



Environmental issues and threat to wildlife animals in India

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Abstract:

India, a megadiverse country with rich biodiversity, faces significant environmental challenges that threaten its wildlife. This research paper explores the major issues affecting wildlife in India, including habitat loss, human-wildlife conflict, poaching, pollution, and climate change. Habitat loss due to urbanization, agriculture, and infrastructure development fragments ecosystems and disrupts wildlife populations. Human-wildlife conflicts, driven by habitat encroachment, lead to crop damage and retaliatory killings. Poaching and illegal trade decimate species like tigers, elephants, and rhinoceroses despite stringent laws. Pollution from industrial and agricultural sources contaminates habitats, while climate change alters ecosystems and species distributions. This paper reviews India's major ecosystems and key wildlife species, highlighting the diverse habitats from the Himalayan range to coastal regions.

It traces the historical perspective on wildlife conservation, emphasizing ancient cultural traditions and modern legislative efforts like the Wildlife Protection Act of 1972. The role of government agencies and NGOs in implementing conservation programs is discussed, alongside successful projects such as Project Tiger and the conservation of Indian rhinoceroses. To address these challenges, the paper recommends strengthening legal enforcement, promoting community-based conservation, sustainable land-use planning, increasing public awareness, and enhancing international collaboration. Legal frameworks need stricter enforcement and advanced monitoring technologies. Community participation, through initiatives like Joint Forest Management, can foster sustainable conservation. Sustainable land-use planning should integrate wildlife corridors and habitat restoration. Public education programs and media campaigns can raise awareness. Collaboration with international organizations and neighbouring countries can bring technical expertise and support transboundary conservation efforts.

Keywords: *Wildlife Conservation, Habitat Loss, Human-Wildlife Conflict, Poaching, Biodiversity Hotspots.*

Introduction:

India, a land of diverse landscapes and ecosystems, boasts an unparalleled richness in biodiversity, making it one of the world's megadiverse countries. From the lush rainforests of the Western Ghats to the vast mangrove forests of the Sundarbans, India's natural habitats harbour an astonishing variety of flora and fauna. This biodiversity is not only a source of national pride but also plays a crucial role in maintaining ecosystem balance and providing essential ecosystem services. Wildlife conservation in India is of paramount importance due to the country's remarkable biodiversity. The term "wildlife" encompasses a wide array of species, including mammals, birds, reptiles, amphibians, and marine organisms, each contributing to the intricate web of life. Conservation efforts aim to safeguard these species and their habitats from various anthropogenic threats, ensuring their survival for future generations.

However, despite its rich biodiversity and conservation efforts, India's wildlife faces numerous environmental challenges and threats. Habitat loss and fragmentation, driven primarily by human

activities such as urbanization, agriculture, and infrastructure development, are among the most pressing issues. As human populations expand, natural habitats shrink, leading to the degradation and fragmentation of ecosystems, which in turn disrupts wildlife populations and their migratory patterns (Sekhar, 2016). Moreover, human-wildlife conflict has emerged as a significant concern in many parts of the country. Competition for resources, encroachment into wildlife habitats, and retaliatory killings exacerbate tensions between humans and wildlife, posing a threat to both human livelihoods and wildlife conservation efforts (Athreya et al., 2015). Poaching and illegal wildlife trade continue to decimate vulnerable species, including iconic megafauna such as tigers, elephants, and rhinoceroses. Despite stringent wildlife protection laws, illicit trade networks persist, driven by demand for exotic animal products in domestic and international markets (Vijayan & Chellam, 2015). Pollution and habitat degradation further compound the challenges faced by India's wildlife. Industrial pollution, agricultural runoff, and plastic waste contaminate natural habitats, endangering aquatic species and disrupting fragile

ecosystems (Joshi *et al.*, 2020). Climate change adds another layer of complexity, with rising temperatures, changing precipitation patterns, and extreme weather events threatening the survival of vulnerable species and altering their distribution ranges (Mondal *et al.*, 2018).

