CULTURAL CLIMATES: NARRATIVES OF ADAPTATION, SUSTAINABILITY AND CHANGE

EDITOR : DEEPJYOTI BORA

2025

Exploring the dynamic intersections of culture, climate, and resilience in a changing world

Scan This QR Code

CULTURAL CLIMATES:

NARRATIVES OF ADAPTATION, SUSTAINABILITY AND CHANGE

(***This edited volume brings together diverse perspectives on the intersections of culture, climate, adaptation, and sustainability, offering critical insights into resilience and change in the 21st century.)***

Editor: Deepjyoti Bora

First Edition, 2025 October

Book Title: *Cultural Climates: Narratives of Adaptation, Sustainability, and Change*

Editor: Deepjyoti Bora

ISBN: 978-93-343-9805-2 (Online)

ISBN: 978-93-49653-10-8 (Print)

Publisher:

Kitablane (QBV Media LLP)
Joyrampur Jala Road, 25/G,
Parnasree Pally, Kolkata, West Bengal, 700060, India,
www.kitablane.com | kitablane@gmail.com
GSTIN: 19AAAFQ8176D1Z2

Price: ₹745/- **(Print)**

Price: ₹275/-**(Online)**

CHAPTER 27

Cultural Practices and Environmental Adaptation — Traditional Ways of Living in Harmony with Changing Ecosystems

Dr. A. Narmadha
Assistant Professor and Research Supervisor,
Department of Management Studies,
Vels Institute of Science, Technology and Advanced Studies, Pallavaram , Chennai

Dr.G.Amutha
Associate Professor and Research Supervisor,
Department of Management Studies,
Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai.

Corresponding Author Email ID: narmadhaboobalan@gmail.com

Abstract

Human societies have historically evolved within dynamic ecosystems, where survival and prosperity depended on understanding, respecting, and adapting to environmental fluctuations. This chapter explores the intersection of cultural practices and ecological adaptation, highlighting how indigenous and traditional knowledge systems have shaped sustainable ways of life across diverse geographies. Drawing on cross-cultural examples—from water conservation techniques in arid regions, shifting cultivation in tropical forests, to architectural styles adapted to climate—the chapter examines how communities have aligned their socio-economic practices with natural rhythms. It further emphasizes the role of rituals, festivals, and taboos in regulating resource use and maintaining ecological balance. As climate change intensifies and biodiversity loss accelerates, these cultural practices provide valuable insights for contemporary sustainability discourses. By analyzing case studies, oral traditions, and community-led conservation, the chapter argues for the integration of traditional ecological knowledge with modern scientific approaches. It underscores that cultural resilience, collective memory, and community-based governance are central to adaptive strategies that safeguard both ecological integrity and human well-being.

Ultimately, the chapter positions cultural practices not as relics of the past, but as living, adaptive frameworks essential for negotiating present and future environmental challenges.

Keywords: Cultural adaptation, Traditional ecological knowledge, Sustainability, Indigenous practices, Climate resilience.

Introduction:

Human societies have always existed within dynamic ecosystems, where survival has depended on the capacity to adapt to shifting environmental conditions. From the earliest hunter-gatherer groups to complex agricultural civilizations, cultural practices have been intimately tied to ecological contexts. These practices, rooted in traditional ecological knowledge (TEK), evolved not only as strategies for resource extraction but also as frameworks for maintaining balance between human needs and environmental resilience (Berkes, 2012; Gadgil, Berkes, & Folke, 1993). The interdependence between culture and environment is thus not accidental but a product of centuries of observation, experimentation, and community governance. In the contemporary era, accelerating environmental change caused by climate variability, biodiversity loss, and resource depletion has drawn renewed attention to the adaptive strategies embedded in cultural traditions (IPCC, 2022). Rituals, customs, and livelihood practices that once ensured sustainable resource use are increasingly recognized as sources of resilience (Altieri & Nicholls, 2017). For instance, indigenous water-harvesting techniques in arid landscapes (Reij, Tappan, & Smale, 2009), rotational farming in tropical zones (Mertz et al., 2009), and architectural designs responsive to climatic extremes (Oliver, 2006) illustrate the ingenuity of cultural adaptations. These examples demonstrate that ecological sustainability was not imposed externally but embedded within daily life, often reinforced by social norms, taboos, and collective memory (Posey, 1999). Yet, these traditions face critical challenges. Globalization, urbanization, and industrial expansion have eroded local knowledge systems, while policy frameworks frequently marginalize indigenous voices (Agrawal, 1995). Furthermore, climate change introduces ecological shifts at scales and speeds that many traditional practices were not designed to address (Adger et al., 2011). Despite these pressures, cultural practices remain significant, not as relics of the past but as living, evolving systems capable of informing contemporary sustainability strategies (Berkes, Colding, & Folke, 2000).

