to manage these challenges.

CONCLUSION

Agroforestry systems can increase food security by giving farmers and their families access to a greater range of food sources. Fruit trees and nitrogen-fixing legumes, as well as livestock products like milk and eggs, can help rural populations eat a more varied, wholesome diet. Farmers may adapt to changing environmental conditions and become more self-sufficient by embracing agroforestry practices, which equip them with new knowledge and skills. For rural populations, agroforestry's financial advantages can result in higher incomes and better quality of life. This can support a more dynamic and sustainable rural civilization by slowing the flow of people from rural to urban areas.

REFERENCES

Chaurasia, S., Kaushal, G. and Mishra, K. (2021). Livestock Production in Agroforestry. In Khare *et al.* Agroforestry Prospective, Strategies and Future Aspects. Taran Publication, Ambala Cantt, Haryana, India, Pp. 252-260.

Gassner, A., Cornelius, JP., Dobie, P., Mercado, A., Mukuralinda, A., Okia, CA., Pinon, C., Somarriba, E., Thorne, P. (2022). Components of agroforestry systems. In Gassner A. and Dobie P. eds. Agroforestry: A primer. Design and management principles for people and the environment. Bogor, Indonesia: Center for International Forestry Research (CIFOR) and Nairobi: World Agroforestry (ICRAF), Pp. 24–49. https://doi.org/10.5716/cifor-icraf/BK.25114s

Kumar, A., Vaishnav, R., Deori, C., Timung, B., Roy, S., Pradhan, R., Prakash, R. and Bochalya, R. (2025). Silvopastoral Systems in India for Fodder Production and Livestock Sustainability: A Review. *Journal of Experimental Agriculture International,* 47(3), 112-135.

Kumar, B. and Rana, R. (2024). Agroforestry and livestock integration: In Murali M et al. Advancements in Forestry: Exploring Contemporary Perspectives (2). Stella International Publication, Kurukshetra, Haryana, India, Pp. 242-260.

Lal R. (2020). Integrating Animal Husbandry with Crops and Trees. *Frontiers in sustainable food systems,* 4(113), 1-12. https://doi.org/10.3389/fsufs.2020.00113

Notenbaert, M., Douxchamps, S., Villegas, D., Arango, J., Paul…….and Peters M. (2021). Tapping into the environmental co-benefits of improved tropical forages for an agroecological transformation of livestock production systems. *Frontiers in sustainable food systems,* 5(742842), 1-18. https://doi.org/10.3389/fsufs.2021.742842

Yadav, A., Gendley, M. K., Sahu, J., Patel, P., Chandraker, K. and Dubey, A. (2019). Silvopastoral system: A prototype of livestock agroforestry.: *The pharma journal,* 8(2), 76-82.

Yoxall N. (2021). Pairing agroforestry with livestock: the major benefits, Soil association. https://www.soilassociation.org/blogs/2021/august/3/pairing-agroforestry-with-livestock-the-major-benefits