

Women's Livelihoods and Challenges in Traditional Mahua Liquor Production: A Study of Tribal Forest-Fringe Communities in Purulia District, West Bengal

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Abstract:

Traditional Mahua liquor production in the forest-fringe villages of Purulia district, West Bengal, serves as both a cultural practice and a crucial source of livelihood for women. This study investigates women's participation in Mahua flower collection, fermentation, and liquor production, and assesses their socio-economic contribution using quantitative measures. Data were collected through household surveys, structured interviews, and focus group discussions across 120 tribal households. Statistical indices, including the Participation Index (PI) and Economic Contribution Index (ECI), were employed to quantify women's involvement and income contribution. Results reveal that women contribute over 72% of labor in collection and processing, with an average monthly income of INR 2,500–3,000 derived from Mahua products. Key challenges identified include seasonal dependency, limited market access, quality adulteration, and ecological constraints affecting flower availability. The study underscores the need for integrating traditional knowledge with sustainable harvesting practices and market support policies to enhance women's economic empowerment, preserve cultural heritage, and maintain forest ecosystem balance.

Keywords: Mahua Liquor, Women's Livelihoods, Tribal Communities, Forest-Fringe, Traditional Knowledge,

1. Introduction:

Mahua liquor, derived from the flowers of the *Madhuca longifolia* tree, holds profound cultural and economic significance for tribal communities in Purulia district, West Bengal. This indigenous practice, deeply rooted in the traditions of forest-fringe villages, intertwines with the livelihoods of women, who play a pivotal role in its production (Rath, 2020). In Purulia, particularly in areas like Mudidih village, the Oraon community has

maintained sustainable forest management practices, deeply rooted in their indigenous knowledge. This includes the ethical harvesting of mahua flowers, ensuring both ecological balance and community well-being. Such traditional wisdom plays a crucial role in the sustainable production of mahua liquor, preserving both the environment and cultural heritage (Banerjee & Das, 2017; Choudhury, 2021). However,

challenges such as erratic weather patterns, adulteration, and limited market access threaten the viability of this practice. Women in these communities are central to the mahua liquor production process (Chakraborty, 2015; Samantray, 2025). They engage in various stages, from collecting flowers before sunrise to participating in fermentation and distillation. This involvement provides them with a source of income and strengthens their role within the community. Beyond liquor production, women utilize mahua in preparing traditional foods and other products. However, challenges such as the perishable nature of these products and limited market access hinder their economic potential. Efforts to introduce these products to urban markets are ongoing, aiming to enhance women's economic opportunities. Despite its cultural significance, mahua liquor faces challenges (Rath, 2020). Erratic weather patterns and the proliferation of adulterated liquor have impacted its quality and market demand. These factors threaten the traditional knowledge associated with its production and the livelihoods dependent on it. To address these issues, initiatives focusing on sustainable harvesting, ethical production, and market access are essential (Banerjee & Das, 2017). Such measures can help preserve the tradition of mahua liquor production while ensuring the economic empowerment of women in these communities (Choudhury, 2021; Samantray, 2025). This study aims to explore the intricate relationship between traditional knowledge, women's livelihoods, and sustainable practices in mahua liquor production in Purulia's forest-fringe villages. By examining the socio-economic role of women in this context, the research seeks to identify challenges and propose strategies for enhancing women's economic empowerment while preserving cultural heritage and forest biodiversity.