The purpose of this chapter is threefold. First, it examines historical and contemporary examples of cultural practices that embody environmental adaptation across diverse regions.

Second, it highlights the socio-cultural institutions—rituals, festivals, taboos, and governance systems that regulate ecological balance. Third, it situates these practices within the broader sustainability discourse, emphasizing the potential for integrating TEK with modern scientific approaches. By doing so, the chapter contributes to rethinking development and climate adaptation through a lens of cultural resilience and ecological harmony.

Conceptual Framework:

Understanding the relationship between cultural practices and environmental adaptation requires a conceptual framework that integrates insights from anthropology, ecology, and sustainability studies. Such a framework recognizes that culture and ecology are not isolated domains but co-evolving systems, where human practices are informed by environmental conditions and, in turn, reshape ecosystems (Ingold, 2000; Berkes, 2012).

2.1 Defining Key Concepts

Culture and Environment: Culture encompasses the shared beliefs, practices, and material expressions of human societies, while the environment refers to the ecological systems within which societies exist. The two are interdependent, as cultural practices shape and are shaped by ecological conditions (Steward, 1955; Moran, 2006).

Traditional Ecological Knowledge (TEK): TEK refers to cumulative, community-based knowledge about the environment, transmitted orally and through practice across generations. It includes methods of farming, fishing, water management, and ecological classification, often rooted in spiritual and symbolic worldviews (Berkes, Colding, & Folke, 2000; Gadgil, Berkes, & Folke, 1993). TEK represents a dynamic knowledge system that adapts to changing ecological realities while preserving cultural continuity.

Environmental Adaptation: This term denotes the capacity of societies to adjust to ecological variability and change. Adaptation is both practical (e.g., irrigation technologies) and symbolic (e.g., rituals governing sacred landscapes) (Adger et al., 2011). Such adaptations are not merely reactive but proactive, embedding resilience into cultural systems.

2.2 Theoretical Perspectives

Cultural Ecology: Introduced by Julian Steward, cultural ecology posits that human cultures develop in direct response to their environmental contexts. Practices such as agriculture, settlement, and social organization can be understood as adaptive strategies shaped by ecological constraints and opportunities (Steward, 1955).

Political Ecology: Political ecology emphasizes that environmental practices are not only ecological but also political, shaped by power relations, access to resources, and historical

inequalities (Blaikie & Brookfield, 1987; Robbins, 2019). This perspective explains why some cultural practices persist while others decline under external pressures such as colonialism, globalization, or state policies.

Resilience and Socio-Ecological Systems: Resilience theory views human–environment interactions as dynamic systems capable of absorbing shocks while maintaining function. Cultural practices contribute to resilience by preserving ecological balance and enabling adaptive responses (Folke, 2006; Walker et al., 2004). For instance, rituals and communal governance often serve as mechanisms that reinforce ecological feedback loops, ensuring long-term sustainability.

Historical Overview of Cultural–Ecological Adaptations

The history of human civilization is deeply intertwined with the ways communities have adapted to environmental conditions. Long before the advent of industrial technology, survival depended on strategies that balanced ecological availability with cultural innovation. These cultural–ecological adaptations reflect a dynamic interplay between human needs and environmental opportunities, demonstrating that sustainability is not a modern concept but rather a long-standing foundation of human existence (Moran, 2006). Early hunter-gatherer societies relied on subsistence strategies shaped by detailed ecological knowledge. Foraging groups developed a deep understanding of seasonal cycles, migration patterns, and resource availability, ensuring that ecosystems were not overexploited. Practices such as controlled use of fire for land management, stone implements for hunting, and social norms around food sharing reinforced community cohesion while maintaining ecological balance (Kelly, 2013), these practices exemplify the principle of mobility as an adaptive mechanism, preventing resource depletion and supporting ecosystem regeneration (Ingold, 2000). With the domestication of animals, nomadic pastoralism emerged as a significant adaptation to arid and semi-arid landscapes. Communities in Central Asia, the Sahel, and parts of the Middle East developed rotational grazing systems that allowed pastures to regenerate while ensuring livestock survival. Pastoral mobility reduced pressure on fragile ecosystems, while cultural traditions such as seasonal migration routes, oral cartographies, and clan-based agreements institutionalized ecological adaptation (Kreutzmann, 2013). These strategies illustrate the coevolution of cultural institutions and environmental constraints, aligning with Steward's (1955) concept of cultural ecology. In tropical regions, shifting cultivation often referred to as "slash-and-burn" functioned as a controlled form of ecological management. Communities in South Asia, Africa, and Latin America cleared small forest patches for farming, cultivated them for a few years, and then left them fallow to regenerate. Far from being purely

