

Women, Resource Conservation, Sustainable Forestry and Resource Management in Nigerian Traditional Communities: Caveat on Unsung Heroes

¹Abiodun Akinola OLADITI, ²Christopher Bolawa OLAPADE, PhD, ³Gbenga Edward OLADOKUN PhD, ⁴Binta Taiwo KAMARISE, ⁵Safiyya Lawal DANMUSA

¹Orcid: 0009-0005-5144-8897

^{1,4}Department of Social Studies and Civic Education, Faculty of Social Science Education, Emmanuel Alayande University of Education, Oyo, Oyo State, Nigeria

²Department of Social Works, Faculty of Social Science Education, Emmanuel Alayande University of Education, Oyo, Oyo State, Nigeria

³Department of Geography, Faculty of Social Science Education, Emmanuel Alayande University of Education, Oyo, Oyo State, Nigeria

⁵Federal University of Dustin-Ma, Kastina State, Nigeria

DOI: <https://doi.org/10.47772/IJRISS.2026.100700386>

Received: 16 July 2026; Accepted: 21 July 2026; Published: 02 August 2026

ABSTRACT

Sustainable forestry and natural resource management constitute major environmental and developmental concerns in Sub-Saharan Africa where traditional communities depend heavily on forests for livelihoods, domestic energy, medicine and socio-cultural survival. Despite several forestry policies and conservation programmes in Nigeria, forest degradation and biodiversity loss remain persistent. This persistence is attributable partly to the marginalisation of indigenous ecological knowledge and gendered exclusion in environmental governance. Women, who serve as primary users and custodians of forest resources in traditional communities, remain inadequately recognised within formal conservation frameworks. Thus, women's roles in indigenous conservation practices and sustainable forestry governance in Nigeria underpin this study. The study is anchored on Ecofeminist Theory and Common-Pool Resource Theory, using a mixed-method research design involving Survey questionnaires, Key Informant Interviews and Focus Group Discussions conducted across selected forest-dependent communities. Findings revealed high women's involvement in resource conservation (grand mean = 3.32) and strong adherence to indigenous conservation practices (grand mean = 3.44). Inferential analysis further showed significant differences in sustainable forestry outcomes between communities with high and low levels of women's participation ($t = 4.21$, $df = 238$, $p < .05$). Women were found to possess extensive ecological knowledge, regulate forest use through customary norms and contribute significantly to biodiversity conservation and forest regeneration, while patriarchal land-tenure systems, inadequate institutional support and limited access to policy platforms do constraint their effectiveness. Thus, integrating women-centred indigenous conservation systems into formal forestry governance remains indispensable for sustainable forest management and the attainment of national and global sustainability goals.

Keywords: Women; Resource Conservation; Sustainable Forestry; Resource Management; Nigerian Traditional Communities

INTRODUCTION

Forests remain among the most valuable ecological assets supporting environmental stability and human existence as they perform indispensable ecological functions. Basic among such include biodiversity conservation, climate regulation, soil protection, watershed preservation and carbon sequestration and thus, simultaneously sustaining livelihoods for millions of people across the developing world. Forests, according to

the Food and Agriculture Organization (2020) do provide subsistence and income opportunities for more than 1.6 billion people globally. Out of this lot, many do reside in rural communities with daily survival depending directly upon forest ecosystems.

Without mincing words, the relevance of forests assumes greater significance in Sub-Saharan Africa where rural populations continue to depend substantially upon fuelwood, medicinal plants, wild foods and timber resources. The more reason why the United Nations Environment Programme (2021) observed that ecological degradation and unsustainable resource extraction have intensified environmental vulnerabilities across Africa. This of course is with concomitant threatening of food systems, biodiversity and local economies. Nigeria presents a compelling case within this broader ecological crisis.

From time immemorial, Nigeria's forests do support livelihoods, cultural identity and ecological balance, however, rapid population growth, agricultural expansion, illegal logging, urbanisation and weak governance have accelerated deforestation and environmental degradation. Subscribing to this, the Food and Agriculture Organization (2020) estimated substantial forest loss across Nigeria over the past decades which places the country among regions experiencing ecosystem decline alarming rates. Such losses threaten biodiversity and undermine the resilience of forest-dependent communities.

