

Water, Forests and the Living Covenant: Five Millennia of Ecological Thought in Vishal Bharat

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Abstract

This article traces five millennia of ecological consciousness across the Indian subcontinent, examined through the civilizational framework of Vishal Bharat, the vast geographical and cultural continuum bounded by the Himalayas and the three seas. Beginning with the hydro-urban genius of the Indus Valley Civilization (c. 3300 BCE), it moves through the sacred river ecology of the Vedic age, the state sponsored conservation of the Mauryan and Gupta empires, the hydraulic engineering of the Chola dynasty, the aesthetic and agrarian interventions of the Mughal period and the catastrophic ecological rupture of British colonialism, before arriving at India's contemporary attempts to recover and re-articulate an ecologically grounded modernity. The central argument is that Vishal Bharat is not merely a territorial concept but a civilizational proposition: that the subcontinent produced, across its many historical phases, a persistent and deeply practical understanding of nature as a partner in human flourishing rather than a resource to be depleted. In an era of accelerating climate breakdown, this inheritance demands serious scholarly and policy attention.

Keywords: Vishal Bharat, Indus Valley Civilization, Ecological Urbanism, Vedic Ecology, Mauryan Conservation, Chola Hydro-engineering, Colonial Ecology, Climate Change

Introduction - A Civilization That Remembered the River

Modern societies often suffer from a subtle kind of forgetting. First, we lose sight of the environmental foundations that made our cities possible, and

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eventually, we forget that this loss has even occurred. The infrastructure beneath our feet, drainage systems, diverted rivers, and cleared forests fades into the background, becoming unnoticed and taken for granted. What makes the long history of the Indian subcontinent so valuable today is that it offers many examples where this was not the case. In several periods, human life was closely tied to nature, with ecological relationships shaping society, governance and even spiritual practices.

The idea of Vishal Bharat, often described as Greater India or a shared civilizational space, provides the framework for this discussion. Geographically, it stretches from the Himalayas in the North to the surrounding seas in the South, a region once referred to in ancient texts as Jambudvipa. However, this concept should not be misunderstood as a political or nationalist claim. Instead, it is a way of asking whether, despite immense cultural and historical diversity, there have been common ways of understanding and engaging with nature across this region.

The answer is broadly yes, but it is not straightforward. India's environmental history is not a perfect story of harmony between humans and nature. Rather, it is marked by cycles of adjustment, conflict, decline and renewal. It includes both remarkable ecological innovations and serious environmental disruptions, particularly during the colonial period when many traditional systems were undermined. By tracing this journey from the sophisticated drainage systems of the Indus Valley to modern renewable energy initiatives like solar projects in the Thar Desert, we do not uncover a lost golden age, but instead identify valuable ideas and practices that remain relevant in addressing today's environmental challenges.

This article is organized into five historical sections, each focusing on a key ecological phase within the broader Vishal Bharat framework, followed by a concluding discussion on its relevance for the present century. The aim is to present a history that is both well-researched and engaging, recognizing that the environmental crisis we face is not only technical but also deeply connected to how we think and imagine our relationship with the world around us.

The Hydro-Urban Genesis - Harappa and the Art of Living with Water

Around 3300 BCE, in the floodplains of the Indus and the now-vanished Saraswati River, an important transformation began. Communities that had long lived a mobile, pastoral life in the Northwestern subcontinent gradually started to settle down. They selected their locations with care, choosing slightly elevated areas above the floodplains where seasonal flooding would enrich the soil without causing major damage.



Figure 1. Aerial view of excavated residential quarters at Mohenjo-daro, showing the city's grid-plan layout (c. 2500 BCE).

Source: Archaeological Survey of India [Public domain]

What they created was not centered on grand temples or royal palaces, as seen in many other ancient civilizations, but something equally remarkable, a form of urban planning focused on managing the practical needs of daily life.