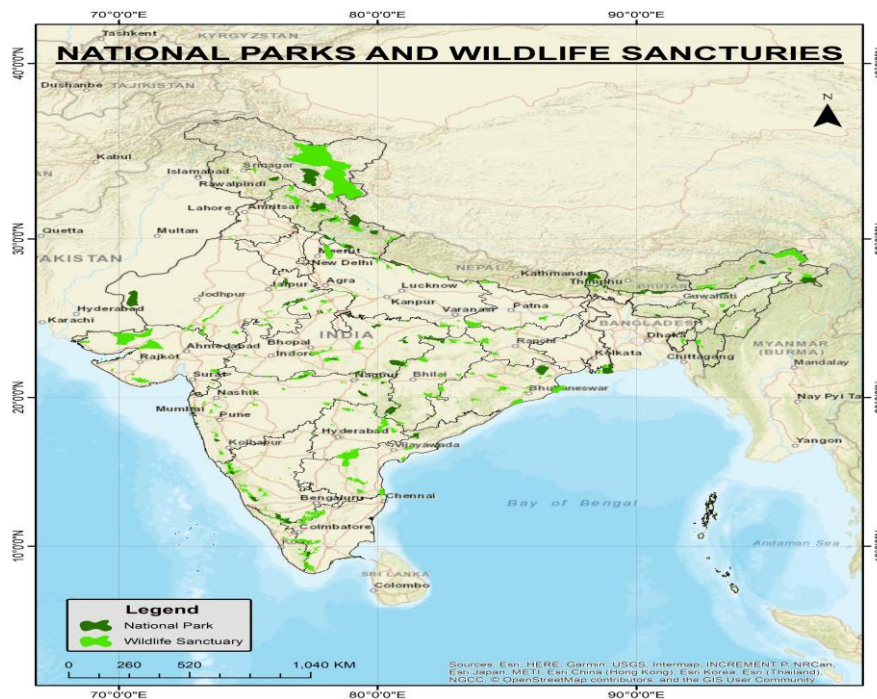
The purpose of this paper is to critically examine the environmental issues and threats faced by wildlife animals in India, with a focus on understanding the underlying causes and implications for conservation efforts. By synthesizing existing literature, case studies, and empirical data, this paper aims to shed light on the multifaceted nature of the problem and propose actionable recommendations for mitigating these challenges. This paper encompasses of key environmental issues impacting wildlife in India, including habitat loss, human-wildlife conflict, poaching, pollution, and climate change. Through a comprehensive review of relevant literature and case studies, this paper will explore the complex interplay of socioeconomic factors, policy frameworks, and ecological dynamics shaping the conservation landscape in India. Addressing the environmental issues and threats faced by wildlife in India requires a concerted effort involving government agencies, nongovernmental organizations, local communities, and other stakeholders. By raising awareness, strengthening

conservation measures, and promoting sustainable development practices, we can strive towards a future where India's rich biodiversity thrives in harmony with human society.

Historical Perspective on Wildlife Conservation in India:

India's relationship with wildlife has a long and complex history, deeply rooted in its cultural and spiritual traditions. Ancient Indian texts, such as the Vedas and the Arthashastra, highlight the importance of wildlife and prescribe measures for their protection. During the Mauryan Empire (circa 322–185 BCE), Emperor Ashoka established some of the earliest known wildlife conservation laws, promoting the preservation of forests and wildlife as part of his policy of Dhamma (righteousness). However, the colonial period marked a significant shift. The British administration's policies, focused on resource extraction and game hunting, led to extensive deforestation and a decline in wildlife populations. Postindependence, India recognized the need for systematic wildlife conservation. The Wildlife Protection Act of 1972 was a landmark legislation, providing a legal framework for the protection of endangered species and their habitats. The establishment of national parks and wildlife sanctuaries, such as Jim Corbett National Park and Kaziranga National Park, underscored India's commitment to preserving its natural heritage.