In spite of several attempts by successive Nigerian governments in the implementation of several forestry regulations and environmental policies, the evolving situation dishearten has made their effectiveness remains limited. Corroborating this view, the World Bank (2021) averred that many African forestry policies suffer from inadequate institutional coordination and insufficient community participation. In like manner, the United Nations Development Programme (2022) maintained that sustainability initiatives frequently fail where governance structures exclude local actors and neglect indigenous systems of ecological management.

Pardoxically within these policy limitations lies an enduring paradox where women perform central environmental roles within traditional communities but yet remain marginal within formal forestry governance. Among others, they collect fuelwood, preserve medicinal species, process forest products and transmit ecological knowledge across generations. This notwithstanding, their contributions frequently remain invisible when it comes to conservation planning and environmental policymaking.

This contradiction constitutes both an ecological and governance concern. Sustainable forestry cannot be effectively pursued where those most closely connected to forest systems remain excluded from institutional decision-making. As such, research work must move beyond viewing women merely as beneficiaries of environmental programmes toward recognising them as active conservation agents and governance stakeholders, the crux of the present study.

The Study

Environmental sustainability has emerged as one of the defining policy concerns of the twenty-first century. Global environmental debates increasingly recognise that ecological degradation intersects with poverty, inequality and governance failures. The United Nations, through the Sustainable Development Goals (SDGs), explicitly linked gender equality, climate action and ecosystem protection under Goals 5, 13 and 15 respectively. These interconnections imply that environmental sustainability and social inclusion cannot be pursued in isolation.

It is never an understatement that Nigeria possesses diverse ecological systems comprising rainforest, mangrove, savannah and montane forests that support significant biodiversity and rural livelihoods. However, the evolving event of the present time has made these ecosystems to continue to experience severe degradation. It has been canvassed that environmental degradation results not merely from resource exploitation but from governance systems incapable of balancing ecological integrity with human needs.

Conventional forestry administration in Nigeria has historically reflected top-down approaches inherited from colonial and postcolonial resource regimes. Such approaches frequently emphasise state control and technical regulation while marginalising customary institutions and indigenous ecological knowledge. Such assumptions

has been challenged since resource sustainability often depends less on centralised control and more on locally developed institutions and participatory governance systems.

It is on record that the traditional Nigerian communities historically maintained ecological balance through indigenous norms regulating harvesting periods, sacred forests and communal sanctions. Within these systems, women frequently exercised environmental responsibilities associated with resource management and ecological stewardship. This however, was weakened by the colonial forestry systems with great impact on indigenous governance structures while simultaneously reinforcing patriarchal land and authority relations.

The consequence is a gendered governance imbalance. Women continue to shoulder conservation responsibilities while lacking commensurate institutional recognition which has been described as contradiction and a major obstacle to environmental governance arising from exclusion that diminishes both justice and conservation effectiveness. Consequently, the persistence of forest degradation despite policy interventions raises an important question of whether sustainable forestry in Nigeria can be realised without adequately recognising and institutionalising women's indigenous ecological roles. This study thus set to examine the caveat of unsung heroes in forest conservation, sustainable forestry and resource management in Nigerian traditional communities.

Objectives of the Study

The study was guided by the following objectives:

1. To examine women's involvement in resource conservation within Nigerian traditional communities.
2. To assess indigenous conservation practices employed by women in sustainable forestry management.
3. To determine whether women's participation significantly influences sustainable forestry outcomes.
4. To identify barriers constraining women's participation in forestry governance and resource management.

Research Questions

The following questions guided the study:

1. What roles do women perform in resource conservation within Nigerian traditional communities?
2. What indigenous conservation practices are employed by women in forestry management?
3. Does women's participation significantly influence sustainable forestry outcomes?
4. What structural barriers constrain women's participation in forestry governance?

Research Hypothesis

The study tested the following hypothesis:

H₀₁: There is no significant difference in sustainable forestry outcomes between communities characterised by high and low levels of women's participation.

LITERATURE REVIEW

Theoretical Framework

This study is anchored on Ecofeminist Theory and Common-Pool Resource Theory (CPR). The complementary use of these frameworks provides an integrated lens for understanding women's environmental

agency and institutional participation in sustainable forestry governance within Nigerian traditional communities.