The Harappan cities, Mohenjo-daro and Harappa in the western sector, Rakhigarhi and Dholavira further east, share a set of features that archaeologists have spent the better part of a century trying to explain. Their street grids are oriented to the cardinal directions, suggesting a sophisticated understanding of seasonal winds and drainage gradients (Jansen, 1989). Their bricks are standardized to a ratio of 1:2:4, implying not merely consistent manufacture but a civic system capable of enforcing standards across an urban network that at its height may have encompassed over five million people spread across an area larger than ancient Egypt and Mesopotamia combined (Possehl, 2002; Kenoyer, 1998).

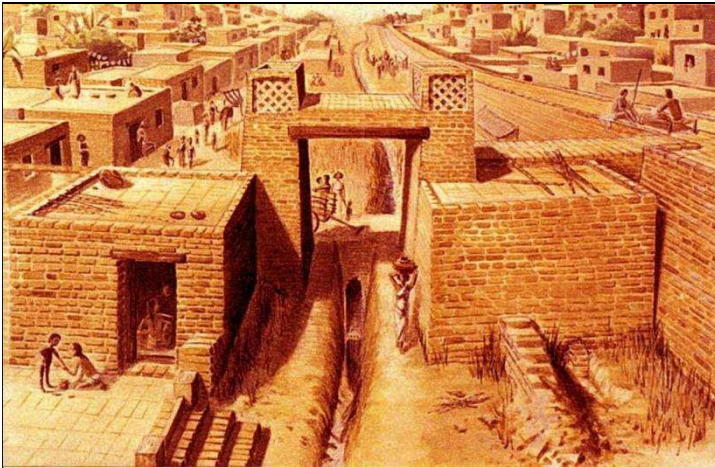


Figure 2. Artist's reconstruction of Mohenjo-daro's street and drainage system, c. 2500 BCE.

Source: Archaeological Survey of India/ Kenoyer, J. M. (1998). *Ancient cities of the Indus Valley civilisation*. Oxford University Press

Most extraordinarily, nearly every house in these cities was connected to a covered drainage system, a network of brick-lined channels that carried wastewater out of the residential areas and into larger collectors at the city

margins. Nothing comparable would appear in European cities for another four thousand years.

What this infrastructure represents is not merely technical competence but a philosophy of urban life. The Harappans appear to have understood that a city is not a thing imposed upon a landscape, but a system embedded in one. The raised platforms at Mohenjo-daro and the elaborate water reservoirs at Dholavira, cut directly into the rocky terrain with remarkable precision, demonstrate a sustained, intergenerational effort to understand and work with the hydrological rhythms of the Indus valley (Bisht, 1991; Jansen, 1989).

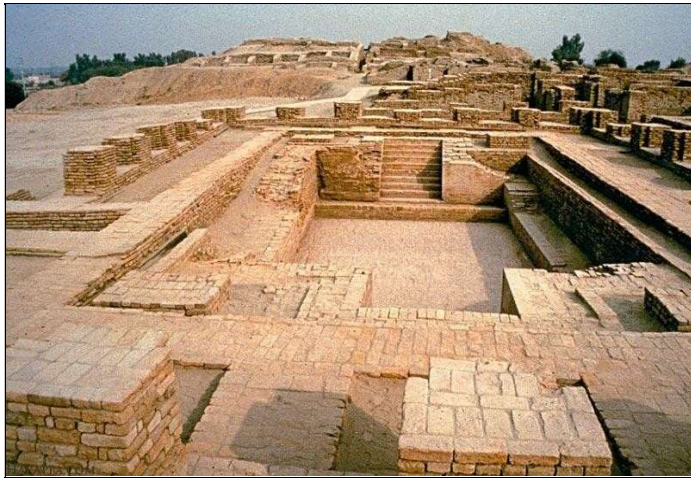


Figure 3. The Great Bath at Mohenjo-daro, c. 2500 BCE - one of the world's earliest public water structures. Photo: Wikimedia Commons [CC BY-SA 3.0]

The Great Bath at Mohenjo-daro, lined with bitumen for waterproofing and fed by a dedicated well, speaks of a culture for which water was simultaneously practical and sacred, a substance to be carefully stewarded rather than carelessly consumed (Mackay, 1938; Wheeler, 1968).