2. Literature Review:

The *Madhuca longifolia* (commonly known as Mahua) tree has long been recognized as a multipurpose species in central and eastern India. Its flowers, seeds, and oil are widely used for

food, medicine, and fermented beverages among tribal communities (Gupta & Sharma, 2011). Ethnobotanical surveys highlight Mahua's role as a keystone non-timber forest product (NTFP) that sustains both cultural practices and household economies (Hegde, 2014). Mahua flowers serve as a seasonal cash income source for forest-dependent communities across Jharkhand, Odisha, Madhya Pradesh, and West Bengal (Sahu et al., 2012). Livelihood studies indicate that Mahua-based value chains — from flower collection to distillation — supplement household income, especially during the lean agricultural season (Kumar & Singh, 2016). However, women remain the primary collectors and processors, with limited participation in higher-value marketing stages (Rao, 2018). In West Bengal, Purulia district represents one of the most forest-dependent and socio-economically marginalized regions. Tribal households in Purulia have historically relied on NTFPs like Sal leaves, lac, and Mahua for subsistence and income (Chakraborty, 2015). Studies show that forest degradation and declining tree density have reduced Mahua flower availability, creating additional livelihood stress (Banerjee & Das, 2017). Women in Purulia's forest-fringe villages spend substantial time in Mahua collection, yet face constraints in accessing markets due to middlemen control (Pramanik, 2022). Gendered analyses confirm that women are central to Mahua collection, drying, fermentation, and household-level sales (Patnaik, 2013). In Purulia's Ranga forest-fringe villages, Pramanik (2023) documented that women contribute over 70% of labor in Mahua-related tasks, while men often control bulk sales and interactions with traders. This division reflects both cultural norms and structural inequalities in access to capital and mobility. The indigenous knowledge of fermentation — involving pit fermentation, bamboo baskets, and clay distillation apparatus — has been transmitted orally across generations (Singh & Rout, 2019). Scientific assessments suggest that traditional fermentation techniques yield alcohol with variable quality, and low-cost innovations could improve efficiency and safety

(Mishra et al., 2020). Such innovations, if adopted, could enhance women's earnings, since they are primary producers. Erratic rainfall and shortened flowering seasons linked to climate variability have reduced Mahua yields in parts of eastern India (Choudhury, 2021). Additionally, the growing presence of adulterated liquor has undermined consumer trust and reduced returns to genuine women producers (Mongabay-India, 2023). Policy frameworks governing forest produce and local liquor trade often marginalize tribal women, who lack licenses or organizational support (Das & Roy, 2019). Despite substantial documentation of Mahua's cultural and economic role, few studies in West Bengal and Purulia quantify women's economic contribution using indices like the Participation Index (PI) or Economic Contribution Index (ECI). Moreover, longitudinal studies linking Mahua yields with climate change are scarce. Finally, limited work has addressed the policy-practice gap that constrains women's participation in formal Mahua markets.

3. Methodology:

This study employed a mixed-methods approach, integrating both quantitative and qualitative techniques to examine women's roles, economic contributions, challenges, and traditional knowledge in Mahua-based livelihoods in tribal forest-fringe villages of Purulia district, West Bengal. The villages were selected based on their proximity to Mahua-rich forest areas, high dependence on Mahua for livelihood and food security, and active women participants engaged in Mahua collection and liquor production. A purposive sampling method was used to select 120 households across five villages, focusing on women aged 20–60 years who were actively involved in flower collection, processing, and brewing, ensuring representation from small, medium, and large households. Primary data were collected through structured questionnaires capturing household composition, income, and participation in production stages; semi-structured interviews exploring traditional knowledge, indigenous practices, and socio-ecological

challenges; focus group discussions validating collective experiences; and participant observation documenting production processes. Secondary data were obtained from Census and demographic reports (Census of India, 2011), district and state-level forest reports, and scholarly literature on Mahua, tribal livelihoods, and women's empowerment, providing contextual support and enabling triangulation of findings for a comprehensive understanding of Mahua-based livelihoods. Descriptive statistics, including mean, percentage, and frequency distribution, were used to summarize household income, participation rates, and dependence on Mahua, while SPSS and MS Excel facilitated data coding, tabulation, and statistical computations.

5.1 Data Analysis

3.1.1 Quantitative Analysis

I. Participation Index (PI): Measures women's involvement across different stages of production.

$PI = \text{Women's participation (\%)} \text{ at each stage} / 100$

II. Economic Contribution Index (ECI): Proportion of household income contributed by women through Mahua liquor production.

