

Historical Roots of Human-Wildlife Conflict in Kerala: Ecology, Society, and Environmental Change

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Human-wildlife conflict (HWC) has become a major environmental and socio-economic challenge in Kerala, particularly in the forest-fringe regions of the Western Ghats. While contemporary explanations often focus on wildlife population growth or conservation policies, this article argues that present-day conflicts are rooted in the long-term historical transformations of landscapes and human-environment relations. Adopting an environmental history approach, this study traces the evolution of HWC in Kerala from the pre-colonial period to the present using primary sources such as *The Travancore State Manual* (1906), *Malabar Manual* (1887), census records, legislative proceedings, and forest regulations, alongside relevant secondary literature. The analysis demonstrates that colonial forest commercialisation, plantation expansion, post-independence agricultural migration, infrastructure development, and changing land-use policies have progressively fragmented wildlife habitats and reduced the ecological buffers separating human settlements from wildlife. More recent pressures associated with climate change have further intensified these interactions. The article contends that contemporary HWC is not merely a wildlife management problem but the outcome of cumulative socio-ecological transformations spanning over two

centuries. Understanding this historical trajectory is essential for developing sustainable, landscape-level approaches that balance conservation objectives with the livelihoods and security of forest fringe communities.

Keywords: Colonial forestry; Environmental history; Human-wildlife conflict; Kerala; Western Ghats

Introduction

Human–wildlife conflict (HWC) refers to negative interactions arising when wildlife encroaches upon human-settled landscapes or when human activity penetrates wildlife habitats, resulting in crop destruction, livestock predation, property damage, human injury or death, and retaliatory killing of animals. The contemporary severity of HWC in Kerala is evident from parliamentary discussions. In a Lok Sabha intervention, concerns were raised regarding increasing crop damage, human casualties, and elephant attacks in regions such as Chinnakkanal, Bisonvalley, Marayoor, Kuttampuzha, and Mankulam. The discussion identified elephants, wild pigs, porcupines, and sambar as major crop-raiding species affecting marginal farmers, highlighting the growing socio-economic impact of HWC in the state (Lok Sabha Secretariat, 2017). Kerala presents an instructive case: it is simultaneously one of the most biodiverse regions on the planet, a part of the UNESCO-recognised Western Ghats biodiversity hotspot, and a state where HWC-related mortality and economic losses have attracted sustained political attention. Popular and policy discourse treat HWC as a problem caused by recent population growth or specific conservation failures (Redpath et al., 2015). This article challenges this framing. Ecological systems and the relationships between human communities and wild animals have been profoundly altered by successive waves of transformation: pre-colonial settlement, British colonial forest exploitation, post-independence land reforms, development mega-projects, and accelerating climate change. Each wave deposited institutional sediment in the form of laws, land-use patterns, and ecological legacies that shaped subsequent conflicts. To understand contemporary HWC, we must read it stratigraphically: layer by layer, through time. In doing so, this article intervenes in

debates at the intersection of environmental history, political ecology, and conservation studies, arguing that the production of human-wildlife conflict is inseparable from broader histories of colonial governance, land dispossession, and development-driven ecological transformation (Peluso & Watts, 2001; Beinart & Hughes, 2007). These historical layers have created complex socio-ecological dynamics that cannot be addressed through simplistic or short-term solutions. Effective management of HWC in Kerala requires acknowledging these deep-rooted factors and integrating ecological, social, and political dimensions. Only by adopting a multi-scalar and historically informed approach can sustainable coexistence between humans and wildlife be envisioned.

Objectives of the Study:

1. Examine the historical evolution of human-wildlife conflict in Kerala from the pre-colonial period to the present.
2. Analyse the impact of colonial forest policies, plantation expansion, and commercial resource extraction on wildlife habitats and human-animal interactions.
3. Investigate the role of post-independence agricultural expansion, migration, infrastructure development, and land-use change in intensifying human-wildlife conflict.
4. Assess the influence of conservation policies and climate-related environmental changes on contemporary patterns of human-wildlife conflict in Kerala.
5. Demonstrate that present-day human-wildlife conflict is a historically produced socio-ecological phenomenon shaped by long-term environmental and human interventions.