Excavations at Harappa and Kalibangan reveal evidence of ploughed fields adjacent to settlement areas and the spatial patterning of granaries suggests a

centralized system of agricultural surplus management (Lal, 1997; Meadow, 1991). The transition from nomadic pastoralism to settled urban life was made possible not by the conquest of nature but by its careful and sustained reading by communities that accumulated detailed knowledge of flood cycles, soil types and seasonal rainfall patterns and encoded that knowledge in their built environment. This is the foundational lesson of Vishal Bharat's ecological history: intelligence about the natural world is not primitive. It is the foundation of civilization itself.

The Vedic Transition: Naming the Rivers, Honouring the Forest

As the Harappan cities declined in the late second millennium BCE, whether from climate induced dedication, shifts in the monsoon, internal social stress or some combination of all three (Giosan et al., 2012; Staubwasser et al., 2003), a new cultural complex was taking shape across the northern subcontinent. The Vedic age brought with it the iron axe and the capacity to clear the dense forests of the Gangetic plain for agriculture. This was a significant ecological transformation. Yet it would be a mistake to read the Vedic period as simply a story of deforestation.

The Vedic corpus, the Rigveda, Samaveda, Atharvaveda and the Upanishads, is saturated with ecological consciousness. The concept of Rta, often translated as cosmic order, is at its core a concept about natural balance: the right season of rains, the proper flow of rivers, the regular cycle of fire and regeneration (Oldenberg, 1894; Witzel, 2003). Prakriti's nature is not the backdrop in Vedic thought; it is the protagonist. The Rigveda's river hymns name the sacred waterways of the northwest with a specificity that functions as ecological mapping: the Vitasta (Jhelum), the Asikni (Chenab), the Parusni (Ravi), the Sindhu (Indus) and the great Saraswati, described as surpassing all other rivers in might and sanctity (Witzel, 2003). To name a river is to claim a relationship with it and to claim a relationship is to acknowledge an obligation.

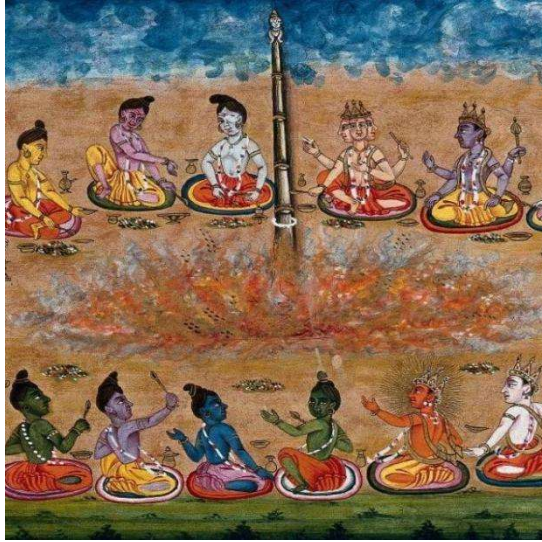


Figure 4. Vedic fire sacrifice (yajna) with assembled deities. Indian miniature painting, c. 18th-19th century. Wellcome Collection [CC BY 4.0]

The Tapovan, the forest hermitage, became the institutional setting for the highest forms of learning. The Upanishads, those profound philosophical dialogues, take place not in palaces or cities but in forest clearings, beside rivers, under trees (Radhakrishnan, 1953). The implication is not incidental: knowledge worthy of the name emerges from proximity to non-human life, from sustained attention to the rhythms of the living world. This pedagogical philosophy had ecological consequences; it created, generation after generation, thinkers who were also naturalists, whose metaphysics was grounded in intimate knowledge of specific places and specific species (Zimmermann, 1987). The geographical divisions of the subcontinent, Uttarapatha, Madhya-desa, Dakshinapatha were understood not merely as administrative zones but as distinct ecological characters within the larger whole of Vishal Bharat (Majumdar, 1944; Sircar, 1971).