$ECI = \text{Women's income contribution} / \text{Total household income} \times 100$

III. Gender Role Index (GRI): Compares women's role to men's in specific stages.

$GRI = \text{Women's participation (\%)} / \text{Men's participation (\%)}$

- **Descriptive Statistics:** Mean, percentage, and frequency distribution were used to summarize household income, participation rates, and dependence on Mahua.

- **SPS and MS Excel** were used for data coding, tabulation, and statistical computations.

3.2 Qualitative Analysis

For qualitative data, thematic analysis was applied to interview and focus group discussion transcripts to identify recurring themes related to traditional knowledge and indigenous practices, socio-economic and ecological challenges, and

gender roles and empowerment. Observational notes from participant observations were cross-checked with respondents’ accounts to ensure the accuracy and reliability of documented traditional practices, providing a comprehensive understanding of both quantitative and qualitative dimensions of Mahua-based livelihoods.

4. Results and Discussion:

The findings highlight that women play a pivotal role in traditional Mahua liquor production within the tribal forest-fringe villages of Purulia district. Their participation extends beyond household-level involvement, encompassing the entire production cycle—ranging from the collection of Mahua flowers in the forest, fermentation, distillation, and storage, to marketing in local and regional markets. This active engagement not only sustains household consumption needs but also serves as a vital source of supplementary income, thereby enhancing family livelihood security (Xaxa, 2018; Ghosh, 2020). Women’s contribution is particularly significant in income generation, as the sale of Mahua liquor provides cash earnings that are often reinvested in household expenditure, education, and health care

(Singh & Mondal, 2019). However, despite their central role, women face multiple challenges. The absence of modern brewing equipment and limited access to improved technologies force them to rely on traditional methods, which are labor-intensive and time-consuming (Mitra, 2017). Moreover, restricted mobility and poor access to organized markets limit their bargaining power, leading to lower profits and greater dependence on intermediaries (Sahu, 2021). Another critical constraint is the legal ambiguity surrounding liquor trade in India, where traditional Mahua brewing is often subjected to strict excise laws. Women producers in Purulia encounter frequent harassment, fines, and confiscation of products, which exacerbate their economic vulnerability (Kumar, 2016; Basu, 2019). These structural barriers reinforce gendered marginalization, despite women’s indispensable role in sustaining both household and community-level economies. The results suggest that Mahua liquor production is not merely an economic activity but also a socio-cultural practice tied to tribal identity, customary rights over forest resources, and community resilience (Rao, 2014).

Table 1: Women’s Role in Mahua Liquor Production of the Study Area

Stage of Production	Women’s Involvement (%)	Men’s Involvement (%)	Participation Index (PI)	Gender Role Index (GRI)	Observation
Collection of Flowers	78	22	0.78	3.54	Women dominate in collection
Drying & Storage	74	26	0.74	2.85	Women ensure quality drying
Fermentation & Brewing	82	18	0.82	4.55	Traditional knowledge preserved by women
Selling/Marketing	38	62	0.38	0.61	Male dominance due to mobility & legal issues
Average PI	—	—	0.68	2.89	High women’s role in production, low in marketing

Source: Field Survey (2025)

Table 1 illustrates the distribution of gender roles and participation in different stages of Mahua liquor production, along with corresponding statistical indices. Women dominate the collection of flowers (78% involvement) and drying/storage (74%), reflected in high Participation Index (PI) values of 0.78 and 0.74, and Gender Role Index (GRI) values of 3.54 and 2.85, indicating their central role in maintaining quality and preserving traditional practices. In fermentation and brewing, women's involvement is even higher at 82%, with a PI of 0.82 and a GRI of 4.55, demonstrating that

indigenous knowledge is primarily preserved by women. However, in selling and marketing, men dominate (62%), resulting in a lower PI of 0.38 and GRI of 0.61, largely due to mobility constraints and legal restrictions affecting women. Overall, the average PI of 0.68 and GRI of 2.89 confirm that women play a significant role in production activities but remain underrepresented in commercial aspects, highlighting the gendered division of labor and the need for interventions to empower women in market participation.

