Policy Brief

Building Knowledge and Capacity for Bamboo-based Agroforestry:
Empowering Extension Staff and Farmers

Executive Summary   July 2025

Bamboo-based agroforestry involves the integration of bamboo into farming systems. The Rwenzori region, found in western Uganda, has been grappling with rampart land and water resources degradation. Over the years, bamboo-based agroforestry has been fronted as a sustainable agricultural system to counteract the land degradation effects. However, its adoption has been faced with a myriad of challenges including the insufficient technical capacity of both the extension staff and smallholder farmers specifically on the bamboo taxonomy, propagation and management practices in the nursery and the field. Addressing these gaps through capacity building, awareness creation and value addition will enable the establishment of sustainable bamboo agroforestry systems, enhance livelihoods, and promote environmental restoration.

This policy brief outlines key findings and recommendations to strengthen the knowledge and capacity of stakeholders in bamboo-based agroforestry.

Policy gaps

Rising populations and emerging technologies are driving strong demand for bamboo raw materials across multiple industries. The current lack of awareness about the potential of bamboo-based agroforestry among smallholder farmers (Table 1) should be addressed by launching strategic dissemination of knowledge through workshops and collaborative initiatives, thereby promoting higher adoption and strong demand for bamboo raw materials.

Policy recommendations

Equipping forestry staff and lead farmers with the necessary skills in nursery establishment, species selection and bamboo silviculture. This will ensure promotion of bamboo adoption that aligns with farm objectives and site conditions. The above can be achieved through;

- **Capacity Building for Extension Staff and lead farmers;** Provide targeted training in bamboo science, including species identification, propagation, and field management.
- **Farmer Awareness;** Organize training programs for farmer groups on nursery establishment, bamboo cultivation, and cross-learning visits.
- **Promotion of Value Addition;** Facilitate market linkages and value addition initiatives to enhance the economic potential of bamboo products within local communities.
- **Awareness Creation;** Educate farmers and extension staff on the various bamboo species and their applications.
- **Provision of Planting Materials;** Ensure the availability of quality bamboo seedlings through the establishment of community nurseries.
- **Technical Support;** Train extension workers in bamboo propagation techniques and provide ongoing technical backstopping.
- **Market Development;** Develop and assure markets for bamboo products to incentivize farmers to invest in bamboo agroforestry.
- **Policy Support;** Advocate for supportive government policies that promote bamboo agroforestry as a tool for environmental restoration and rural development.
- **Integration into Development Plans;** Incorporate bamboo-based agroforestry initiatives into District Development Plans (DDPs) to ensure alignment with broader environmental and socio-economic goals.

Figure 1: Unmanaged bamboo growing on farm which is a common practice revealing farmer lack of technical expertise.

Figure 2: Bamboo can benefit farmers when used as fodder to livestock.

Table 1: Results of the binary logistic regression model for the predictor variables of adoption of bamboo-based agroforestry (Significant factors)

Predictor Variables	B (Coefficient)	Standard Error	P-value
Technical knowledge in planting and management	-2.320	0.362	0.000
Land tenure (Renting)	0.000	0.000	0.000
Knowledge about the various uses of bamboo	2.681	0.793	0.001
Access to bamboo seedling	-1.223	0.401	0.002
Availability of funds to purchase seedlings	-1.562	0.559	0.005
Age bracket (60 and above)	1.210	0.557	0.030

Roles of stakeholders

- Ministry of Water & Environment to allocate funding for training and extension services and integrate bamboo into national agroforestry programs and climate action plans.
- National Forestry Authority to provide technical expertise on bamboo species selection and silviculture, distribute bamboo extension materials and oversee the establishment of certified bamboo nurseries.
- District Local Governments (e.g., Kabarole District) to coordinate local training and awareness programs, support monitoring and evaluation of bamboo agroforestry projects and facilitate partnerships between farmers, NGOs, and private actors.
- Research Institutions (e.g., NARO, Makerere University) to conduct research on appropriate bamboo species, propagation methods, and management practices, evaluate the socio-economic impact of bamboo agroforestry systems and produce evidence-based recommendations to inform policy.

- Private Sector (Bamboo processors, seedling suppliers) to invest in bamboo value chains (e.g., construction, furniture, crafts), support marketing, processing, and value addition infrastructure
- Smallholder Farmers and Farmer Groups to participate in trainings and demonstration plot, adopt and manage bamboo agroforestry systems and collaborate in group marketing and processing initiatives.
- Development Partners (e.g., FAO, UNDP, GIZ) Provide financial and technical support for bamboo initiatives.
- Non-Governmental Organizations to mobilize communities and support farmer field schools, provide capacity building and extension support and pilot innovative bamboo value chains and connect farmers to markets.

Conclusion

The study identified challenges and opportunities in promoting bamboo-based agroforestry among smallholder farmers. Limited knowledge of bamboo taxonomy, propagation, management, and diverse applications hinders its adoption and value addition. Addressing these gaps requires targeted training for forestry staff and lead farmers in bamboo species identification, nursery establishment, and silviculture. Enhancing farmer awareness through training programs and cross-learning visits can further encourage adoption. Additionally, fostering market linkages and value addition initiatives will unlock bamboo's economic potential, supporting sustainable livelihoods and environmental conservation. These strategies align with farm objectives, site conditions, and broader sustainable development goals.

REFERENCES

Fauziyah, E., Sanudin, & Hani, A. (2023). Impact of Bamboo-Based Agroforestry Demonstration Plots Based on Farmers' Perceptions. BIO Web of Conferences, 80, 1–9. https://doi.org/10.1051/bioconf/20238003012

Sawant Konkan Krishi Vidyapeeth, B., Meshram Balasaheb Sawant Konkan Krishi Vidyapeeth,. (2023). Impact of Dendrocalamus stocksii Munro based agroforestry system on soil fertility and yield of crops in Alfisol. ~ 2109 ~ The Pharma Innovation Journal, 12(1), 2109–2112. www.thepharmajournal.com

Sinha, A., Malakar, A., & Gorain, S. (2025). Efficacy of Edible Bamboo (Dendrocalamus asper) Based Agroforestry to Aid Socio-economic Status in Red and Lateritic Belt of Eastern India. Indian Journal of Economics and Development, 21(1), 69–76. https://doi.org/10.35716/IJED-23576

Tewari, S., Banik, R. L., Kaushal, R., Bhardwaj, D. R., Chaturvedi, O. P., & Gupta, A. (2015). Bamboo Based Agroforestry Systems. In Bamboos in India (pp. 261–284). http://www.frienvis.nic.in/WriteReadData/UserFiles/file/Content-Page/Books/Bamboo/Bamboo-Based-Agroforestry.pdf

ABOUT THIS POLICY BRIEF

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