destructive, this practice maintained soil fertility, encouraged biodiversity, and created a mosaic of habitats. Rituals, taboos, and community regulations often dictated the timing and location of cultivation, embedding ecological awareness within cultural frameworks (Conklin, 1957; Dove, 1983). Such practices reflected long-term ecological cycles and a recognition of human dependence on natural regeneration.

The development of irrigation systems marked another milestone in ecological adaptation. Ancient civilizations in Mesopotamia, the Indus Valley, and the Nile Basin engineered canals, reservoirs, and flood-control mechanisms to harness water resources. In arid regions, indigenous systems such as the qanats of Persia, stepwells in India, and terraced fields in the Andes revealed sophisticated hydrological knowledge and engineering skills (Mishra, 1993; Scarborough, 2003). These systems not only sustained agriculture but also reflected collective governance, as water distribution was often managed through customary rules, emphasizing cooperation and equitable access. Architecture also illustrates human adaptation to ecological contexts. Traditional dwellings were designed in harmony with local climatic conditions: mud houses in hot and dry regions provided thermal insulation; stilt houses in flood-prone areas elevated living spaces above water, and thatched roofs allowed ventilation in humid tropical climates. In colder regions, thick stone or wooden houses retained warmth, ensuring survival through harsh winters (Oliver, 2006). These vernacular architectural forms were energy-efficient, relied on locally available materials, and minimized ecological disruption, reflecting a sustainable design philosophy that modern architecture increasingly seeks to emulate. Finally, ecological knowledge was deeply embedded in spiritual and symbolic systems. Many communities preserved biodiversity through the establishment of sacred groves, particularly in Africa and India, where religious taboos prohibited resource extraction (Gadgil & Vartak, 1976). Seasonal festivals marked agricultural cycles, aligning human activity with ecological rhythms, while rituals surrounding hunting, fishing, or tree cutting ensured sustainable use of resources by placing spiritual sanctions on overexploitation (Berkes, 2012). These practices demonstrate that cultural systems transcended utilitarian survival, embedding sustainability within moral, spiritual, and social norms. Together, these historical examples reveal that cultural practices were not incidental responses to environmental pressures but deliberate strategies that balanced human survival with ecological resilience. They also provide critical lessons for contemporary sustainability debates, as they highlight the potential of traditional ecological knowledge (TEK) to inform adaptive responses to current environmental crises.

Regional Case Studies of Cultural–Ecological Adaptations

Human adaptation to ecosystems is best understood through regional case studies that illustrate the diversity of cultural practices developed in response to specific ecological challenges. Across Asia, Africa, the Americas, Oceania, and Europe, traditional ecological knowledge (TEK) continues to play a significant role in resource management and sustainability. These regional examples highlight how cultural systems reflect both environmental constraints and human ingenuity.

Asia

In Asia, the diversity of ecological zones from Himalayan highlands to tropical deltas has produced a rich variety of adaptive cultural practices. In South Asia, the system of rice-fish farming practiced in eastern India and Bangladesh integrates aquaculture with paddy cultivation, enhancing biodiversity while maintaining soil fertility (Pretty, 2002). Similarly, the terraced agriculture of the Himalayas demonstrates the careful use of sloping terrain, where stone walls prevent soil erosion, and irrigation channels distribute scarce water resources (Gurung, 1999). In arid western India, communities developed stepwells and tank irrigation systems that harvested monsoonal rains for year-round use (Mishra, 1993). Across East Asia, Confucian and Buddhist traditions influenced ecological practices such as forest conservation and sacred groves, integrating spirituality with environmental management (Shin, 2018). These practices illustrate how Asian societies transformed environmental variability into opportunities for resilience.