Ecofeminist Theory

Ecofeminism emerged as an interdisciplinary framework linking environmental degradation with systems of gender domination. Ecofeminist scholars contend that the exploitation of nature and the marginalisation of women derive from similar hierarchical structures embedded within patriarchal societies. Shiva (1988) remains one of the most influential proponents of this perspective. According to Shiva, dominant development models frequently commodify nature and marginalise women's knowledge systems while privileging technocratic and extractive forms of resource management. She argued that women's ecological roles are not accidental but are historically connected to their responsibilities in sustaining households, agriculture and community welfare.

Mies and Shiva (1993) further argued that modern environmental crises reflect broader systems of social and ecological domination. Their position suggests that environmental sustainability requires not merely technical interventions but structural transformation in power relations and governance arrangements. Ecofeminism does not imply that women are biologically closer to nature. Rather, contemporary ecofeminist scholarship emphasises women's environmental experiences and socio-economic positioning. Leach (2016) argued that women's ecological knowledge emerges primarily from lived realities associated with subsistence production, caregiving and resource management.

Within Nigerian traditional communities, women's daily interaction with forests through fuelwood collection, medicinal-plant harvesting, food processing and household energy management generates specialised ecological understanding. This experiential knowledge frequently informs conservation practices and environmental ethics. The relevance of Ecofeminist Theory to this study therefore lies in its capacity to explain why women often emerge as conservation actors while simultaneously experiencing exclusion from formal governance systems. Ecofeminism provides a useful framework for interrogating the contradiction between women's ecological responsibilities and their institutional invisibility.

Common-Pool Resource Theory

This theory derives from Common-Pool Resource Theory is associated principally with the scholarship of Ostrom (1990). Classical resource-management debates were strongly influenced by Hardin's (1968) "tragedy of the commons" thesis, which suggested that shared resources inevitably suffer degradation because users pursue individual interests without restraint. According to Hardin, collective ownership tends toward overexploitation unless regulated through state authority or privatisation.

Ostrom (1990), however, challenged this deterministic assumption. Through extensive empirical research, she demonstrated that communities frequently develop sophisticated institutions governing shared resources sustainably through collective norms, monitoring and sanctions. Ostrom (1990) identified several institutional conditions supporting successful common-pool resource governance to include: Clearly defined user boundaries; Locally adapted rules; Participatory decision-making; Effective monitoring; Graduated sanctions; Accessible conflict-resolution mechanisms.

Her later work further conceptualised sustainability as a social-ecological system requiring institutional diversity and adaptive governance (Ostrom, 2009). Common-Pool Resource Theory possesses significant relevance for Nigerian forestry systems. Traditional communities historically developed indigenous institutions regulating forest exploitation through sacred groves, seasonal harvesting restrictions, customary authority and social sanctions. These governance arrangements align substantially with Ostrom's institutional principles.

Importantly, women frequently participate in maintaining such arrangements. They monitor harvesting practices, preserve sacred ecological spaces and transmit customary environmental rules. Agarwal (2010) argued that governance institutions achieve greater effectiveness where participation is inclusive and representative. Excluding women from forestry institutions therefore weakens institutional legitimacy and

reduces conservation effectiveness. CPR theory thus supports the argument that sustainable forestry depends not solely on state regulation but on inclusive and locally grounded governance systems.

Women and Indigenous Ecological Knowledge

Indigenous ecological knowledge represents cumulative environmental understanding developed through sustained interaction between people and ecosystems. Such knowledge encompasses biodiversity management, seasonal observations, resource-use norms and conservation ethics transmitted across generations. Scholars increasingly acknowledge indigenous knowledge as a legitimate and indispensable resource for environmental governance. Berkes (2018) argued that traditional ecological knowledge embodies adaptive strategies developed through long-term environmental experience and cultural learning. Such knowledge systems often provide context-sensitive conservation approaches overlooked within formal environmental administration.

Women occupy particularly strategic positions within these systems. Shiva (1988) argued that women's environmental experiences derive from their daily interaction with land, forests and household survival systems. According to Shiva, environmental degradation disproportionately affects women because of their roles in water sourcing, fuel collection and food security. Similarly, Leach (2016) contended that women's ecological expertise emerges from socio-economic responsibilities rather than biological determinism. Their environmental knowledge is therefore socially produced and practically grounded. Empirical studies support these theoretical positions. Agarwal (2009), in a landmark study on community forestry, demonstrated that women's participation improves forest governance and conservation outcomes. Her findings revealed stronger monitoring systems and better resource protection where women actively participated in governance institutions.

