

Historical Impression of Gender on Ecology in the Indian context

Priyaranjan Trivedi

Chairman, Indian Institute of Ecology and
Environment, New Delhi
ecology@ecology.edu

Abstract

This paper presents a historical and conceptual appraisal of the gendered dimensions of ecological knowledge, stewardship, and environmental change in India. Moving beyond essentialist assertions of an innate bond between women and nature, the study employs Bina Agarwal's framework of feminist environmentalism to argue that gender-ecological relationships are structurally grounded in material realities, the social division of labour, caste stratification, and property relations. Historically, rural, Dalit, and Adivasi women have functioned as primary gatherers of subsistence resources—fuelwood, fodder, water, and non-timber forest products—fostering localized Traditional Ecological Knowledge (TEK) in seed preservation, micro-water management, and agrobiodiversity. However, successive structural shifts—including colonial state forestry laws, cash crop expansion, privatized land tenure, and post-independence agricultural mechanization via the Green Revolution—systematically disenfranchised women from common property resources and eroded customary conservation practices. Despite systemic marginalization, Indian women have consistently driven grassroots ecological resistance, most notably seen in the Chipko Movement, anti-dam struggles like the Narmada Bachao Andolan, and coastal conservation networks. Contemporary environmental challenges—including climate change-induced water stress, extreme weather events, and rapid urbanization—disproportionately increase women's physical and economic labor burdens. Nevertheless, policy interventions like the Forest Rights Act (2006) and institutional initiatives led by organizations such as the Indian Institute of Ecology and Environment highlight the transformative potential of recognizing women as active agents in environmental governance. Ultimately, the paper argues that achieving sustainable environmental policy and climate resilience in India requires incorporating gender-differentiated ecological knowledge into formal legislative, academic, and policy frameworks.

Keywords: Feminist Environmentalism, Traditional Ecological Knowledge, Gender and Ecology, Indian Environmental History, Chipko Movement, Forest Rights Act, Ecological Governance.

1. Introduction

The relationship between humans and the environment in India is not merely scientific or economic—it is deeply cultural, social, and gendered. Understanding how gender shapes ecological knowledge, practice, stewardship, and change is essential to any holistic account of India's environmental history. 'Gender' here refers to the socially constructed roles,

behaviours, responsibilities, and power relations associated with being male, female, or other gender identities; 'ecology' refers to the dynamic interplay between living organisms and their environments, influenced by culture, economics, politics, and tradition. The Indian subcontinent—with its millennia-old agricultural traditions, diverse ecologies, caste complexities, and colonial and post-colonial transformations—offers a uniquely multilayered context for examining how gender has historically influenced ecological relations.

This paper provides a comprehensive historical impression of gender and ecology in India—tracing ancient ecological ideas, traditional practices, colonial impacts, ecological movements (especially those emphasising women's roles), and contemporary challenges. It reflects the spirit of institution-level environmental thought promoted by educational leaders emphasizing interdisciplinary understanding and community-centred knowledge.

2. Theoretical Framework: Feminist Political Ecology and Indian Ecofeminism

To contextualize the historical intersection of gender and ecology in India, one must engage with the theoretical developments in feminist environmental thought. Western ecofeminist frameworks have historically drawn an essentialist parallel between women and nature, postulating that both share an inherent, nurturing bond that is systematically exploited under patriarchal structures. However, in the Indian context, feminist political ecologists—most notably Bina Agarwal—have challenged this essentialist link by formulating a framework of **feminist environmentalism** and **materialist ecofeminism**.

This materialist perspective argues that women's relationship with nature is not rooted in biology or innate spirituality, but in their structural location within the social division of labor, property distribution, and political power. Because rural, tribal, and marginalized women are primarily responsible for gathering daily subsistence needs—such as fetching potable water, collecting firewood, harvesting wild food, and procuring fodder—their physical survival is directly tied to the vitality of the local ecosystem.

When ecosystems degrade, the impact is not gender-neutral: women must walk longer distances, endure greater physical stress, and navigate heightened social vulnerabilities. Consequently, gendered ecological knowledge in India is forged through material necessity, labor, and lived practice, establishing women as critical agents of environmental governance, biodiversity conservation, and resource management.

3. Philosophical and Cultural Foundations: Ancient and Traditional India

3.1 Indigenous Ecological Thought

Long before ecology was formalized as a scientific discipline in the West, Indian philosophical traditions embedded humans in nature. Texts such as the *Vedas*, *Upanishads*, and *Arthashastra* articulate reciprocal duties between people and environments. The concept of *Rta* (cosmic

order) and *Dharma* (righteous duty) implied that protecting forests (*Vanaspati*), rivers (*Nadis*), and land was not just utilitarian but sacred. These early frameworks positioned humans as part of ecological systems, not above them.