Empires of Conservation - From Ashoka's Edicts to the Chola Tanks

The rise of large political systems in ancient India, beginning with the Mahajanapadas and later the Mauryan Empire around 322 BCE, brought major changes to how people interacted with the environment. As agriculture expanded, cities grew and trade routes extended into forested regions, human pressure on natural landscapes increased significantly. While these ecological impacts are well recognized, it is less often noted that these empires also developed systems to protect and manage the environment (Thapar, 2012; Chakrabarti, 1992). Among the rulers associated with this approach, Ashoka Maurya stands out as particularly significant.

After the brutal conquest of Kalinga, a campaign that, by his own account, killed or displaced hundreds of thousands of people, Ashoka underwent what he described as a transformation of the heart, converting to Buddhism and resolving to govern henceforth by Dhamma: moral duty, non-violence and compassion toward all living beings (Thapar, 2012; Strong, 1983). The ecological consequences were concrete. His rock edicts, placed deliberately at ecological junctions: mountain passes, river confluences, the margins of forest zones, constitute the world's earliest body of state-mandated environmental legislation (Rangarajan, 1996; Lahiri, 2015). They mandate the protection of certain animal species, the planting of shade trees and medicinal herbs along trade routes and the provision of water facilities for travelers and animals alike. Edict XIII, in which a reigning monarch publicly reflects on the cost of military conquest measured in the suffering of sentient beings, remains one of the most extraordinary documents in the history of political ecology (Hultzs, 1925).



Figure 5. Lion Capital of Ashoka, Sarnath, c. 250 BCE (polished sandstone).
Sarnath Archaeological Museum.

Source: Wikimedia Commons [CC BY-SA 4.0]

Kautilya's Arthashastra, the great manual of statecraft composed in roughly the same period, approaches ecological management from an entirely different angle. Where Ashoka moralizes, Kautilya calculates. The Arthashastra mandates the creation of Abhayaranyas, inviolable wildlife sanctuaries and the strict regulation of forest use, but its reasons are pragmatic: forests are strategic resources, elephants are military assets and timber is essential for construction (Kangle, 1972; Rangarajan, 1996). The motivation differs from Ashoka's entirely; the outcome, protected forests, designated wildlife refugia, maps surprisingly closely onto what contemporary conservation science recommends (Gadgil & Guha, 1992).

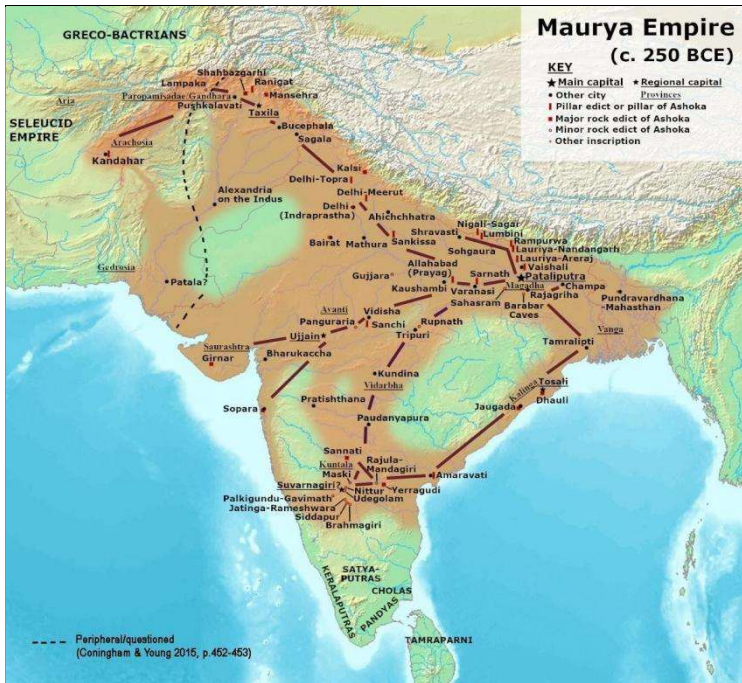


Figure 6. Map of the Maurya Empire showing the locations of Ashoka's major and minor rock edicts (c. 250 BCE)