India's Major Ecosystems and Biodiversity Hotspots:



India is characterized by a diverse range of ecosystems, each hosting unique flora and fauna. The country's geographical diversity spans from the Himalayan Mountain range in the north to the coastal regions in the south, and from the arid

deserts of Rajasthan to the lush rainforests of the Northeast.

- **Himalayan Ecosystem:** This includes alpine meadows, temperate forests, and glacial regions, home to species like the snow leopard, red panda, and Himalayan tahr.

- **Gangetic Plains:** Rich in alluvial soils, these plains support a variety of agricultural practices and are also home to significant wildlife, including the Ganges River dolphin and numerous migratory birds.
- **Western Ghats:** A UNESCO World Heritage site, this region is a biodiversity hotspot with high endemism. It hosts species such as the Nilgiri tahr, liontailed macaque, and numerous endemic plants.
- **Eastern Ghats:** Less explored than their western counterpart, they still hold significant biodiversity, including the Eastern Ghats gecko and the rare Jerdon's courser.
- **Thar Desert:** Despite its arid conditions, this ecosystem supports unique wildlife, including the Indian bustard, desert fox, and various reptiles.
- **Sundarbans:** The world's largest mangrove forest, this area is crucial for the survival of the Bengal tiger, estuarine crocodile, and numerous bird species.
- **Northeast Rainforests:** This region is part of the IndoBurma biodiversity hotspot, housing diverse species like the Hoolock gibbon, Indian rhinoceros, and an array of orchids and other plants .

Key Wildlife Species in India:

India's biodiversity is one of the richest in the world, supporting a vast array of species across its varied ecosystems.

- **Tigers (*Panthera tigris*):** India is home to about 70% of the world's tiger population. Tigers are primarily found in reserves such as Ranthambore, Bandhavgarh, and Sundarbans.
- **Asian Elephants (*Elephas maximus*):** Elephants are found across several regions, including the Western Ghats, Northeast India, and the forests of Central India. They play a crucial role in maintaining the ecological balance.
- **Indian Rhinoceros (*Rhinoceros unicornis*):** Mostly found in Assam's Kaziranga National Park, the Indian rhino is known for its single horn and armorlike skin.
- **Snow Leopard (*Panthera uncia*):** This elusive big cat is native to the high altitudes of the Himalayas and is a symbol of the alpine ecosystem.
- **Indian Leopard (*Panthera pardus fusca*):** Widely distributed across various habitats, from forests to urban fringes, leopards are highly adaptable.
- **Birds:** India is home to over 1,300 species of birds, including the Indian peafowl (national bird), the Great Indian bustard, and various migratory species that visit the subcontinent seasonally.

- **Marine Life:** The coastal waters support diverse marine life, including dugongs, various species of sea turtles, and an array of fish and coral species.

Environmental Issues Facing Wildlife in India

India, renowned for its diverse and rich wildlife, faces numerous environmental challenges that significantly threaten its fauna. Key issues include habitat loss and fragmentation, human wildlife conflict, poaching and illegal wildlife trade, pollution and contamination of natural habitats, and climate change impacts.

Habitat Loss and Fragmentation:

Habitat loss and fragmentation are among the most critical threats to wildlife in India. Rapid urbanization, agricultural expansion, infrastructure development, and deforestation have led to the significant destruction of natural habitats. For instance, the expansion of agricultural lands has encroached upon forests and grasslands, vital habitats for species like the Indian rhinoceros and Bengal tiger (*Reddy et al., 2018*). Fragmentation divides populations into smaller, isolated groups, making them more vulnerable to extinction due to genetic inbreeding and reduced resilience to environmental changes (*Karanth & Nichols, 2000*).

Human Wildlife Conflict:

Human wildlife conflict is a pervasive issue in India, primarily driven by habitat encroachment. As human settlements expand into wildlife territories, incidents of wildlife entering human habitats in search of food and shelter have increased. This often results in crop damage, livestock predation, and, occasionally, human casualties, leading to retaliatory killings of animals (*Sukumar, 2006*). Elephants and big cats, such as leopards and tigers, are frequently involved in these conflicts, exacerbating conservation challenges (*Fernando et al., 2008*).