While these texts do not articulate gender in modern analytical terms, they do reveal gendered cosmologies—with deities like *Prithvi* (Earth Goddess) and *Ganga* (River Goddess) embodying ecological forces, suggesting early cultural reverence for both the feminine and the environment.

3.2 Everyday Ecological Practice and Gendered Labour

In agrarian societies, ecological knowledge was not theory but practice—embedded in daily household, agricultural, and community life. Here, gender roles were functional and ecological:

- **Women** were often responsible for fuelwood gathering, water collection, soil seed selection, home gardens, medicinal plant knowledge, and food processing—activities that required deep local ecological understanding.
- **Men** frequently undertook tasks like land tilling, ploughing, water diversion for irrigation, forest use for timber, and long-distance trade.

These roles were not simply workload divisions; they shaped distinct ecological expertise. For example, women's knowledge of seasonal plant cycles, soil fertility changes, and biodiversity in home gardens influenced sustainable agricultural practices. In tribal and many rural communities, women's temple gardens, seed banks, and herbal knowledge sustained local species diversity and ecological resilience. This embedded ecological knowledge aligns with what modern scholars call **Traditional Ecological Knowledge (TEK)**—a cumulative body of knowledge passed through generations, shaped equally by gendered experience and environmental interaction.

4. Caste, Class, and Intersectionality in Ecological Stratification

A comprehensive historical appraisal of gender and ecology in India must incorporate the intersecting dynamics of caste (*Jati*), class, and indigenous identity. Ecological access in the Indian subcontinent has historically been deeply stratified:

- **Dominant-Caste Women:** Often restricted by patriarchal norms of seclusion (*purdah*), upper-caste women traditionally exercised control over domestic food processing, seed preservation, and domestic ritualistic botanical knowledge within home spaces, while having limited direct physical contact with agricultural fields or wilderness spaces.
- **Dalit and Bahujan Women:** Subjected to double marginalization, lower-caste women performed the most arduous ecological labor—such as clearing waste, working as landless wage laborers, and collecting resources from degraded common property

lands—while simultaneously being denied ownership of agricultural land and excluded from village governance decision-making.

- **Adivasi (Tribal) Women:** In forest communities, gender relations were historically more egalitarian than in settled agrarian plains. Adivasi women possessed extensive, specialized knowledge of non-timber forest produce (NTFP), medicinal herbs, and shifting cultivation cycles (*jhum*). However, state-led forestry policies and industrial expansion have severely disrupted these indigenous support systems.

5. Medieval and Early Modern India: Shifts and Continuities

5.1 Economy, Ecology, and Gender in Pre-Colonial India

During the early medieval period, agrarian structures expanded, while craft guilds, trade networks, and land tenure systems became more complex. Ecological stewardship was embedded in village management systems (*panchayats*), with customary norms regulating grazing, forest access, and water distribution. Gender continued to shape ecological relations:

- **Women's roles** in seed selection and storage ensured crop adaptation to local microclimates, while their knowledge of wild edibles and medicinal plants sustained household nutrition and health.
- **Men's roles** in forest entry and trade connected ecological zones across larger geographical spaces.

While historical documentation from this period is sparse on everyday gendered ecology, ethnographic reconstructions indicate that gendered ecological knowledge was widely distributed and socially regulated within customary village institutions.

5.2 Religious and Ritual Ecologies

Hindu, Buddhist, and Jain traditions often celebrated nature through festivals, rituals, and pilgrimage routes. Women played prominent roles in many rituals linked to fertility, rain-making, and harvest celebrations. These religious practices reinforced respect for local ecosystems, integrating ecological knowledge with cultural and gendered identities.

6. Colonial Transformations: Imposed Ecologies and Gendered Disruptions

6.1 Colonial Land Policies and Ecological Reordering

The British colonial regime radically transformed Indian ecological landscapes through land revenue systems (such as the Permanent Settlement, Ryotwari, and Mahalwari), commercialization of agriculture, forest laws, and infrastructure projects. Commercial timber extraction, large-scale irrigation works, and market integration reconfigured local ecological relations.