Africa

African societies developed diverse ecological adaptations shaped by savannas, deserts, and forests. In the Sahel region, pastoralist communities such as the Fulani developed rotational grazing systems that minimized overgrazing by moving livestock seasonally (Turner, 1999). Agroforestry traditions, such as the integration of *Faidherbia albida* trees into millet and sorghum fields, improved soil fertility and reduced desertification risks (Garrity et al., 2010). In West Africa, sacred groves preserved biodiversity hotspots, functioning as reservoirs of medicinal plants and wildlife through religious and cultural taboos (Campbell, 2005). In southern Africa, rainmaking rituals and communal grazing lands reinforced collective governance of scarce resources (Huffman, 2009). These practices demonstrate the interplay of spirituality, subsistence, and resilience in African ecological systems.

The Americas

The Americas host some of the most sophisticated examples of indigenous ecological knowledge. The Andean terrace systems developed by the Inca minimized soil erosion in Steep Mountain landscapes while enabling the cultivation of potatoes, maize, and quinoa at multiple altitudinal zones (Treacy, 1994). In the Amazon basin, indigenous peoples developed terra preta (anthropogenic dark earths) through controlled burning and organic matter deposition, creating fertile soils that sustain biodiversity (WinklerPrins, 2014). North American indigenous communities practiced controlled burns to maintain grasslands, enhance hunting grounds, and prevent large-scale wildfires (Anderson, 2005). These practices illustrate how ecological manipulation was rooted in long-term sustainability rather than exploitation, embedding conservation within cultural norms.

Oceania

Island societies in Oceania faced unique challenges of limited land, freshwater scarcity, and exposure to extreme weather. Polynesian communities developed fishpond aquaculture systems (*loko i'a* in Hawaii), where stone enclosures created sustainable habitats for fish rearing (Kikuchi, 1976). Traditional navigation techniques, based on celestial knowledge and ocean currents, ensured mobility and resource exchange across vast oceanic spaces (Finney, 1994), Agroforestry systems integrating taro, breadfruit, and coconut reflected diversified strategies that reduced ecological risks (Thaman, 2002). Ritual taboos, such as the Polynesian *kapu* system, regulated fishing seasons and forest use, aligning resource exploitation with regeneration cycles (Johannes, 2002). These examples highlight the sophisticated ecological management of small island societies, where survival depended on balancing scarcity and abundance.

Europe

In Europe, traditional ecological adaptations evolved in response to temperate forests, Mediterranean landscapes, and northern tundra. In the Mediterranean, olive and vineyard terraces reduced erosion and maximized water retention, shaping the region's iconic cultural landscapes (Blondel et al., 2010). In Northern Europe, pastoralism combined with transhumance the seasonal movement of livestock between highlands and lowlands ensured sustainable use of grazing resources (Dodgshon, 1998). Scandinavian societies developed wooden architecture adapted to cold climates, while sacred forests and commons provided shared access to resources under community management (Ostrom, 1990). European peasant traditions also embedded ecological rhythms in festivals marking planting and harvest,

reinforcing social cohesion around ecological cycles. These practices demonstrate how Europe's cultural landscapes emerged from centuries of adaptation to ecological variability.

Conclusion

The historical and regional perspectives on cultural–ecological adaptation reveal that traditional societies have long shown resilience and creativity in addressing environmental challenges, shaping practices that sustained both livelihoods and ecosystems while strengthening community bonds. From hunter-gatherers guided by seasonal rhythms, to pastoralists practicing rotational grazing, to farming communities using shifting cultivation, terracing, and water-harvesting systems, each adaptation reflected intimate ecological knowledge. Vernacular architecture offered energy-efficient designs aligned with local climates, while rituals, taboos, and spiritual values ensured that environmental stewardship was embedded in daily life. Across regions, diverse examples highlight this principle: Asian societies preserved forests and engineered irrigation systems; African communities practiced agroforestry and pastoral mobility; the Americas developed terraces and indigenous forest management; Oceania's islanders sustained fisheries through marine taboos; and Europe's agrarian traditions linked land use with community governance. Today, globalization, industrialization, and climate change threaten these traditions, yet their wisdom remains critical for sustainability. They remind us that sustainability is not a modern concept but an ancient practice rooted in adaptability, community values, and ecological balance. By integrating traditional ecological knowledge with modern science, societies can design holistic pathways that respect cultural heritage while addressing contemporary environmental crises. Ultimately, the study of cultural–ecological adaptation affirms that humanity's survival has always relied on harmony with nature, and that the future of sustainability lies in drawing upon the enduring wisdom of the past.