Table 2: Women's Income Contribution from Mahua Liquor Production

Household Size	Average Monthly Household Income (₹)	Income from Mahua Liquor (₹)	Income Share Index (ISI %)
Small (2-3 members)	5,200	2,050	39.4%
Medium (4-5 members)	7,800	2,850	36.5%
Large (6+ members)	10,500	3,420	32.6%
Overall Average	7,833	2,773	35.4%

Source: Field Survey (2025)

Table 2 presents the income contribution of women from Mahua liquor production across households of different sizes. Smaller households (2-3 members) derive the highest proportion of their monthly income from Mahua, with an Income Share Index (ISI) of 39.4%, indicating strong reliance on women's earnings from this activity. Medium-sized households (4-5 members) show slightly lower dependence, with an ISI of 36.5%, while larger households (6+ members) report the lowest contribution at 32.6%,

reflecting a diversification of income sources in bigger households. The overall average ISI of 35.4% highlights that Mahua liquor production is a significant source of income for women across all household sizes, underscoring their central role in sustaining household livelihoods and supporting economic resilience in tribal forest-fringe communities.

Dependence of Tribal Households

Tribal households in the forest-fringe villages of Purulia district show a strong dependence on

Mahua-based livelihoods for both income generation and food security. The study revealed that Mahua contributes not only as a raw material

for liquor brewing but also as a multi-purpose resource supporting household nutrition, cultural practices, and seasonal employment.

Table 3: Dependence of Tribal Households on Mahua for Income and Food Security

Household Size	Monthly Household Income (₹)	Income from Mahua Liquor (₹)	Income Dependence (%)	Food Security Dependence (Reported % of Households)
Small (2–3 members)	5,200	2,050	39.40	81
Medium (4–5 members)	7,800	2,850	36.50	73
Large (6+ members)	10,500	3,420	32.60	67
Overall Average	7,833	2,773	35.40	73.70

Source: Field Survey (2025)

Table 3 highlights the significant dependence of tribal households on Mahua-based livelihoods for both income and food security. The data show that smaller households (2–3 members) derive the highest proportion of their income from Mahua liquor, with 39.4% of their monthly earnings, and report an 81% reliance on Mahua for food security, reflecting a strong dependence on forest resources. Medium-sized households (4–5 members) earn 36.5% of their income from Mahua and report 73% reliance for food needs, while larger households (6+ members) show slightly lower dependence, with 32.6% of income and 67% of food security linked to Mahua. Overall, the average income contribution from Mahua stands at 35.4%, and the average food security dependence is 73.7%, indicating that

Mahua serves as a critical safety net for both subsistence and cash needs. These findings underscore the importance of Mahua-based activities in sustaining livelihoods, particularly for smaller and resource-constrained households, and highlight its role in buffering against seasonal food shortages and economic vulnerability.

Traditional Knowledge and Indigenous Practices

The study documented rich traditional knowledge and indigenous practices that tribal women in Purulia district have preserved for generations in relation to Mahua flower collection and liquor production. These practices not only sustain livelihoods but also reflect an eco-cultural balance between forest use and conservation.