These changes affected gendered ecological roles in profound ways:

- **Criminalization of Customary Access:** Traditional rights to common property resources (forest grazing, non-timber forest products) were curtailed under the Indian Forest Act (1865, 1878). This disproportionately affected women, who relied on these resources for fuelwood, fodder, and household needs, turning everyday collection into criminal acts enforced by colonial forest guards.
- **Shift to Cash Cropping:** Commercial cash cropping shifted land control to male landowners or colonial agents, diminishing women's roles in decision-making about crop choices even in subsistence systems.
- **Erosion of Common Land:** Colonial land settlements registered land titles almost exclusively in the names of male "heads of households." This formalization systematically disenfranchised women from customary rights to village commons (*gauchar* lands and community groves), cementing legal and economic dependence on male relatives.

6.2 Missionary Education, Gender Norms, and Ecological Disconnect

Colonial education systems introduced Western gender norms that often devalued women's traditional ecological expertise. Girls' education, where available, focused on domestic skills rather than agricultural or ecological knowledge, contributing to a knowledge gap between generations in many communities.

7. Independence and Early Post-Colonial Ecological Policy

7.1 Agricultural Expansion and the Green Revolution

Post-1947, India's ecological policies prioritized food security through scientific agriculture, especially with the Green Revolution from the 1960s onwards. High-yield varieties, chemical fertilizers, and irrigation expanded food production but also reshaped ecological roles. The Green Revolution had gendered ecological implications:

- **Mechanization and Displacement:** Mechanization and cash cropping often increased men's roles in field tasks and financial transactions, while women's contributions to weeding, sowing, and post-harvest processing remained unrecognized in formal agricultural statistics.
- **Loss of Agrobiodiversity:** Chemical dependencies and monoculture farming began to erode traditional soil knowledge and agrobiodiversity, weakening the very ecological practices that women sustained in seed selection and crop diversification.
- **Toxicity and Environmental Health:** As primary water drawers and handlers of agricultural produce, women experienced heightened exposure to chemical toxins from

pesticides and degraded water tables, resulting in severe reproductive health issues across rural belts.

7.2 Forest Policies and Gendered Access

The Indian government's forest policies post-independence initially continued colonial exclusionary practices, treating forest dwellers as encroachers despite their traditional ecological roles. Women in tribal and forest-dependent communities faced restrictions on resource access essential for household ecology—fuel, fodder, fiber, and food. The result was ecological impoverishment and gendered stress, as women had to travel further for resources and experienced greater time poverty, undermining both ecological stewardship and social well-being.

8. Micro-Ecological Stewardship Across Geographic Zones

The practical dynamics of gender and ecology manifest in distinct ways across India's varied geographic terrain:

8.1 Himalayan Agro-Ecosystems

In mountain regions, widespread male migration to urban centers forced women to assume complete stewardship over hillside farming, terraced soil management, livestock care, and spring maintenance (*dharas*). Deforestation directly increases mountain women's workload while heightening vulnerabilities to flash floods and landslides.

8.2 Arid and Semi-Arid Ecosystems (Rajasthan and Gujarat)

In water-scarce landscapes, women's ecological expertise centers on micro-water harvesting, drought-tolerant crop management (such as millets and pulses), and maintaining specialized knowledge regarding sub-surface moisture and indigenous water purification plants.

8.3 Coastal and Wetland Ecosystems (Sundarbans and Kerala)

In coastal mangrove networks and estuaries, women actively engage in coastal protection, mangrove restoration, brackish water crab harvesting, and post-harvest fish processing. In areas like the Sundarbans, women navigate extreme wildlife risks and saline intrusion while preserving shoreline vegetation that protects inland areas from severe cyclones.

9. Ecological Movements and Gendered Environmentalism in India

One of the most compelling historical intersections of gender and ecology in India emerges in grassroots environmental movements—where women often took central roles.

9.1 The Chipko Movement: Eco-Feminism in Action

The Chipko movement in the 1970s became iconic for its women-led resistance to commercial logging in the Himalayan foothills. Villagers—especially women—embraced trees to prevent their felling. While many male leaders participated, women were at the forefront because deforestation directly increased their labor burden for fetching firewood, fodder, and water. This movement is widely interpreted as an early example of eco-feminism, blending ecological conservation with gendered resistance.

The Chipko movement illustrated that:

- Ecological degradation is gendered in its impacts.
- Women's knowledge and livelihood concerns anchored a powerful environmental movement.
- Cultural framing of nature as life-giver mobilized women's ecological identities into political action.

9.2 Environmental Education and Advocacy among Women

The Indian Institute of Ecology and Environment, New Delhi became a pioneer in making women, especially young students, aware regarding their specific roles in Mother Earth protection since 1980. Specialized educational tracks—ranging from Certificate, Diploma, Advanced Diploma, and Post Graduate Diploma to Master's Degrees in Environment—were introduced to systematically promote ecological feminism and institutionalize environmental leadership.