Source: Wikimedia Commons [CC BY-SA 4.0], based on Coningham & Young (2015)

The Gupta period (c. 320-550 CE) added a dimension that is only now receiving the scholarly attention it deserves. The integration of Vrikshayurveda, the classical Indian science of plant life, codified in works like Surapala's treatise into agricultural practice created a systematic basis for what we would today call agro-biodiversity conservation (Majumdar, 1935; Sadhale, 1996). Sacred groves maintained as inviolable community commons functioned as de facto biodiversity refugia, preserving species assemblages that would otherwise have been lost to agricultural expansion (Gadgil &

Vartak, 1976; Hughes & Chandran, 1998). Temple economies managed groundwater recharge through Vapi (stepwells) and Pushkarni (temple tanks), embedding water management in religious practice in ways that gave it a durability that purely administrative mandates rarely achieve (Mosse, 1999; Agarwal & Narain, 1997).

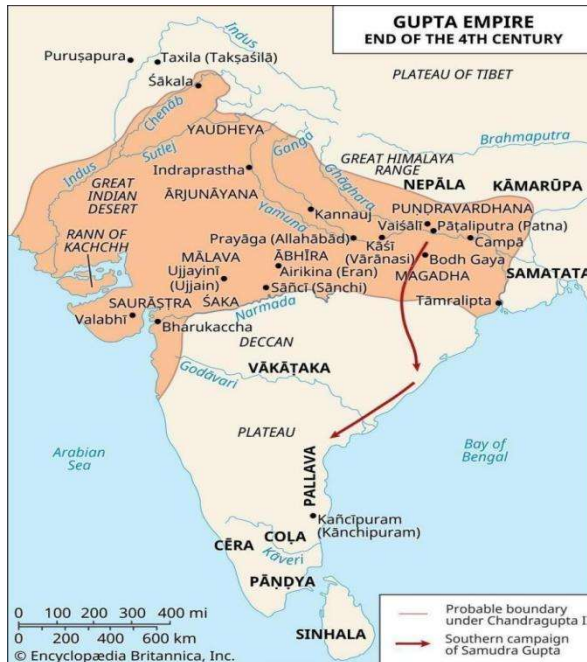


Figure 7. The Gupta Empire at the end of the 4th century CE, including Samudra Gupta's southern campaigns. © Encyclopædia Britannica, Inc.

The hydraulic achievement of the Chola dynasty (c. 300-1279 CE) stands as the single most impressive feat of ecological engineering in the pre-modern subcontinent. The Cholas transformed the semi-arid Kaveri delta into one of the most productive agricultural landscapes in Asia through the chain-tank system, cascading reservoirs connected so that overflow from each fed the next, maximizing the capture of an unreliable rainfall (Mosse, 1999;

Subramanian, 1966). The Kallanai or Grand Anicut, built across the Kaveri river by Karikalan and still functioning today, is among the oldest operating water-regulatory structures on earth. Crucially, it does not dam the Kaveri; it diverts a portion of its flow into irrigation channels while allowing the main current to continue downstream, a design that enhances rather than disrupts the river's ecology (Agarwal & Narain, 1997; Pappu, 2008). The lesson of the Kallanai is not merely technical: you can build with a river or against it, and building with it is the only thing that endures.