Table 4: Traditional Knowledge and Indigenous Practices in Mahua-Based Livelihoods

Aspect	Indigenous Practice Documented	Sustainability Dimension
Flower Collection	Early morning collection, no tree shaking	Ensures regeneration of trees
Drying & Storage	Sun-drying, neem leaves in bamboo baskets	Pest control, natural methods
Fermentation Starter (<i>Bakhar</i>)	Mix of rice, herbs, and roots, recipe guarded by women	Maintains biodiversity of local herbs
Brewing Methods	Earthen pots, clay stoves, side vents for smoke	Eco-friendly, low-cost method
Water Use	Selected natural sources for brewing	Protects quality, avoids contamination
Cultural Beliefs	Mahua tree worship, liquor used in rituals	Strengthens cultural identity
Waste Reuse	Fermentation residue fed to animals	Zero-waste cycle

Source: Field Survey (2025)

Table 4 illustrates the rich traditional knowledge and indigenous practices associated with Mahua-based livelihoods, emphasizing their sustainability dimensions. Women follow careful flower collection methods, harvesting early in the morning without shaking the trees, which ensures regeneration and long-term availability of Mahua resources. Drying and storage practices, such as sun-drying flowers and using neem leaves in bamboo baskets, provide natural pest control while avoiding chemical preservatives. The fermentation starter (*bakhar*), prepared from a mix of rice, herbs, and roots and guarded as a secret recipe by women, maintains local biodiversity by incorporating indigenous plant species. Brewing methods using earthen pots and clay stoves with side vents are eco-friendly, low-cost, and minimize environmental impact. Careful selection of water sources ensures quality and prevents contamination, while cultural practices like Mahua tree worship and ritual use of liquor reinforce community identity. Finally, the reuse of fermentation residues as animal feed reflects a zero-waste approach. Collectively, these practices demonstrate a sophisticated integration of ecological sustainability, cultural preservation,

and livelihood support within Mahua-based production systems.

Process and Local Technology Used for Mahua Alcohol Production

Mahua liquor, prepared from the flowers of *Madhuca longifolia*, holds profound socio-cultural and economic significance for tribal communities in central and eastern India, particularly in the Purulia district of West Bengal. The liquor is produced through a traditional fermentation and distillation process, primarily managed by women, who are the custodians of indigenous knowledge and local technological practices (Rao, 2014; Xaxa, 2018). This practice is not merely an economic activity but also a cultural tradition that reflects community resilience and intergenerational knowledge transfer. The production process begins with the fermentation of dried Mahua flowers, mixed with jaggery, water, and locally prepared fermenting agents, commonly known as *bakhar*. The seasonal variation in fermentation time—ranging from 3–4 days in summer to 6–7 days in winter—demonstrates the community's intimate understanding of climatic influences on

biochemical processes (Mitra, 2017; Singh & Mondal, 2019). Following fermentation, a traditional three-pot distillation apparatus is used, where vapors are condensed into liquid form, resulting in the preparation of Mahua liquor. This grassroots innovation, passed down through generations, illustrates the adaptive capacity of tribal communities to utilize available natural resources for both subsistence and livelihood security (Basu, 2019; Sahu, 2021). Importantly, the role of women in Mahua liquor production is central. They not only oversee the technical aspects of fermentation and distillation but also manage the marketing of the product, thereby contributing significantly to household income. However, despite their pivotal role, women brewers face constraints such as inadequate access to modern equipment, poor market integration,

and restrictive excise laws regulating liquor trade (Kumar, 2016; Ghosh, 2020). These challenges highlight the gendered vulnerabilities within indigenous livelihood systems. Thus, Mahua liquor production represents a complex interplay of traditional ecological knowledge, grassroots technological innovation, and socio-economic dependence, while also raising questions of policy, legality, and gender equity in forest-fringe tribal societies.

Socio-Economic and Ecological Challenges of Women

Women engaged in Mahua liquor production in tribal forest-fringe villages of Purulia face multiple socio-economic and ecological challenges that affect their livelihoods, health, and sustainability of production.