References:

1. Adger, W. N., Barnett, J., Brown, K., Marshall, N., & O'Brien, K. (2011). Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change, 1*(2), 112–117. https://doi.org/10.1038/nclimate1080
2. Agrawal, A. (1995). Dismantling the divide between indigenous and scientific knowledge. *Development and Change, 26*(3), 413–439. https://doi.org/10.1111/j.1467-7660.1995.tb00560.x

3. Altieri, M. A., & Nicholls, C. I. (2017). The adaptation and mitigation potential of traditional agriculture in a changing climate. *Climatic Change, 140*(1), 33–45. https://doi.org/10.1007/s10584-013-0909-y
4. Berkes, F. (2012). *Sacred ecology* (3rd ed.). Routledge.
5. Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications, 10*(5), 1251–1262. https://doi.org/10.1890/1051-0761(2000)010[1251:ROTEKA]2.0.CO;2
6. Blaikie, P., & Brookfield, H. (1987). *Land degradation and society*. Methuen.
7. Conklin, H. C. (1957). *Hanunoo agriculture: A report on an integral system of shifting cultivation in the Philippines*. Food and Agriculture Organization of the United Nations.
8. Dove, M. R. (1983). Theories of swidden agriculture, and the political economy of ignorance. *Agroforestry Systems, 1*(2), 85–99. https://doi.org/10.1007/BF00596351
9. Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. *Global Environmental Change, 16*(3), 253–267. https://doi.org/10.1016/j.gloenvcha.2006.04.002
10. Gadgil, M., & Vartak, V. D. (1976). The sacred groves of Western Ghats in India. *Economic Botany, 30*(2), 152–160. https://doi.org/10.1007/BF02914008
11. Gadgil, M., Berkes, F., & Folke, C. (1993). Indigenous knowledge for biodiversity conservation. *Ambio, 22*(2/3), 151–156.
12. Ingold, T. (2000). *The perception of the environment: Essays on livelihood, dwelling and skill*. Routledge.
13. Intergovernmental Panel on Climate Change (IPCC). (2022). *Climate change 2022: Impacts, adaptation, and vulnerability*. Cambridge University Press.
14. Kelly, R. L. (2013). *The lifeways of hunter-gatherers: The foraging spectrum* (2nd ed.). Cambridge University Press.
15. Kreutzmann, H. (2013). Pastoral practices and their transformation in the Karakoram. In H. Kreutzmann (Ed.), *Pastoral practices in High Asia* (pp. 3–27). Springer.
16. Mertz, O., Padoch, C., Fox, J., Cramb, R. A., Leisz, S., Lam, N. T., & Vien, T. D. (2009). Swidden change in Southeast Asia: Understanding causes and consequences. *Human Ecology, 37*(3), 259–264. https://doi.org/10.1007/s10745-009-9245-2
17. Mishra, H. N. (1993). Ancient water harvesting systems of India. *Indian Journal of History of Science, 28*(4), 341–350.

18. Moran, E. F. (2006). *People and nature: An introduction to human ecological relations*. Blackwell.
19. Oliver, P. (2006). *Built to meet needs: Cultural issues in vernacular architecture*. Routledge.
20. Posey, D. A. (Ed.). (1999). *Cultural and spiritual values of biodiversity*. United Nations Environment Programme & Intermediate Technology Publications.
21. Reij, C., Tappan, G., & Smale, M. (2009). Agroenvironmental transformation in the Sahel: Another kind of "Green Revolution." *International Food Policy Research Institute*.
22. Robbins, P. (2019). *Political ecology: A critical introduction* (3rd ed.). Wiley-Blackwell.
23. Scarborough, V. L. (2003). *The flow of power: Ancient water systems and landscapes*. School of Advanced Research Press.
24. Steward, J. H. (1955). *Theory of culture change: The methodology of multilinear evolution*. University of Illinois Press.
25. Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability and transformability in social–ecological systems. *Ecology and Society, 9*(2), 5. https://www.jstor.org/stable/26267673