African scholarship reinforces this perspective. Aluko (2018) observed that indigenous environmental knowledge among rural women in southwestern Nigeria contributes significantly to environmental security and sustainable development. Likewise, Egbe, Ebu and Ekpoto (2022) documented extensive indigenous conservation knowledge among women in Cross River State, particularly regarding medicinal plants, non-timber forest products and species protection. These studies collectively suggest that women possess valuable ecological knowledge often overlooked within formal forestry systems.

Women and Sustainable Forestry Governance

Contemporary sustainability literature increasingly recognises that environmental governance requires inclusive institutional arrangements. Ostrom (1990) rejected deterministic assumptions that common resources inevitably collapse through overuse. Instead, she demonstrated that communities frequently establish sustainable governance arrangements through shared norms, participation and accountability. Ostrom's later work further emphasised that social-ecological sustainability depends upon institutional diversity and local participation (Ostrom, 2009). Such insights are particularly relevant to forestry governance where conservation outcomes depend heavily upon local compliance and ecological knowledge.

Women's participation represents an important dimension of this institutional perspective. Westermann, Ashby and Pretty (2005) demonstrated that gender diversity strengthens natural-resource management groups by enhancing cooperation, accountability and social capital. Similarly, Meinzen-Dick, Kovarik and Quisumbing (2014) maintained that sustainability initiatives achieve stronger outcomes where women participate substantively in governance and decision-making.

Forestry institutions, however, frequently reproduce gender inequalities. FAO (2023) observed that women remain underrepresented in forestry governance globally despite their substantial contributions to conservation and forest-product systems. The International Union for Conservation of Nature (2021) likewise reported that insecure tenure and restricted participation continue to limit women's environmental effectiveness across many developing regions.

The literature therefore reveals a significant contradiction. Women contribute substantially to environmental conservation yet remain institutionally marginalised. This contradiction necessitates deeper investigation

within Nigerian traditional communities where indigenous governance and gender relations continue to shape environmental outcomes.

Empirical Review

Existing scholarship on forestry and environmental sustainability in Nigeria has generated important insights into deforestation, biodiversity decline and institutional weaknesses. Nevertheless, significant gaps remain. Much forestry research concentrates on ecological indicators and policy failures while devoting insufficient attention to gendered conservation systems. For instance, FAO (2020) extensively documented forest loss and environmental decline but devoted comparatively limited attention to women's informal conservation institutions. Similarly, Nigerian forestry literature often prioritises technical resource management and state regulation. Where women appear in forestry studies, they are frequently portrayed as resource users or vulnerable populations rather than conservation leaders and institutional actors. Agarwal (2009) criticised this tendency by arguing that environmental scholarship frequently underestimates women's governance capacities despite evidence linking their participation with stronger conservation outcomes.

Nigerian empirical studies further reveal a documentation gap. Aluko (2018) examined indigenous environmental knowledge among rural women in southwestern Nigeria and observed that such knowledge contributes substantially to environmental sustainability. Likewise, Egbe et al. (2022) documented women's specialised forest-resource knowledge in Cross River communities. However, these studies largely concentrated on knowledge and utilisation patterns rather than examining women's conservation roles within broader forestry-governance systems. Moreover, contemporary forestry policy discourse in Nigeria continues to reflect top-down institutional arrangements that inadequately integrate indigenous conservation systems.

Methodology

The study adopted a mixed-method research design that integrate quantitative and qualitative approaches. Such designs are particularly useful where social behaviour and institutional processes intersect. Because forestry governance involves ecological practices, gender relations and institutional dynamics, a mixed-method design was considered appropriate. The study population cut across adult women, traditional authorities and environmental stakeholders involved in forest-resource use and governance. The study was conducted among selected forest-dependent communities located within Southern and North-central Nigeria where dependence upon forest ecosystems remains substantial with communities engaging prominently in: fuelwood collection; medicinal-plant harvesting; non-timber forest-product extraction; subsistence farming; sacred-forest preservation. The quantitative component involved structured questionnaires which adopted a modified four-point Likert rating scale of Strongly Agree = 4; Agree = 3; Disagree = 2; Strongly Disagree = 1 while qualitative data were generated through key informant interviews (KIIs) and focus group discussions (FGDs). A multi-stage sampling technique was employed with forest-dependent communities purposively selected based on ecological characteristics and forest dependence followed by stratified procedures ensured representation across gender and stakeholder categories and simple random sampling was used to select respondents. A total of 240 survey respondents participated 12 Key Informant Interviews and 4 Focus Group Discussions conducted involving traditional rulers, women leaders, forestry officers, environmental stakeholders. Validation of instrument was ensured through expert review involving specialists in environmental education, gender studies and social research methodology while Pilot testing produced a Cronbach Alpha coefficient of 0.84. Data were analysed quantitatively using Mean; Standard deviation and Grand mean while the inferential statistics involved Independent samples t-test at 0.05 significance level. Qualitative data from interviews and focus groups were analysed thematically through triangulation of instrument.