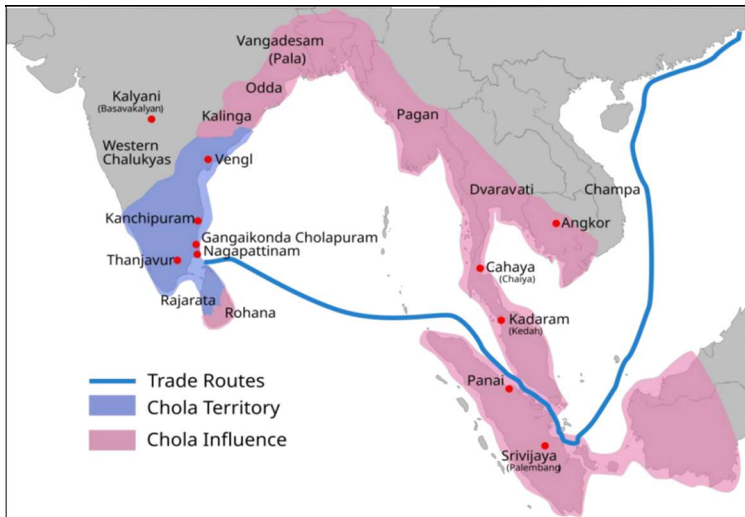


Figure 8. Chola Empire at its greatest extent, showing territory (blue), cultural influence (pink), and maritime trade routes to Southeast Asia.

Source: Wikimedia Commons [CC BY-SA 4.0]

Ordering Nature and Breaking It - Mughals, Railways and the Colonial Wound

The medieval period introduced new aesthetic and agricultural philosophies. The Mughal Charbagh, the four-quarters garden derived from Persian and Central Asian traditions, imposed a geometric order on urban landscapes, creating enclosed garden environments in Delhi, Agra, Lahore and Srinagar Lok Sambhashan: Vol: 4, Issue: 2, April - June, 2026

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that used water channels for both aesthetic effect and practical irrigation (Koch, 2001; Wescoat & Wolschke-Bulmahn, 1996). The Persian wheel (Saqiya) deepened irrigation capacity and enabled the intensive cultivation of indigo, cotton and tobacco, reshaping both the agricultural landscape and the social relations embedded in it (Richards, 1993).



Figure 9. Charbagh garden at Humayun's Tomb, Delhi, 16th century CE, showing the four-quarters layout with central water basin. Photo: Wikimedia Commons [CC BY-SA]

Shikargahs, royal hunting grounds, preserved extensive forest patches across northern and central India not from any environmental consciousness but because the nobility valued them for sport; the unintended ecological consequence was the slowing of agricultural encroachment into those zones (Rangarajan, 2001).

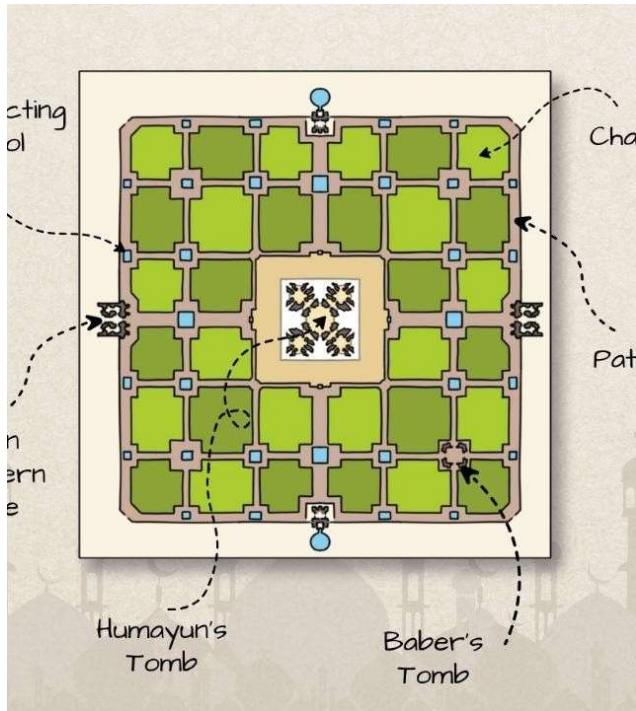


Figure 10. Annotated plan of a Mughal Charbagh garden with central water feature and tomb locations marked. After Wescoat, J. L., & Wolschke-Bulmahn, J. (Eds.). (1996). *Mughal gardens*. Dumbarton Oaks

This marks a subtle yet important shift from earlier ecological traditions in India. In Vedic and Mauryan thought, nature was seen as an active moral presence, something to understand, respect and work alongside. In contrast, the Mughal approach increasingly viewed the landscape as something to be shaped, organized and refined according to human design and aesthetic ideals (Koch, 2001). This change in perspective, though gradual, later took a far more damaging form under colonial rule.