Methodology

This study adopts a historical and interdisciplinary approach to examine the evolution of human-wildlife conflict (HWC) in Kerala. The research is based on the qualitative analysis of both primary and secondary sources. Primary sources include colonial administrative records, state manuals, census reports, legislative proceedings, forest legislation, government notifications, and official documents such as

The Travancore State Manual (1906), *Malabar Manual* (1887), Census of India reports, Kerala Legislative Assembly Proceedings, and parliamentary debates. These sources provide evidence relating to historical land-use patterns, forest administration, settlement expansion, demographic change, wildlife management, and state responses to human-wildlife interactions.

Secondary sources comprising scholarly books, peer-reviewed journal articles, environmental history studies, ecological research, and policy analyses were used to contextualise and interpret historical developments. This study employs a chronological framework, tracing changes from the pre-colonial period through colonial forest commercialisation, post-independence agricultural expansion, infrastructure development, conservation interventions, and contemporary climate-related challenges. The analysis is guided by the perspective of environmental history, which examines the reciprocal relationship between human societies and ecological systems over time. By integrating historical records with contemporary ecological and policy studies, this article demonstrates that present-day human-wildlife conflict in Kerala is the cumulative outcome of long-term socio-ecological transformations rather than an isolated contemporary phenomenon.

A critical methodological caution is necessary regarding the primary sources employed. The colonial administrative records, state manuals, and forest legislation that constitute much of this study's archival foundation were produced within structures of imperial governance and resource management. As Guha and Martinez-Alier (1997) and Rangarajan (1996) have observed, colonial archives frequently represent forests and wildlife through administrative, economic, and governmental categories that reflect the priorities of the colonial state rather than the experiences of local communities. These sources should therefore be treated as partial and ideologically situated evidence rather than transparent historical descriptions. Where possible, this analysis reads colonial documents against their institutional grain, attending to what they reveal inadvertently about community practices, indigenous resource use, and local resistance, dimensions that colonial bureaucracies systematically marginalised. This

interpretive approach draws on insights from subaltern environmental studies and political ecology, which have long argued that forest histories must be read through the absences and distortions of official archives, as much as through their explicit content (Sivaramakrishnan, 1999; Agrawal, 2005).

Human-Wildlife Relations in Pre-Colonial Kerala

Until at least the eighteenth century, approximately three-fourths of Kerala's territory was covered by dense tropical forests. According to the *Travancore State Manual*, the hill tracts of Travancore were characterised by extensive forests supporting elephants, gaur, deer, and other large mammals, indicating the ecological continuity that existed before large-scale modern land-use transformation (Aiya, 1906). The Western Ghats escarpment supported moist evergreen and semi-evergreen formations of remarkable biological richness, while the lowlands were threaded with tidal forests, wetlands, and riparian corridors. Human settlement was concentrated in the coastal strip, and the interior highlands were inhabited primarily by indigenous tribal groups whose lifeways were ecologically calibrated to the forest environment (Leenamol & Samala, 2019). Indigenous tribal communities, such as the Paniyas, Kurichiyas, and Kattunaikkars, have developed sustainable agricultural and forest management practices, including shifting cultivation and non-timber forest product harvesting, which help preserve forest integrity. Critically, these communities were not passive inhabitants of forest landscapes but active agents who shaped ecological conditions through deliberate practices of resource management, fire use, and species selection (Gadgil & Guha, 1993). Their knowledge systems constituted a form of ecological governance that predated and, in many respects, rivalled state-administered conservation in its capacity to sustain biodiversity. Coastal settlements engage in fishing, trade, and rice cultivation, benefiting from Kerala's unique estuarine and backwater systems. By the eighteenth century, deforestation began gradually due to the expansion of agriculture, plantation development (notably spices and later rubber), and colonial resource extraction, leading to significant ecological changes.