Table 5: Socio-Economic and Ecological Challenges of Women in Mahua Liquor Production

Type of Challenge	Specific Issues Reported by Women	Impact on Livelihoods
Legal Restrictions	Raids, confiscation, fines, harassment by authorities	Income loss, insecurity
Market Barriers	Dependence on male intermediaries, low bargaining power	Reduced profit margins
Health Risks	Smoke inhalation, eye irritation, body aches	Declining work capacity
Social Stigma	Negative perception of liquor brewing by outsiders	Gender marginalization
Declining Mahua Trees	Deforestation, climate variability reducing yields	Lower production levels
Seasonal Scarcity	Short flowering season (March–May)	Inconsistent income
Forest Access Restrictions	JFM rules and forest guards’ control	Limited collection rights
Environmental Degradation	Soil erosion, biodiversity loss	Threat to sustainability

Source: Field Survey (2025)

Table 5 highlights the socio-economic and ecological challenges faced by women engaged in Mahua liquor production. Legal restrictions, including raids, fines, and harassment by authorities, result in income loss and insecurity, while market barriers such as dependence on male intermediaries and low bargaining power reduce profit margins. Health risks from smoke inhalation, eye irritation, and body aches diminish women’s work capacity, and social stigma

surrounding liquor brewing contributes to gender marginalization. Ecological challenges, including declining Mahua tree populations due to deforestation and climate variability, seasonal scarcity of flowers, restrictions on forest access under JFM rules, and environmental degradation like soil erosion and biodiversity loss, collectively threaten both production levels and long-term sustainability. These challenges illustrate the multiple pressures—legal, economic, health-

related, social, and ecological—that limit women's productivity and highlight the need for

targeted interventions to support their livelihoods while conserving forest resources.

Table 6: Use of Mahua flowers and seeds

Use Category	Description	Details
Food	Mahua flowers and seeds used as food items	Flowers eaten fresh or cooked; seeds roasted or ground into flour
Animal Feed	Used as fodder for livestock	Leaves and seeds used as feed for cattle, goats, etc.
Medicine	Traditional medicinal uses	Treatment of cough, skin ailments, digestive issues
Biofuel	Production of bio-diesel and bio-ethanol	Oil extracted from seeds for bio-diesel; flowers used for bio-ethanol
Handicrafts	Use of Mahua parts for craft and household items	Bark and wood used for making ropes, mats, and small tools
Cultural/Religious	Used in rituals and festivals	Flowers used in local ceremonies and offerings

Source: Field Survey (2025)

The multifunctional uses (Table 6) of Mahua underscore its centrality in the socio-economic and cultural fabric of tribal communities in Purulia district. As a food resource, Mahua flowers and seeds serve as a supplementary dietary item, particularly during periods of food scarcity. Their versatility—being consumed fresh, cooked, roasted, or ground into flour—illustrates the community's adaptive strategies for nutritional security. Similarly, the use of leaves and seeds as animal feed reflects Mahua's role in sustaining livestock-based livelihoods, thereby reinforcing household economies dependent on mixed farming systems. The medicinal applications of Mahua, including treatment of cough, skin ailments, and digestive problems, highlight its place in indigenous health care practices. Such traditional knowledge systems not only reduce dependence on modern medical facilities but also preserve bio-cultural heritage. Furthermore, Mahua contributes to the renewable energy sector, as its seeds provide oil for bio-diesel and its flowers can be processed into bio-ethanol. This positions Mahua as a potential biofuel resource, linking local practices with broader sustainable energy initiatives. Beyond utilitarian purposes, Mahua also contributes to handicrafts and household items, with bark and wood being

transformed into ropes, mats, and small tools. This represents an additional livelihood stream, particularly for women and artisans engaged in cottage industries. Most importantly, the cultural and religious significance of Mahua—its flowers being integral to rituals, festivals, and community offerings—cements its role as a sacred tree, deeply embedded in the spiritual identity of tribal groups. Overall, the multiple categories of Mahua utilization reveal that the species is not only an ecological resource but also a livelihood anchor and cultural emblem. Its diverse applications bridge subsistence needs, economic opportunities, and socio-cultural continuity, making it indispensable for the survival and resilience of forest-fringe tribal societies.

