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Bamboo-Based Cooperative Bioenergy Revolution in Vidarbha: A Policy-Aligned Critique of Maharashtra's New Bamboo Industrial Policy 2025

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SUMMARY

The integration of bamboo into Maharashtra's rural bioenergy ecosystem represents a transformative opportunity for sustainable growth, carbon reduction, and rural industrialization. Vidarbha's abundant agro-residues, bamboo resources, and cooperative culture provide a fertile ground for establishing a "Farm-to-Fuel" economy under the cooperative framework. This critique analyses the emerging bamboo-based bioenergy model through the lens of the New Bamboo Industrial Policy 2025 of Maharashtra, highlighting its socio-economic and environmental potential, policy coherence, and institutional challenges. The paper also synthesizes relevant literature on cooperative bioenergy systems, bamboo industrialization, and circular economy frameworks to justify the strategic direction of the state policy.

INTRODUCTION

India's national target of achieving Net Zero carbon emissions by 2070 has accelerated interest in renewable bioenergy systems. Vidarbha, though resource-rich, remains economically distressed, with large volumes of agricultural and forest residues unutilized. The *AGROWON* article (2025) emphasizes that the region generates nearly 8–10 million tonnes of biomass annually, offering a potential revenue of over ₹5,000 crore and 50,000 rural jobs. The bamboo sector, historically underutilized, is now emerging as a crucial player in the green industrial transition, linking agriculture, forestry, and cooperative entrepreneurship. The *New Bamboo Industrial Policy 2025* of Maharashtra recognizes bamboo as a strategic green material for multiple industries — from bioenergy to construction and handicrafts — while promoting bamboo clusters through cooperatives and MSMEs. This policy-oriented research critique situates Vidarbha's "Farm-to-Fuel" cooperative initiative within the policy's framework, assessing its viability and alignment with national energy and rural development goals.

Review of Literature

Bamboo has been recognized globally as a sustainable substitute for wood and a feedstock for biomass energy (Scurlock et al., 2000; Liese & Köhl, 2015). In India, the National Bamboo Mission (2022) catalyzed bamboo plantation expansion, yet value-chain integration remains weak. Studies by the Energy and Resources Institute (TERI, 2021) and MNRE (2022) underscore that decentralized bioenergy systems can empower local cooperatives while reducing dependence on fossil fuels. The cooperative model has a proven legacy in India — as demonstrated by Amul's dairy revolution — wherein farmers collectively control production, processing, and marketing (Kurien, 2007). Similarly, *bioenergy cooperatives* in Europe, such as those in Germany and Denmark, have shown how local ownership enhances energy security and income redistribution (Rosa et al., 2020). Applying this model to bamboo-based energy aligns with Elkington's (1998) "Triple Bottom Line" approach, ensuring environmental, economic, and social sustainability. Literature also emphasizes institutional embeddedness (Polanyi, 1944) — implying that markets for renewable energy should integrate social institutions like cooperatives and panchayats for equitable outcomes. Thus, the cooperative-led bamboo energy approach provides both ecological justification and socio-economic resilience.

Policy Alignment: New Bamboo Industrial Policy 2025 (Maharashtra)

The Maharashtra Bamboo Industrial Policy 2025 envisions bamboo as a "green industrial catalyst" supporting carbon-neutral growth, rural entrepreneurship, and export-oriented innovation. It emphasizes:

- Establishing Bamboo Industrial Clusters and Common Facility Centres (CFCs);
- Incentivizing bamboo-based bioenergy, pellets, charcoal, and bio-coal production;
- Promoting cooperative participation in plantation, aggregation, and processing;
- Integrating bamboo with climate finance and carbon credit frameworks under ESG norms.

This policy aligns strongly with Vidarbha's proposed cooperative bioenergy mission. As the AGROWON article notes, each district could generate 10,000–12,000 rural jobs and annual cooperative profits of ₹25–30 lakh through bamboo and biomass pelletization units. Moreover, the policy's focus on linking bamboo industries with ISCC (International Sustainability and Carbon Certification) could unlock global carbon market investments, directly benefiting rural cooperatives.

Stakeholders Consultation and Discussion points

Despite strong policy intent, several implementation challenges persist. First, the Forest Rights Act (2006), while empowering gram sabhas to manage forest resources, imposes procedural bottlenecks for commercial bamboo use. This limits scalability and delays private or cooperative participation. Second, there is a financial asymmetry between policy incentives and ground-level access — NABARD and NCDC schemes need clearer integration for bamboo-based enterprises. Institutionally, the policy assumes that cooperatives will naturally mobilize around bamboo, but most existing cooperatives lack technical and managerial capacity in bioenergy operations. Thus, capacity building, training, and digital supply-chain platforms (like ODK/KoBo) must accompany physical infrastructure. Furthermore, while carbon credit potential is recognized, operationalizing ESG-linked financing requires legal and accounting clarity for small cooperatives.

The critique also finds that while bamboo's bioenergy role is emphasized, its multi-sectoral applications (e.g., furniture, textiles, construction composites) could diversify income sources and reduce dependency on energy markets alone. A cluster-based hybrid model — combining bamboo bioenergy with industrial applications — may therefore be more resilient. Finally, sustainability must remain central. Without scientific harvesting norms and regeneration cycles, over-extraction could undermine ecological balance. Integrating the Forest Department, Cooperatives Department, and Energy Department through a "single-window Bamboo Cooperative Mission" would ensure regulatory coherence.

CONCLUSION

Vidarbha's "Farm-to-Fuel" vision exemplifies how cooperative-based bamboo bioenergy can transform rural Maharashtra. The *New Bamboo Industrial Policy 2025* provides a robust institutional framework, but its success hinges on local governance, cooperative capacity, and technological integration. Aligning with India's Net Zero agenda and "Viksit Bharat @2047" vision, bamboo cooperatives can drive both green entrepreneurship and inclusive rural growth.This critique concludes that a Cooperative Bamboo-Bioenergy Nexus offers Maharashtra a unique pathway to achieve sustainable industrialization — blending tradition, innovation, and environmental stewardship. Strengthening policy execution through research-led pilots, financial linkages, and training ecosystems will ensure that Vidarbha becomes a model for India's bamboo-based circular economy.

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