Traditional Coexistence and Cultural Ecology

Before colonial intervention, the commercial exploitation of forest produce was limited primarily to high-value spices along established trade routes. Forests were not perceived as resources awaiting extraction but as living environments within which communities maintained complex reciprocal relationships with animals and plants. Sacred groves known as Kavu, governed by customary prohibitions on felling and hunting, functioned as refugia for biodiversity and markers of territorial identity (M V, 2021). Official descriptions in the *Travancore State Manual* recorded numerous sacred groves and forest tracts preserved through customary practices, demonstrating the role of local institutions in conserving biodiversity before the expansion of state-managed forestry (Aiya, 1906). Hunting existed but was culturally bounded, operating at a scale insufficient to drive significant reductions in wildlife populations. This is not to romanticise the pre-colonial period. Crop raiding by elephants and wild pigs is documented even in the earliest surviving records. A proclamation by the ruler of Travancore in 1818 authorised arms provision to farmers for driving away wildlife, suggesting such disturbances were commonplace. Evidence from the late eighteenth century further indicates that wildlife had already become a subject of administrative regulation. A proclamation issued at Calicut on 19 November 1793, required individuals who captured elephants within Malabar to report the capture to Company authorities and reserved one-third of the animal's assessed value for the East India Company (Logan, 1887). The regulation demonstrates the growing incorporation of wildlife into colonial systems of revenue and resource management. Elephants were increasingly viewed not only as components of local ecological and cultural landscapes but also as valuable economic resources subject to state control. Nevertheless, the intensity of conflict was far lower because the spatial and ecological buffer between human settlement and wildlife habitat remained largely intact. Pre-colonial communities often practiced shifting cultivation and agroforestry, integrating forest conservation with subsistence needs, which maintained ecological balance without large-scale deforestation. Customary laws and taboos regulated access to forest resources, including restrictions on tree

fellings, hunting seasons, and species protection, contributing to sustainable use and biodiversity preservation. Sacred groves, such as Kavu, served not only as biodiversity refuges but also as cultural centres for rituals and community governance, reinforcing social cohesion and environmental stewardship. The spatial separation between human settlements and core wildlife habitats was maintained through traditional land-use patterns, which limited habitat fragmentation and minimised the intensity of human-wildlife conflict (Bhagwat & Rutte, 2006). Early colonial records indicate that commercial exploitation of forest products expanded significantly only after colonial policies undermined customary governance and opened forests to timber extraction and plantation agriculture. Wildlife population declines became pronounced post-colonial intervention due to intensified hunting, habitat loss, and the introduction of commercial market demands absent in the pre-colonial period.

Colonial Intervention and Forest Transformation

The incorporation of Kerala's highland regions into the British imperial apparatus fundamentally redrew the boundaries between human and wildlife space. However, state intervention in forest management predated the formal establishment of colonial forestry. A proclamation issued at Calicut on June 9, 1799, prohibited the felling of immature teak trees in the forests of Malabar and described the widespread cutting of young teak as a "ruinous and wanton practice" (Logan, 1887). The measure imposed penalties on offenders reflected growing official concern regarding the depletion of valuable timber resources. These early conservation-oriented regulations reveal that forest governance and resource control had already become matters of administrative importance by the close of the eighteenth century. The Forest Charter of 1855 and subsequent Indian Forest Acts of 1865 and 1878 established the legal framework through which vast tracts of communally managed forests were classified as Reserve and Protected Forests under state control. Forest offences previously governed by customary norms were criminalised: 1,905 such cases were reported in 1890–91 alone (Sarker, 2011). Colonial administrative manuals described Travancore forests as valuable sources of teak and rosewood, reflecting the increasing commercial orientation of forest

governance during the late nineteenth century (Aiya, 1906). The Madras Forest Act of 1882 further formalised the erosion of customary rights by dispossessing local populations of access to resources they had utilised for generations. This transformation represented a substantial alteration in the interaction between local communities and their environment. The criminalisation of forest offences under these acts exemplifies the broader colonial strategy to consolidate imperial authority over natural resources. Additionally, the Madras Forest Act of 1882 intensified this process by legally excluding indigenous populations from lands essential to their livelihoods. Collectively, these policies illustrate the comprehensive legal framework through which colonial power reconfigured human–wildlife interactions in Kerala’s highlands (Saravanan, 2018).