The scale and speed of environmental disruption during British colonialism were unlike anything seen before in the subcontinent's history. The East India Lok Sambhashan: Vol: 4, Issue: 2, April - June, 2026

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Company and later the British Crown after 1858, introduced entirely new ways of thinking about land, nature and economic value, ideas that were largely disconnected from existing ecological traditions. One of the most impactful changes was the classification of land based on revenue generation. Any land that was not actively cultivated or contributing to taxable income was labeled as “waste,” a term that carried both practical and negative connotations (Whitcombe, 1972; Guha, 1989). As a result, forests that had long supported local communities, wetlands that played a crucial role in water regulation and grasslands used by pastoral groups were all treated as unproductive and opened up for clearing and private ownership (Gadgil & Guha, 1992; Grove, 1995).

The expansion of railways was one of the most environmentally damaging aspects of colonial rule. Between 1850 and 1900, India’s railway network grew rapidly from almost nothing to more than 50,000 kilometers and most of the materials required, especially fuel and wooden sleepers, were sourced from Indian forests (Hejmadi, 2011; Tucker, 1988). This led to the large-scale cutting of millions of Sal and Teak trees, while important wildlife corridors in regions like the Western Ghats and Central India were permanently disrupted. Although the Indian Forest Act of 1878 was presented as a step toward conservation, it actually shifted control of forests from local communities to the colonial government. This allowed for organized commercial exploitation while restricting and even criminalizing traditional practices that had long supported ecological balance (Guha, 1989; Rangarajan, 1996). By the early twentieth century, the sub-continent was increasingly treated as a resource base for the global economy and local ecological knowledge systems were often dismissed as backward or unscientific (Agarwal & Narain, 1997; Shiva, 1988).



Figure 11. A cultivator ploughing with oxen, Company School watercolour, India, c. early 19th century. Wellcome Collection/ British Library [CC BY 4.0]

The significance of this colonial disruption goes beyond visible environmental damage such as deforestation, land revenue policies or the breakdown of traditional water systems. Its deeper impact lay in what can be called epistemic loss, the weakening and erasure of long-standing ecological knowledge and ways of understanding nature. When such knowledge systems are undermined, it not only disconnects people from their past but also limits future generations' ability to learn from and build upon that wisdom.

Revival, Rupture and the Solar Turn - Modern Bharat's Ecological Reckoning

After independence, India inherited a landscape that had been deeply reshaped by two centuries of colonial exploitation. At the same time, its long-standing

traditions of ecological knowledge had been weakened and often discredited, though they were never completely lost. In the early decades after 1947, the Nehruvian model of development focused on large dams, industrial growth and the Green Revolution. While these initiatives aimed at rapid national progress, they largely continued the colonial view of nature as a resource to be controlled and used (Baviskar, 1995; D'Souza, 2006). This approach came with significant environmental and social costs, including large-scale displacement due to dam projects, declining soil quality and groundwater levels from intensive agriculture and widespread pollution from unchecked industrialization (Shiva, 1988; Gadgil & Guha, 1995).

At the same time, this period also saw powerful movements of environmental awareness and resistance that reflected deeper cultural traditions. One of the most notable examples is the Chipko movement of the 1970s, where women in the Garhwal Himalayas, led by figures like Gaura Devi, physically protected trees by hugging them to stop commercial logging. This was more than just a protest; it represented a deep-rooted belief in the sacred connection between communities and forests (Guha, 1989; Shiva, 1988). The movement echoed an earlier tradition of the Bishnoi community in Rajasthan, where in the seventeenth century, hundreds of people sacrificed their lives to protect Khejri trees (Guha, 1989). Despite being separated by time and distance, both instances show a similar commitment, where people placed themselves as the last line of defense for nature. Such examples demonstrate that ecological wisdom can persist over time, surviving in cultural memory and practices until it re-emerges when needed.

