



EMPOWERING WOMEN THROUGH ENVIRONMENTAL EDUCATION: EXPLORING THE ROLE OF FEMALE PARTICIPATION IN COMMUNITY ECOLOGY FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT :

This study explores the transformative power of environmental education in empowering women and fostering sustainable development within community ecological systems. In the past, women have kept water, land, and forests as primary custodians and managers even in rural and marginalised settings. In addition, custodians of natural resources are still facing gender-specific challenges such as lack of education, lack of representation in political decisions, and cultural discrimination which decrease women's leadership in the environment. This study examines education-focused eco-feminism. It studies women gaining skills and knowledge from training programs and being at the forefront of community resource management, climate change adaptation, and biodiversity conservation. It also addresses gendered silos, curricula, and resource barriers to women's participation in leadership roles in the environmental field in Australia. Research indicates that women with localised support in formal and informal education improve both ecological and economic resilience at the community level. This study emphasizes that women's engagement in education on environmental issues is vital for achieving sustainability targets. There is a need for policymakers, education, and the NGO sector to remove barriers to equitable access and incorporate gender-responsive approaches in teaching about the environment. Society gains a greater diversity of ideas and knowledge to innovate and advance socially just and sustainable futures when women are the primary focus of environmental education. This study advocates contextually tailored, participatory approaches to enhance women's roles in community ecology and urges the continual evaluation of the gendered dimensions of environmental sustainability.

Keywords: Empowerment, Women Education, Ecology, Sustainable Development .

I.Introduction:

Environmental breakdown, climate change, and social inequality are at the fore of what we see as primary global issues today. To address these issues, we require a multi-pronged



approach, one of which that is very effective is environmental education which not only brings to light environmental issues but also provides people with the information and skills to put forward sustainable solutions. Women are important, but their roles are often neglected. They face more problems, such as a lack of natural resources, pollution, and climate disasters. However, they are not often included in decisions about the environment because of gender inequalities. Educating women about the environment is key to building stronger and more sustainable communities.

Women, particularly those in rural and marginalized communities, often assume the role of primary managers of essential natural resources, including water, fuel, and food. This pivotal position endows them with extensive indigenous knowledge and a distinctive perspective on environmental sustainability. Nevertheless, gender norms, limited access to education, cultural biases, and underrepresentation in decision-making processes constrain women's capacity to fully influence environmental outcomes (Mukoni, 2015). The United Nations emphasizes that "environmental education is a key factor in promoting sustainable development and improving the quality of the environment" (UNEP, n.d.). However, this potential can only be realised when women have equal access to environmental education programs tailored to their specific contexts and needs.

Empirical research indicates that women contribute innovative and effective solutions to environmental challenges, resulting in improved resource management, enhanced biodiversity conservation, and strengthened climate adaptation at the local level. Women's involvement in environmental decision-making correlates with more inclusive processes and sustainable outcomes (Arora-Jonsson 2017). Initiatives such as the Green Belt Movement, led by Nobel Laureate Wangari Maathai, illustrate that empowering women through education and community engagement can facilitate large-scale environmental restoration and improve community livelihood (Lee, 2025). However, persistent barriers, such as poverty, restrictive social norms, insufficient gender-sensitive educational programs, and limited institutional support, continue to impede women's active participation.

The effective integration of gender perspectives into environmental education extends beyond access. This requires an inclusive pedagogy that incorporates women's lived



experiences and Indigenous knowledge, participatory teaching methods, and leadership development support (Lee, 2025). These strategies promote women's empowerment and reinforce community resilience to climate change and environmental degradation through sustainable practice. Achieving environmental justice, which involves addressing the disproportionate environmental burdens faced by women and marginalised groups, relies on education that explicitly links ecology to gender and social equity (Mukoni, 2015).