Commercial Extraction and Ecological Disruption

The commercialisation of forests and wildlife was already evident in the late eighteenth century. A lease issued on November 13, 1796, granted exclusive rights for timber extraction and elephant capture in the region extending from the Kotta River to the mouth of the Chettuva River (Logan, 1887). By linking timber extraction with elephant capture under a single lease arrangement, colonial authorities integrated forest resources and wildlife into an emerging system of revenue generation and administrative control. These developments laid the foundation for more extensive forms of environmental transformation that characterised the nineteenth century. British commercial imperatives accelerated the exploitation of Kerala’s highland landscapes. Teak was harvested on a large scale, while forest roads opened previously inaccessible areas to extraction, settlement, and commercial activity. The conversion of extensive forest tracts into plantation agriculture was the most significant. Colonial policy encouraged the expansion of coffee, tea, and later rubber plantations in regions such as Wayanad, Idukki, and the Anamalai Hills (Sooryalekshmi, 2024). Consequently, large areas of continuous forests were transformed into plantation monocultures and fragmented landscapes. These changes had profound ecological and demographic consequences. The population of Wayanad increased from approximately 34,272 in 1827 to 125,827 by 1871, reflecting the growth

of the plantation economy and the influx of settlers and labourers (Logan, 1887). The combined effects of commercial forestry, plantation expansion, and population growth reshaped both the environment and human geography of Kerala's highlands, creating conditions that would later contribute to habitat fragmentation and intensified human-wildlife interactions.

Agricultural Expansion and Habitat Fragmentation

Independence in 1947 marked a new phase of pressure on Kerala's forests. The state's population more than doubled between 1951 and 1991, reaching 29.1 million, and increased further to 33.3 million by 2011. Agricultural expansion accompanied this demographic growth. The total cropped area increased by 26% between 1960 and 1969, while the area under rubber cultivation expanded by 627% between 1955 and 2000. Coconut cultivation increased by 106% and banana and plantain cultivation by 96% during the same period (Sivaram, 2003). These developments represented a fundamental reorganisation of Kerala's landscape, with significant consequences for wildlife habitats.

Migration from central Travancore into the hills of Wayanad continued into the 1970s, driven largely by land scarcity in the lowlands. Wayanad alone lost 62% of its green cover between 1950 and 2018, while the Western Ghats experienced substantial forest loss during the 20th century. The most significant ecological consequence was the fragmentation of previously continuous forest landscapes. Post-independence land and forest policies further altered the relationship between human settlements and forest environments. Legislative discussions concerning the registration of private forest lands in Malabar reveal the extent to which cultivation and occupation had expanded into formerly forested areas. Debates in the Kerala Legislative Assembly during the 1980s indicate continued state engagement with questions of ownership and rights over forest lands under cultivation (Kerala Legislative Assembly Proceedings, 1982–1987). Such developments facilitated the consolidation of permanent settlements in forest-frontier regions and reduced the ecological buffers separating human communities from wildlife habitats.

As forests became increasingly fragmented, wildlife corridors essential for animal movement were disrupted by agricultural land, roads, and settlements. Elephants were increasingly forced into human-dominated landscapes as traditional migratory routes were blocked. Therefore, the spatial conditions that intensified human-wildlife conflict were produced primarily by long-term land-use change rather than changes in animal behaviour.