In independent India, environmental protection has gradually taken shape through key laws and policies. Important measures include the Wildlife Protection Act of 1972, the Forest Conservation Act of 1980 and the Environment Protection Act of 1986, along with progressive judicial interpretations that recognize the right to a clean environment as part of fundamental rights (Divan & Rosencranz, 2001; Pillai, 2016). Policies like the National Water Policy of 2012 also reflect a shift toward viewing water as a

shared heritage rather than merely a commodity, echoing older traditions that regarded rivers as sacred and lifegiving (MoWR, 2012).

The most symbolically resonant contemporary expression of India's ecological recovery is in its energy landscape. The Bhadla Solar Park in Rajasthan, covering nearly 14,000 acres of the Thar Desert with a generating capacity exceeding 2,245 MW, making it one of the largest solar installations on earth, represents an extraordinary historical inversion (MNRE, 2023; Tongia & Gross, 2019). The Thar was the landscape most thoroughly dismissed by colonial revenue settlement as 'waste', unproductive, ungovernable, irrelevant to the imperial economy. It turns out to be extraordinarily productive, generating clean electricity for tens of millions of people on terms that require working with the landscape rather than against it. The desert's solar irradiance, which colonial administrators saw as an obstacle, is in fact its greatest asset. This is, at its core, a return to the Harappan insight; read what the land offers and build accordingly.

India's climate commitments under the Paris Agreement, including achieving 500 GW of non-fossil fuel energy capacity by 2030 and reaching net zero emissions by 2070, are ambitious, especially for a developing country (UNFCCC, 2022; Dubash et al., 2018). Achieving these goals will require not only technological advancement but also a deeper cultural shift in how nature is understood and valued. It calls for reconnecting with the long-standing ecological consciousness that has shaped the sub-continent's history over thousands of years.

Conclusion - The Covenant Renewed

The ancient Vedic idea of *Vasudhaiva Kutumbakam*, that the world is one family, is often understood as a philosophical belief. However, the environmental history of Vishal Bharat shows that it was also practiced in everyday life. It reflected an understanding that humans are part of a larger network of living beings and depend on it for survival. Civilizations that thrived in the sub-continent, such as the Harappan, Mauryan, Gupta and Chola, succeeded because they built systems that respected this connection through

water management, forest protection, sacred groves and policies that encouraged ecological care.

This continuity was disrupted during the colonial period in a way that affected both the environment and the knowledge systems tied to it. Forests were cleared, traditional water systems were damaged and the cultural values that supported sustainable living were weakened or dismissed (Grove, 1995; Gadgil & Guha, 1992). Today, the challenge is not to simply revive ancient methods in their original form. We cannot rely on Ashokan edicts or traditional irrigation systems exactly as they existed in the past. Instead, the real task is to recover the deeper way of thinking behind them, seeing nature not as something to exploit, but as a shared responsibility and recognizing ecological understanding as a sign of a mature and sustainable society.

The natural features of the sub-continent remain largely the same. The Himalayas continue to feed the rivers, the monsoon still shapes life across the region and the surrounding seas define its geography. What has changed is how humans respond to these natural systems. The key question today is whether we treat nature as something to control through technology or as a system to understand and work alongside. The long history of Vishal Bharat strongly supports the latter view and in the face of today's climate crisis, this perspective is no longer optional but essential.

"Dharma means our duty towards nature", the ancient texts remind us. Harappan engineers knew it in the slope of a drainage channel. Ashoka knew it in the language of his edicts. The women of Chipko knew it in the grain of an embraced tree. The engineers at Bhadla are beginning, perhaps, to know it again in the angle of a solar panel. The task is to remember and to build accordingly.

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