This study aimed to explore how environmental education empowers women to actively participate in and lead community ecological initiatives. Drawing from feminist political ecology and relevant case studies, it examines barriers to women's participation, the positive impacts of education, and policy frameworks that can support gender-inclusive environmental sustainability. By centring women in environmental education, this study argues that sustainable development goals (SDGs) become more attainable and equitable.

II. Objectives of the Study:

The primary objective of this study was to investigate how environmental education empowers women to actively participate in and lead sustainable ecological practices in their communities. Specifically, this study aims to:

- This study explores the role of women in community environmental stewardship and how education enhances their ecological knowledge and leadership.
- Identify the social, economic, and institutional barriers that restrict women's access to environmental education and full participation in ecological decision-making.
- The impact of women's empowerment through environmental education on sustainable development outcomes, including biodiversity conservation, climate adaptation, and community resilience, was assessed.
- We examined policy frameworks and educational strategies that effectively promote gender-inclusive environmental education.
- We provide recommendations for empowering women through environmental education to achieve more equitable and sustainable ecological practices.



III. Limitation of the study:

The primary data for this study were derived exclusively from secondary sources, including academic papers, websites, and other relevant resources. The statistical data considered spanned the period from January 2015 to December 2025.

IV. Methodology:

The present study predominantly utilised secondary data sourced from research papers published in journals, government websites, and other verified sources. The data were meticulously analyzed and synthesized to offer a comprehensive understanding of the research topic. This approach facilitates a broad perspective on the existing literature and findings, allowing for the identification of trends, gaps, and potential areas for further exploration.

V. Literature Review:

The relationship between women's empowerment and environmental education has garnered increasing attention in both academic and policy circles in recent years. Women are central to natural resource management in both global and Indian contexts, particularly in rural and tribal communities, where livelihoods depend on local ecosystems. Their expertise in sustainable agriculture, water conservation, and forest management contributes significantly to community resilience to ecological degradation. However, social, economic, and institutional barriers frequently restrict women's participation in formal environmental education and decision-making processes. (Mukoni 2015).

Research shows that involving women in environmental education improves resource management, fosters climate change adaptation, and protects the environment (Arora-Jonsson, 2017). Women acquire the knowledge and ability to influence decisions when they learn about the environment. Educational initiatives that consider gender and incorporate women's perspectives and local knowledge are more effective and have a longer lifespan (Lee, 2025).

The feminist political ecology framework advances the understanding of gendered power dynamics in environmental governance. This framework critiques traditional top-down environmental interventions for neglecting women's roles and experiences, which are essential for achieving sustainable equity in environmental conservation. Empirical studies have



demonstrated that women's involvement in community environmental education enhances social justice outcomes and ecological health. (Mukoni, 2015; Lee, 2025).

Women's leadership and mobilising abilities are demonstrated in the Indian context by their participation in environmental movements, such as the Chipko Movement and Narmada Bachao Andolan. Notwithstanding these achievements, many women still encounter obstacles, such as low literacy, the gendered division of labour, and social norms that limit their mobility. To close these gaps, we need environmental education programs that are culturally appropriate and easy to access, as well as institutional support to include gender perspectives in environmental policy (Talukdar, 2019).

Women's Environmental Leadership in Assam, India:

Assam, a biodiversity-rich state in Northeast India, offers a vivid example of how women's environmental education and leadership can drive conservation and sustainable development in India. Assam's rural women, often marginalized across social and economic dimensions, have become effective agents of ecological change through community-based education efforts and grassroots activism.

One inspirational example is Dr. Purnima Devi Barman's "Hargila Army", an initiative focused on protecting the endangered Greater Adjutant stork, an iconic but threatened bird species locally called Hargila. By offering environmental education, training in sustainable livelihoods, and advocacy platforms, Dr. Barman engaged rural women from marginalised communities in the Kamrup district. Previously excluded from official conservation procedures, these women gained the authority to monitor nests, protect habitats, and run awareness campaigns using storytelling and folk arts.