Changing Patterns of Human-Wildlife Conflict

Documentary evidence suggests that human-wildlife conflict in Kerala has intensified over time, both in scale and complexity. Historical records from the 1890s describe the use of machans (elevated treetop guard platforms) in Wayanad to protect agricultural fields from elephants, gaur, wild boars, tigers, leopards, and primates, indicating that crop-raiding and livestock predation were already significant concerns in forest-fringe regions. However, these conflicts occurred within landscapes where forests were comparatively extensive and human settlements were less intrusive.

By the early twenty-first century, the nature of conflict had expanded considerably. Studies from the Thrissur district recorded damage to 11 different crops caused by 10 wildlife species between 2009 and 2012, resulting in substantial economic losses. Recent reports indicate increasing incidents of crop destruction, livestock predation, and property damage across multiple districts. This intensification reflects the cumulative effects of habitat fragmentation, agricultural expansion, infrastructure development, and changing ecological conditions. The persistence of traditional mitigation methods, such as machans, alongside modern conflict-management strategies, underscores the continuity of human-wildlife interactions while also highlighting the growing challenges posed by a rapidly changing landscape.

Post-Independence Development and Environmental Change

The development of large-scale infrastructure has introduced significant ecological disruptions. The construction of hydroelectric dams in the Western Ghats has led to the inundation of extensive valley-floor forests, resulting in the displacement of wildlife into the

remaining upland forests. Furthermore, the expansion of the road network has compounded these ecological impacts (Kale et al., 2010). Currently, Kerala possesses an exceptionally dense road network, spanning approximately 331,904 kilometres, which ranks among the highest densities in Asia. These roads impede natural water flow, facilitate the spread of invasive species, create barriers to wildlife movement, and promote encroachment into previously remote forest margins. Consequently, wildlife populations have become increasingly confined to isolated protected area islands, which are surrounded by a matrix of human-dominated landscapes.

Silent Valley in the Palakkad district serves as a significant case study. The proposed hydroelectric project on the Kunthipuzha River, which threatened to submerge the last remaining undisturbed tropical rainforest in peninsular India, was abandoned following a sustained conservation campaign, leading to Silent Valley's designation as a National Park in 1984 (Ramakrishnan, 1984). In contrast, Wayanad district exemplifies the trajectory of human-wildlife conflict at the landscape scale. The combination of colonial plantation establishment, post-independence agricultural migration, road construction, and long-term decline in forest cover has created a landscape where elephants, tigers, leopards, and wild pigs are in daily contact with farming communities. This case underscores the importance of sustained conservation efforts in protecting vulnerable ecosystems, setting a precedent for similar initiatives elsewhere. While Silent Valley represents a successful conservation outcome, the situation in Wayanad highlights the complex challenges arising from ongoing interactions between wildlife and agricultural communities.

Conservation Policies and Emerging Challenges

The Wildlife Protection Act (WPA) of 1972 established the legal foundation for wildlife conservation in India by prohibiting hunting and wildlife trade, creating a network of protected areas, and establishing statutory conservation authorities. In Kerala, however, the Act also contributed to new tensions in human-wildlife relations by extending legal protection to species such as elephants and tigers, thereby limiting direct responses to wildlife-related damage.

Consequently, affected communities often relied on compensation mechanisms that were frequently criticised as slow and inadequate.

In response to growing concerns over human-wildlife conflict, Kerala became the first state in India to amend the Wildlife Protection Act to facilitate legal intervention against wild animals posing a demonstrable threat to human life. The amendment reflected an attempt to balance conservation objectives with community safety. At the same time, forest governance remained deeply contested. A proposed amendment to the Kerala Forest Act of 1961 was withdrawn in 2024 following widespread public protests, highlighting the competing interests of forest-dependent communities, conservation advocates, and the state. These developments illustrate the evolving and often contested nature of wildlife governance in Kerala. While conservation policies have strengthened species protection, they have also exposed tensions between ecological preservation and the socioeconomic realities of forest-fringe communities (Maiti, 2012). Recent wildlife census data further reflect these complexities. The elephant population, which increased from 5,135 to 6,177 individuals by 2010, declined to between 1,920 and 2,386 by 2023, while tiger numbers in Wayanad Wildlife Sanctuary fell from 120 in 2018 to 84 in 2023. These trends demonstrate that wildlife conservation and human-wildlife conflict continue to evolve within a landscape shaped by historical environmental change, development pressures, and emerging climatic challenges.