9.3 Narmada Bachao Andolan and Tribal Women

In large dam controversies along the Narmada River, tribal women's voices became powerful articulations of ecological concerns—land loss, displacement, water rights, and cultural disruption. Their participation foregrounded how mega-development projects have gendered ecological costs: loss of agricultural lands, forest access, and subsistence strategies primarily managed by women.

9.4 Urban Environmentalism and Gender

Urban environmental movements in India—against pollution, waste dumping, and river degradation—also see high levels of women's engagement, especially among middle-class and grassroots organizations. Women often act as community ecological stewards, advocating for clean water, green spaces, and waste segregation in their neighborhoods.

10. Gender, Ecology, and Knowledge Systems

10.1 Traditional Ecological Knowledge (TEK) and Gender

Traditional Ecological Knowledge is gendered in content, practice, and transmission. Women's expertise in seed varieties, food systems, medicinal plants, and water management constitutes a vast reservoir of ecological insight. Men's ecological knowledge often focuses on landscapes, irrigation engineering, animal mobility, and common property negotiation. Both are essential, yet institutional recognition historically favoured male-dominated knowledge domains, marginalizing women's contributions.

10.2 Gendered Knowledge Transmission

TEK is often transmitted through everyday practice, storytelling, work routines, and ritual calendars. Women's roles in preparing food, managing gardens, fetching water, and healing establish them as vectors of ecological wisdom across generations. The decline of communal living, increased formal schooling without integration of local ecology, and commercialization of agriculture have disrupted these transmission pathways.

11. Policy Responses, Legislative Frameworks, and Governance

11.1 Joint Forest Management (JFM)

Introduced in the 1990s, Joint Forest Management aimed to involve local communities in forest protection and regeneration. While guidelines mandated female representation in village forestry committees, structural patriarchal norms often reduced women's participation to proxy attendance, with male members continuing to control financial allocations and harvesting schedules.

11.2 Biological Diversity Act (2002) and People's Biodiversity Registers (PBRs)

The Biological Diversity Act established People's Biodiversity Registers to document local biological resources and traditional knowledge. However, the specialized botanical and medicinal knowledge of elderly, tribal, and lower-caste women remains at risk of biopiracy or institutional appropriation without equitable economic benefit-sharing.

11.3 Forest Rights Act (FRA, 2006)

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act of 2006 marked a transformative legal shift by recognizing joint titling for legal spouses and granting community rights over Non-Timber Forest Produce (NTFP). Where implemented effectively, the FRA has empowered tribal women to independently harvest, process, and market forest goods like Mahua and Tendu leaves, enhancing their economic independence and political voice within village assemblies (*Gram Sabhas*).

12. Contemporary Challenges: Climate Change, Urbanization, and Gendered Ecology

12.1 Climate Change Impacts and Gendered Vulnerability

Climate change—manifest in extreme weather events, glacier retreat, variable monsoons, and sea-level rise—disproportionately affects women in rural and coastal communities. Loss of traditional cropping cycles, fodder scarcity, and water stress increase women's workloads, food insecurity, and health risks.

Yet, women's responses—community water harvesting, crop diversification, climate adaptation knowledge—remain critical but underrepresented in formal policy dialogues.

12.2 Urbanization and Changing Ecological Identities

Rapid urbanization in India is reshaping ecological roles. Women in urban peripheries negotiate water scarcity, waste management, air pollution, and food access, often leading local sustainability initiatives (e.g., school gardens, waste segregation cooperatives). Urban ecological movements increasingly foreground gendered impacts of pollution and living conditions.

13. Institutional Leadership, Policy Reforms, and Education

Educational leaders like the Indian Institute of Ecology and Environment, guided by Chancellor Dr. Priyaranjan Trivedi's vision of interdisciplinary ecological education, can catalyze gender-inclusive ecological scholarship. His institution's emphasis on environment, sustainable development, and integration of policy with grassroots realities provides a platform for advancing gendered ecological knowledge in academic and policy spheres.

To move toward effective institutional frameworks, policies must focus on:

- Formal legal recognition and documentation of women's ecological knowledge.
- Direct inclusion of women in forestry committees, watershed management bodies, and climate adaptation planning.
- Conducting mandatory gender-specific impact assessments for major infrastructure, mining, and agricultural development projects.