Along with achieving ecological successes, such as a rise in bird populations and a decrease in habitat destruction, the Hargila Army has significantly improved women's economic independence, leadership skills, and self-confidence. Members have begun making eco-friendly crafts and money, which strengthens their position as community leaders and environmental stewards (Baruah, 2024).



Assamese women also actively contribute to forest conservation, sustainable agriculture, and water resource management. They maintain traditional seed banks, adopt organic farming, and participate in water preservation initiatives, often combining indigenous knowledge with new ecological education methods. These efforts strengthen local resilience to climate change and resource depletion while improving their livelihood options (Mazumdar, 2023).

Despite these gains, obstacles such as limited formal education, sociocultural restrictions, and policy-level marginalisation persist. The Assam experience demonstrates that women's empowerment through environmental education requires sustained institutional commitment, gender-sensitive pedagogy, and community-led approaches tailored to local realities (Baruah, 2024; Das, 2022). The Assam case shows that women with environmental education are key to successful and inclusive ecological conservation efforts. This can serve as a model for similar situations worldwide.

VI. Resultss and Discussion:

The intersection of women's empowerment and environmental education in Assam reveals a powerful synergy that enhances ecological sustainability and social development. Evidence from Assam, supported by the broader literature on gender and ecology, points to the transformative potential of women's active engagement and education in environmental conservation. This discussion unpacks the multidimensional benefits, challenges, and implications of fostering female participation in environmental education, drawing on theory and practice.

First, the case study of women-led conservation efforts in Assam, particularly through initiatives such as the Hargila Army, exemplifies the critical role women play in bridging ecological knowledge and community action. Women's indigenous knowledge, closely linked to daily resource management, from farming to forest use, makes them natural stewards of their environment. By acknowledging and valuing local knowledge, environmental education empowers women to become custodians and advocates for sustainable practices. This approach aligns with feminist political ecology, which highlights the significance of gendered experiences and knowledge systems in shaping sustainable environmental practices in the



region. Including women broadens the scope of ecological stewardship beyond male-dominated frameworks that often overlook social and ecological interdependencies (Arora-Jonsson 2017).

Furthermore, women's environmental education cultivates leadership skills and social engagement, empowering them to challenge traditional norms that often marginalise their voices. In Assam, as women gained confidence and skills through participatory education, they successfully spearheaded conservation projects and established networks that amplified their impact on the environment. This empowerment extends beyond ecology to socio-economic realms; women's involvement in eco-friendly livelihoods linked to conservation grants them financial independence, reinforcing their role in decision-making within households and communities. Studies elsewhere authenticate these patterns, demonstrating that environmental education serves as a catalyst for broader gender equality and community well-being (Mukoni 2015).

The environmental outcomes of women's empowerment are equally important. Conservation efforts led by women have resulted in tangible improvements in biodiversity and natural resource management, as evidenced by the rise in Greater Adjutant stork populations and increased forest cover in Assam. This success highlights the crucial insight that sustainable environmental management requires inclusive approaches that harness diverse knowledge and perspectives. The narrow focus on technical solutions often fails to consider gender dynamics, whereas integrating women's knowledge through education leads to more adaptive and resilient ecosystems (Lee 2025).

However, this discussion must also acknowledge the ongoing challenges. Despite progress, systemic barriers such as poverty, social norms that restrict women's mobility and agency, and inadequate access to formal education persist in Assam and in many parts of India. Educational programs must be contextually sensitive and gender-responsive to overcome these hurdles. For instance, incorporating local languages, flexible learning schedules, and culturally appropriate teaching methods helps improve the accessibility and retention of female students. Equally important is the institutional commitment to gender mainstreaming in environmental



policies and programs, ensuring that women's participation is not tokenistic but substantive (UNEP, n.d.).

Policy frameworks in Assam and India increasingly recognise gender as a cross-cutting issue in sustainable development; however, implementation gaps remain. Bridging these gaps calls for multisectoral partnerships involving governments, NGOs, and community-based organisations. Assam's grassroots women's groups demonstrate how local leadership can complement policy efforts by ensuring education and conservation strategies resonate with community needs and realities. Scaling such models could accelerate progress toward multiple Sustainable Development Goals, including gender equality (SDG 5) and climate action (SDG 13).