C. Poaching and Illegal Wildlife Trade:

Poaching and illegal wildlife trade pose severe threats to India's wildlife. Despite stringent laws, illegal hunting for fur, bones, skin, and other animal parts continues, driven by high market demand both domestically and internationally. Tigers, elephants, and rhinoceroses are among the most targeted species. The illegal trade in tiger parts, ivory, and rhino horns not only decimates populations but also undermines conservation efforts (*Rosen & Smith, 2010*). Antipoaching measures and enhanced enforcement are critical to curbing this threat.

Pollution and Contamination of Natural Habitats:

Pollution, including industrial discharge, agricultural runoff, and plastic waste, severely affects wildlife habitats in India. Water pollution from pesticides and heavy metals contaminates rivers and wetlands, impacting aquatic life and

terrestrial animals' dependent on these water sources (Sundar & Kittur, 2013). Plastic pollution poses significant risks to marine life, with animals ingesting or getting entangled in plastic debris. Air pollution also affects forest ecosystems, altering species composition and health (Gupta et al., 2006).

Climate Change Impacts on Wildlife:

Climate change is emerging as a significant threat to wildlife in India. Changes in temperature and precipitation patterns disrupt ecosystems and species' life cycles. For example, alterations in monsoon patterns affect the availability of water and food resources, leading to shifts in species distribution and behaviour (Chaturvedi et al., 2011). Coral reefs, which are highly sensitive to temperature changes, face bleaching events, threatening marine biodiversity (Arthur, 2000). Terrestrial species, such as the snow leopard, are also at risk as their high-altitude habitats shrink due to rising temperatures (Forrest et al., 2012). India's wildlife faces a multitude of environmental challenges that threaten their survival. Addressing these issues requires comprehensive strategies encompassing habitat protection, conflict mitigation, antipoaching efforts, pollution control, and climate change adaptation. Only through concerted efforts can the rich biodiversity of India be preserved for future generations.

Threats to Specific Wildlife Species:

Tigers: Habitat Loss, Poaching, and Human Wildlife Conflict:

India is home to a significant population of tigers, primarily found in reserves and protected areas. Despite these efforts, tigers face severe threats from habitat loss, poaching, and human wildlife conflict. Urbanization, agriculture, and infrastructure development have led to the fragmentation of tiger habitats, reducing their natural range and leading to genetic isolation (Mondol et al., 2009). Poaching remains a critical threat, driven by the high demand for tiger parts in traditional medicine and illegal trade markets (Raza et al., 2012). Additionally, tigers often venture into human settlements in search of food, leading to conflicts that result in the loss of both human and tiger lives (Karanth & Gopal, 2005).

Elephants: Habitat Fragmentation, Human Wildlife Conflict, and Poaching:

Indian elephants are similarly threatened by habitat fragmentation, primarily due to deforestation and agricultural expansion. These activities disrupt elephant migration routes, causing them to stray into human dominated areas, resulting in frequent human elephant conflicts (Sukumar, 2006). Such conflicts often lead to crop damage, property destruction, and casualties on both sides. Poaching for ivory remains a persistent problem, despite legal protections and conservation efforts. The illegal ivory trade not only reduces elephant populations but also disrupts social

structures within elephant herds (Menon & Kumar, 1999).

Indian Rhinoceros: Habitat Loss, Poaching, and Illegal Trade:

The Indian rhinoceros, primarily found in the grasslands of Assam, faces critical threats from habitat loss and poaching. Encroachment of grasslands for agriculture and human settlements significantly reduces their habitat, making it difficult for them to find food and reproduce effectively (Dinerstein, 2013). Poaching, driven by the high value of rhino horns in the black market, remains a severe threat despite strict legal protections and antipoaching measures. The illegal trade in rhino horns, believed to have medicinal properties in some cultures, continues to drive this illicit activity (Biggs et al., 2013).