RESULTS AND DISCUSSION

This section presents findings generated from the quantitative and qualitative components of the study. Descriptive statistics involving mean and standard deviation were employed to examine women's conservation roles and indigenous ecological practices, while inferential statistics tested the study hypothesis.

Research Question One: What roles do women perform in resource conservation within Nigerian traditional communities?

Table 1:

Women's Involvement in Resource Conservation

S/N	Item	Mean	SD	Decision
1	Women regulate fuelwood harvesting and utilisation	3.28	0.76	Not Rejected
2	Women preserve medicinal plants and indigenous species	3.41	0.69	Not Rejected
3	Women monitor forest-resource use and harvesting	3.18	0.81	Not Rejected
4	Women engage in tree planting and regeneration practices	3.34	0.72	Not Rejected
5	Women transmit ecological knowledge to younger generations	3.39	0.74	Not Rejected

Grand Mean = 3.32; Criterion Mean = 2.50

The findings indicate a high level of women's involvement in resource conservation across the selected communities. The grand mean of 3.32, exceeding the benchmark of 2.50, confirms substantial participation. The highest mean score was recorded for medicinal-plant preservation (3.41), followed closely by ecological knowledge transmission (3.39). These findings indicate that women's conservation roles extend beyond subsistence utilisation toward ecological stewardship and environmental regulation. Qualitative findings corroborated these results. One participant during focus-group discussions stated that "Women know the trees that should not be cut and the herbs that must be preserved. These rules came from our mothers and continue to guide us." Such responses illustrate the persistence of indigenous ecological systems mediated substantially through women.

Research Question Two: What indigenous conservation practices are employed by women in forestry management?

Table 2:

Women's Indigenous Conservation Practices

S/N	Practice	Mean	SD	Decision
1	Sacred-grove protection	3.55	0.63	Not Rejected
2	Seasonal harvesting restrictions	3.42	0.71	Not Rejected
3	Protection of medicinal species	3.48	0.66	Not Rejected
4	Community sanctions against illegal exploitation	3.36	0.75	Not Rejected
5	Selective harvesting and regeneration	3.39	0.73	Not Rejected

Grand Mean = 3.44, Criterion Mean = 2.50

The grand mean of 3.44 reflects strong adherence to indigenous conservation practices among women. Sacred-grove protection recorded the highest mean (3.55), demonstrating the continued relevance of spiritual and cultural institutions in environmental management. Medicinal-species protection equally recorded high acceptance (3.48), reflecting women's central role in biodiversity conservation. Interview responses reinforced these quantitative findings. A traditional ruler observed that: "Many forest areas survive because women and elders insist they are protected places. Violators face communal sanctions." These findings suggest that indigenous conservation systems remain functional and environmentally relevant despite increasing socio-economic pressures.

Test of Hypothesis

H₀₁: There is no significant difference in sustainable forestry outcomes between communities characterised by high and low levels of women's participation.

Table 3:

Independent Samples t-Test Showing Difference in Sustainable Forestry Outcomes

Group	N	Mean	SD	t	df	Sig.
High women participation	120	3.48	0.62	4.21	238	0
Low women participation	120	3.06	0.71	4.21	238	0

The result indicates $t = 4.21$, $df = 238$, $p < .05$. Because the probability value is less than 0.05, the null hypothesis was rejected. This implies a statistically significant difference in sustainable forestry outcomes between communities with high and low levels of women's participation. Communities characterised by stronger women's participation recorded better sustainability outcomes. The finding confirms that women's participation contributes measurably to sustainable forestry performance.