Finally, this discussion underscores the need for ongoing research and monitoring to better understand the long-term impact of women's environmental education. Data collection disaggregated by gender and community characteristics can illuminate successes and areas for improvement, thereby informing more effective program designs. Additionally, studies exploring men's and boys' roles in supporting or hindering women's empowerment could help foster more inclusive gender dynamics.

The empowerment of women through environmental education in Assam embodies a vital pathway to sustainable, equitable development. Women's knowledge, leadership, and agency enrich ecological conservation, and education serves as the foundation for their empowerment. Addressing these barriers and institutionalising gender-sensitive approaches are essential to harnessing the full potential of women as environmental stewards. This model from Assam offers valuable lessons for similarly diverse and resource-dependent regions worldwide, advocating for the intertwining of gender justice with ecological resilience as a fundamental objective.

Findings:

The exploration of women's empowerment through environmental education in Assam reveals an important nexus between gender equity and ecological sustainability in Assam. Women's traditional roles as caretakers and managers of natural resources position them



uniquely to contribute significantly to environmental conservation and to sustainable development. However, these contributions have historically been under-recognised and constrained by prevailing social, economic and institutional barriers. This study demonstrated that empowering women through environmental education not only enhances their participation and leadership in ecological initiatives but also drives broader community resilience and sustainable outcomes.

The case of Assam, particularly the successful “Hargila Army” conservation initiative, underscores the profound impact of localised, women-led environmental education programmes. By equipping women with knowledge, leadership skills, and sustainable livelihood opportunities, these programs foster biodiversity protection and socioeconomic empowerment. Women’s enhanced agency enables them to challenge traditional gender norms and increase their influence in community decision-making structures. This integration of gender and environmental priorities represents a critical pathway for achieving inclusive and effective conservation.

Moreover, the literature reviewed here affirms that women’s environmental education is a crucial catalyst for realising multiple Sustainable Development Goals, including gender equality (SDG 5), climate action (SDG 13), and life on land (SDG 15). The empowerment engendered by education elevates women as change agents, capable of innovating and implementing adaptive strategies in response to ecological challenges. This dual benefit—socioeconomic upliftment and ecological sustainability—emphasises the importance of mainstreaming gender perspectives into environmental policies and programs.

However, significant challenges remain. Persistent obstacles, such as limited formal education, restrictive social norms, and inadequate institutional support, hinder many women’s full access to environmental knowledge and leadership opportunities. Overcoming these hurdles demands concerted efforts to design gender-sensitive and culturally relevant educational frameworks. Flexibility in learning modalities, targeted capacity building, and partnerships with local women’s groups are essential to maximise reach and impact. Furthermore, policymakers must prioritise gender mainstreaming in environmental governance to ensure substantive participation, rather than symbolic inclusion.



The Assam experience highlights the need for continuous research, monitoring, and data collection to evaluate the long-term effects of women's empowerment on environmental and social outcomes. Disaggregated data by gender and community characteristics can reveal critical insights into program effectiveness and areas that need adjustment. Additionally, broadening the scope to include men's roles in supporting gender equity can cultivate more inclusive environments in which women's leadership thrives.

V. Conclusion:

In conclusion, empowering women through environmental education is indispensable for sustainable development in Assam and comparable regions worldwide. Women's knowledge, leadership, and agency strengthen ecological conservation, while promoting social justice and economic resilience. Aligning environmental education with gender equity principles amplifies these benefits, making communities more adaptive and capable of confronting current and future challenges. The model exemplified by Assam's women-centred conservation initiatives offers valuable lessons on how to effectively integrate ecological stewardship and women's empowerment. To ensure a sustainable and equitable future, it is imperative that environmental education programs, policies, and partnerships prioritise women's empowerment as a strategic and ethical imperative.

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