Climate Change as Conflict Multiplier

Climate change has added a new layer of stress to Kerala's already fragmented socio-ecological landscape. Between 2000 and 2015, the state experienced declining monsoon rainfall and rising temperatures, while the Arabian Sea continued to warm. These changes affect the flowering and fruiting cycles of forest vegetation, reduce the availability of food and water resources, and increasingly push wildlife into agricultural and human-dominated landscapes. The devastating floods of 2018, which claimed more than 400 lives, further highlighted the growing vulnerability of Kerala's environment to extreme climatic events (Anisha et al., 2023).

Climate-related habitat degradation has also intensified human-wildlife conflict. A WWF India assessment recorded 6,465 forest fire points in Idukki district between 2012 and 2025, with most occurring during the dry season. Forest officials noted that the destruction of grasslands, an important food source for elephants and other wildlife, frequently compels animals to move into nearby settlements in search of food. At the same time, Kerala lost approximately 120000 hectares of tree cover between 2001 and 2025, including areas associated with elephant corridors. As these movement routes become increasingly fragmented, elephants are forced to traverse agricultural lands and settlements, increasing the frequency of conflict. Climate change therefore acts not as an isolated cause but as a multiplier of historical pressures created by deforestation, habitat fragmentation, and land-use change.

Conclusion

This article has traced the historical roots of human-wildlife conflict in Kerala from pre-colonial forest landscapes through colonial exploitation, post-independence agricultural expansion, development-era infrastructure construction, and the climate-altered present. As early administrative records and state manuals reveal, human-wildlife interactions in Kerala were historically embedded within broader patterns of forest use, settlement expansion, and state intervention, long before contemporary conservation debates emerged. HWC in Kerala is not a recent or localised problem amenable to technocratic management fixes, but the product of centuries of environmental transformation that have progressively eroded the spatial, ecological, and cultural buffers that once modulated human-animal interaction. In the pre-colonial period, dense forest cover, low population density, and culturally embedded institutions maintained a landscape in which human communities and wildlife coexisted within broadly sustainable parameters. Colonial forest administration dismantled this order: it commodified forests, criminalised customary rights, and converted highland habitats into plantation monocultures. The ecological consequences, captured in the decline of Kerala's forest cover from 44.4 percent in 1905 to 14.7 percent in 1983, were irreversible at any human timescale. Post-independence development continued and

deepened these disruptions, adding dam reservoirs, road networks, and urban expansion to the cumulative burden on wildlife habitats. The implications for policy are significant. Compensation mechanisms, early-warning systems, and technical interventions such as solar fencing are valuable tools, but they address symptoms rather than causes. What is needed is a historically informed, landscape-scale approach that simultaneously secures and restores wildlife corridors, ensures adequate and timely compensation for conflict-affected communities, integrates indigenous ecological knowledge into land-use planning, and recognises the rights and livelihoods of forest-fringe populations as central concerns in conservation policy. The history of HWC in Kerala teaches, above all, that the boundaries between human and wildlife space are politically and historically produced, and therefore amenable to political and historical reconstruction. This recognition carries significant implications for environmental governance and conservation ethics. Sustainable management of human-wildlife conflict in Kerala cannot be achieved through conservation frameworks that treat forest-dependent communities as problems to be managed rather than as rights-bearing participants in ecological governance. Community-based approaches that restore decision-making authority to those who bear the costs of living alongside wildlife, combined with institutional mechanisms for equitable benefit-sharing from protected area management, offer a more just and ecologically durable foundation for coexistence (Agrawal & Gibson, 1999; Kothari et al., 2013). The historical production of conflict is also the historical production of community knowledge, resilience, and adaptive capacity, resources that conservation policy has too often disregarded.

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