Strategies and Policy Interventions for Women's Empowerment and Sustainable Mahua Production

Based on the study of Mahua-based livelihoods in tribal forest-fringe villages of Purulia, several strategies and policy interventions emerge to enhance women's economic empowerment and ensure sustainable Mahua production. These suggestions are derived from field observations, interviews with women producers, and analysis of socio-economic and ecological challenges.

Table 7: Strategies and Policy Interventions for Women's Empowerment and Sustainable Mahua Production

Focus Area	Suggested Strategies	Expected Outcomes
Skill Development	Workshops on hygiene, fermentation, entrepreneurship	Improved product quality, higher income
Credit Access	Microfinance, SHG loans	Investment in equipment, reduced dependency on intermediaries
Market Linkages	Women-led cooperatives, branding & packaging	Better profit margins, wider market access
Legal Support	Licensing awareness, policy recognition	Reduced legal risks, empowerment
Community Resource Management	Participatory forest management, sustainable harvesting guidelines	Preservation of Mahua trees, ecological sustainability
Ecological Restoration	Tree planting, soil conservation, biodiversity protection	Increased forest resilience and productivity
Traditional Knowledge Promotion	Documentation and intergenerational transfer	Cultural continuity, sustainable practices
Seasonal Income Planning	Alternative livelihoods during off-season	Reduced economic vulnerability

Source: Field Survey (2025)

Table 7 highlights a comprehensive set of strategies and policy interventions aimed at enhancing women's empowerment and promoting sustainable Mahua production. Skill development through workshops on hygiene, fermentation, and entrepreneurship is expected to improve product quality and increase income, while access to microfinance and SHG loans can enable investment in equipment and reduce dependency on intermediaries. Establishing market linkages via women-led cooperatives and branding initiatives can secure better profit margins and wider market access. Legal support through licensing awareness and policy recognition can mitigate legal risks and strengthen women's empowerment. Community-based resource management, including participatory forest management and sustainable harvesting guidelines, along with ecological restoration measures such as tree planting and biodiversity

protection, can enhance the resilience and sustainability of Mahua trees. Furthermore, promoting traditional knowledge through documentation and intergenerational transfer ensures cultural continuity and environmentally sustainable practices, while seasonal income planning through alternative livelihoods reduces economic vulnerability during off-season periods. Collectively, these interventions provide an integrated framework for balancing economic development, gender empowerment, and ecological sustainability in tribal forest-fringe communities.

5. Conclusion:

This study underscores the pivotal role of tribal women in sustaining Mahua-based livelihoods in Purulia district, West Bengal. Women are integral to the collection, processing, and fermentation of Mahua flowers, contributing significantly to

household income and food security. Quantitative analyses reveal that Mahua liquor production accounts for approximately 35.4% of household income, with women playing a central role in this economic activity (Samantray, 2025). Despite their contributions, women face several socio-economic and ecological challenges. Legal restrictions on Mahua liquor production, limited market access, health hazards associated with traditional brewing methods, and declining Mahua tree populations due to unsustainable harvesting practices impede their economic empowerment and the sustainability of Mahua production (Mongabay India, 2023). The study also highlights the rich traditional knowledge and indigenous practices employed by tribal communities in Mahua collection and liquor production. These practices, which include sustainable harvesting methods and the use of natural fermentation processes, are crucial for maintaining ecological balance and cultural heritage (Bhattacharjee et al., 2024). To enhance women's economic empowerment and promote sustainable Mahua production, several strategies and policy interventions are recommended. These include providing training and capacity-building programs, facilitating access to credit and markets, recognizing and protecting traditional knowledge, and implementing community-based forest management practices to ensure the regeneration of Mahua trees (Samantray, 2025). In conclusion, Mahua-based livelihoods in Purulia district represent a complex interplay of gender, culture, economy, and ecology. Supporting women in these communities through targeted interventions can lead to improved livelihoods, sustainable forest resource use, and the preservation of cultural traditions, offering a model for inclusive and sustainable rural development.

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