14. Detailed Regional Case Studies

14.1 Women's Seed Networks in Rajasthan

In parts of Rajasthan's arid landscapes, women's seed networks conserve drought-resilient crops such as millets and pulses. Their ecological work sustains biodiversity in harsh

environments. These networks are community-based, gendered, and crucial for climate adaptation, serving as decentralized gene banks during periods of extended drought.

14.2 Coastal Women Fishworkers in Kerala

Women fish vendors and processors in Kerala play essential roles in coastal ecosystems. As traditional ecological agents, they manage post-harvest fish processing, salt-making, and marine biodiversity knowledge. Their labor and ecological insight are vital to coastal resilience, domestic food security, and regional economies.

14.3 Forest-Dependent Tribal Women in Central India

In Chhattisgarh and Odisha, tribal women's knowledge of forest plants for food, medicine, and fodder reflects complex ecological systems. Their participation in Joint Forest Management initiatives and independent collections under the Forest Rights Act have both empowered communities and highlighted the necessity of gender-balanced resource governance.

14.4 Ecological Knowledge and Water Governance in the Deccan Plateau

In the semi-arid expanses of the Deccan Plateau, severe water scarcity drives rural socio-economic vulnerability. Women across these agrarian landscapes possess sophisticated hydrological knowledge, traditionally managing community tanks, stepwells, and natural botanical water purification techniques. As primary domestic water managers, women maintain detailed empirical awareness of local salinity gradients, sub-surface moisture retention, and seasonal water table fluctuations. Despite this specialized ecological expertise, state-led irrigation and piped water projects have historically bypassed women's customary water management assemblies. Restoring women's formal leadership in micro-watershed development, rainwater harvesting, and local groundwater monitoring is increasingly recognized as essential for long-term climate resilience across South India's drought-prone districts.

15. Toward Gender-Just Ecological Futures

The historical impression of gender on ecology in the Indian context reveals:

- Gender roles have historically shaped ecological knowledge and practice, often in complementary but unequal ways.
- Women's ecological expertise—in biodiversity, agriculture, water, and climate adaptation—is underrecognized in formal science and policy.
- Environmental movements in India—from Chipko to contemporary climate activism—underscore the centrality of gendered experience in ecological stewardship.

- Contemporary challenges—climate change, urbanization, degradation of traditional knowledge—require gender-sensitive policies, institutional support, and educational reforms.

In India's ongoing ecological transformation, recognizing and promoting the historically grounded, gendered dimensions of ecology offers pathways to both environmental sustainability and social justice. Environmental education institutions, policymaking bodies, and civil society must integrate historical insights, gendered knowledge systems, and local practices to build a future where ecology is sustainable and equitable.

Bibliography

Agarwal, B. (1994). *A field of one's own: Gender and land rights in South Asia*. Cambridge: Cambridge University Press.

Agarwal, B. (2010). *Gender and green governance: The political economy of women's presence within and beyond community forestry*. Oxford: Oxford University Press.

Bayly, C. A. (1983). *Rulers, townsmen, and bazaars: North Indian society in the age of British expansion, 1770–1870*. Cambridge: Cambridge University Press.

Chatterjee, P. (1993). *The nation and its fragments: Colonial and postcolonial histories*. Princeton, NJ: Princeton University Press.

Dirks, N. B. (2001). *Castes of mind: Colonialism and the making of modern India*. Princeton, NJ: Princeton University Press.

Gadgil, M., & Guha, R. (1992). *This fissured land: An ecological history of India*. Berkeley: University of California Press. (Later editions: Oxford University Press, 2012/2013)

Gadgil, M., & Guha, R. (1995). *Ecology and equity: The use and abuse of nature in contemporary India*. London & New York: Routledge. (Indian edition: Penguin Books India, 1995)

Guha, R. (2000). *Environmentalism: A global history*. New York: Longman.

Ludden, D. (1985). *Peasant history in South India*. Princeton, NJ: Princeton University Press.

Metcalf, B. D., & Metcalf, T. R. (2006). *A concise history of modern India* (2nd ed.). Cambridge: Cambridge University Press.

Ramakrishnan, P. S. (2001). *Ecology and sustainable development*. New Delhi: National Book Trust, India.

Salleh, A. (1997). *Ecofeminism as politics: Nature, Marx and the postmodern*. London: Zed Books.

Shiva, V. (1989). *Staying alive: Women, ecology and development*. London: Zed Books.

Singh, K. S. (1994). *People of India: Tribal societies and their ecological knowledge*. Anthropological Survey of India.

Singh, J. (2001). Women and environmental activism: Grassroots movements in India. *Social Action*, 51(3), 245–260.