DISCUSSION OF FINDINGS

The findings reveal that women constitute indispensable but inadequately recognised actors in sustainable forestry and resource governance within Nigerian traditional communities. The high grand mean of 3.32 indicates substantial women's participation in conservation practices. This result supports Shiva's (1988) ecofeminist argument that women's environmental experiences generate practical ecological knowledge and conservation ethics. Shiva maintained that women's interaction with environmental systems frequently produces sustainable resource-management orientations grounded in livelihood realities and ecological responsibility.

Similarly, Leach (2016) argued that women's environmental competence derives from socio-economic responsibilities associated with caregiving, household management and subsistence production. The present findings reinforce these perspectives by demonstrating women's active involvement in medicinal-plant preservation, forest monitoring and ecological knowledge transmission. The findings further corroborate Agarwal's (2009) influential work on community forestry. Agarwal demonstrated empirically that women's participation improves forest governance through enhanced monitoring, stronger compliance and improved institutional accountability. The present study similarly reveals stronger forestry outcomes where women participate more actively. The grand mean of 3.44 equally demonstrates strong adherence to indigenous conservation practices. This finding aligns with Berkes' (2018) argument that indigenous ecological knowledge constitutes an adaptive environmental system shaped through prolonged interaction with ecosystems. Berkes maintained that traditional ecological systems frequently provide locally appropriate conservation strategies overlooked within formal environmental administration. The strong performance of sacred-grove protection and seasonal harvesting restrictions suggests that indigenous institutions continue to regulate ecological behaviour effectively.

This finding is consistent with Nigerian evidence. Aluko (2018) observed that indigenous environmental knowledge among rural women contributes significantly to environmental security and sustainability in southwestern Nigeria. Similarly, Egbe et al. (2022) documented women's specialised ecological knowledge and forest-conservation practices among Cross River communities. The inferential findings provide particularly important insights. The statistically significant difference between communities with high and low women participation ($t = 4.21$, $p < .05$) validates Common-Pool Resource Theory. Ostrom (1990) argued that common resources can be sustainably governed through locally developed institutions involving participation, monitoring and social accountability. Her later work (Ostrom, 2009) further emphasised that sustainability depends upon adaptive social-ecological systems rather than exclusively centralised regulation. The present findings support these propositions.

Communities characterised by stronger female participation demonstrated superior forestry outcomes, suggesting that inclusion strengthens governance legitimacy and ecological effectiveness. Westermann, Ashby

and Pretty (2005) similarly demonstrated that gender diversity enhances social capital and institutional performance within natural-resource management groups. However, despite their ecological contributions, women continue to face structural barriers such as patriarchal land-tenure systems; restricted access to forestry committees; limited institutional recognition; inadequate governmental support. These findings align with FAO's (2023) observation that women remain underrepresented in forestry governance globally despite their environmental significance. Likewise, the International Union for Conservation of Nature (2021) reported that unequal land rights and institutional exclusion continue to constrain women's environmental effectiveness. Women perform substantial conservation labour and sustain indigenous ecological systems, yet institutional structures continue to marginalise them. This contradiction weakens both environmental justice and conservation outcomes.

CONCLUSION

This study examined women's roles in resource conservation and sustainable forestry governance within Nigerian traditional communities. Findings demonstrate that women possess substantial indigenous ecological knowledge and participate actively in biodiversity conservation, forest regeneration and environmental regulation. The grand means of 3.32 and 3.44 confirm extensive involvement and strong adherence to indigenous conservation practices. Inferential analysis further revealed significant differences in forestry outcomes between communities with high and low levels of women's participation.

The study therefore concludes that women's participation constitutes not merely a gender-equity concern but an ecological necessity. Sustainable forestry in Nigeria cannot be effectively achieved while women remain institutionally marginalised. Their indigenous conservation systems and governance roles require formal recognition and policy integration.

RECOMMENDATIONS

Based on the findings, the following recommendations are put forward:

Nigerian forestry policies should institutionalise women's participation in forestry governance and conservation planning. Indigenous conservation systems maintained by women should be formally integrated into environmental policy and forest-management frameworks. Government should pursue gender-sensitive land-tenure reforms improving women's ownership and access rights. Forestry programmes should adopt gender-responsive budgeting and capacity-building initiatives. Local conservation committees should ensure equitable representation of women in decision-making structures. Universities and research institutions should intensify documentation of indigenous ecological knowledge and women's conservation practices. Partnerships involving government, NGOs and traditional institutions should be strengthened to promote community-based and gender-inclusive forestry governance.

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