Birds: Habitat Destruction, Pollution, and Climate Change Impacts:

India's avian diversity is under significant threat from habitat destruction, pollution, and climate change. Deforestation and wetland drainage for agricultural and urban development lead to the loss of critical habitats for many bird species (BirdLife International, 2020). Pollution, particularly from pesticides and industrial activities, contaminates water bodies and food sources, causing declines in bird populations (Sundar & Subramanya, 2010). Additionally, climate change alters migration patterns and breeding cycles, threatening species that rely on specific climatic conditions (Prasad et al., 2020).

Marine Life: Pollution, Overfishing, and Habitat Degradation:

Marine ecosystems in India face severe threats from pollution, overfishing, and habitat degradation. Coastal development, industrial discharge, and plastic pollution significantly impact marine biodiversity, affecting coral reefs, mangroves, and marine species (Jayasiri et al., 2013). Overfishing depletes fish populations, disrupting the marine food web and threatening the livelihoods of fishing communities (Bavinck et al., 2013). Habitat degradation, including the destruction of coral reefs and mangroves, further exacerbates the decline of marine species, which rely on these habitats for breeding and shelter (Patil et al., 2020).

Conservation Efforts and Initiatives

Legal Framework for Wildlife Conservation in India:

India has established a comprehensive legal framework to protect its diverse wildlife. The cornerstone of this framework is the Wildlife Protection Act of 1972, which provides for the protection of wild animals, birds, and plants, and establishes protected areas such as national parks and wildlife sanctuaries. Additionally, the Forest Conservation Act of 1980 regulates deforestation

and the diversion of forest land for nanoforest purposes, aiming to preserve critical habitats. The Biological Diversity Act of 2002 further complements these efforts by ensuring the conservation of biological resources and the equitable sharing of benefits arising from their use (*Ministry of Environment, Forest and Climate Change, 2020*).

Role of Government Agencies and Nongovernmental Organizations:

The implementation of wildlife conservation laws and policies in India is primarily overseen by the Ministry of Environment, Forest and Climate Change (MoEFCC) and the Wildlife Institute of India (WII). These agencies coordinate conservation programs, conduct research, and monitor wildlife populations. The National Tiger Conservation Authority (NTCA) specifically focuses on tiger conservation, implementing Project Tiger which has been crucial in stabilizing and increasing tiger populations (*NTCA, 2020*).

Nongovernmental organizations (NGOs) play a significant role in wildlife conservation efforts. Organizations such as the World-Wide Fund for Nature (WWF) India, Wildlife Trust of India (WTI), and Bombay Natural History Society (BNHS) collaborate with government agencies, local communities, and international bodies to address various conservation challenges. These NGOs conduct research, engage in habitat restoration projects, and run antipoaching campaigns, significantly contributing to the conservation landscape in India (*WWF India, 2020*).

Success Stories and Case Studies of Conservation Projects:

India has witnessed several successful conservation projects that serve as models for future initiatives. Project Tiger, launched in 1973, is one of the most prominent success stories. Through the establishment of tiger reserves and stringent antipoaching measures, the project has significantly contributed to the increase in the tiger population from approximately 1,800 in 1973 to over 2,967 in 2019 (*NTCA, 2019*).

Another notable success is the conservation of the Indian rhinoceros. The Assam government, in collaboration with various NGOs, has implemented effective antipoaching strategies and habitat management practices in Kaziranga National Park. As a result, the rhino population in the park has increased from around 200 in the early 20th century to over 2,400 today (*Kaziranga National Park, 2020*).

The return of the Gharial, a critically endangered crocodilian species, to several Indian rivers is another testament to successful conservation efforts. Through captive breeding programs and the release of Gharials into their natural habitats, their numbers have shown a

positive trend, highlighting the importance of targeted species recovery programs (*Choudhury et al., 2007*).

Challenges and Limitations in Conservation Efforts:

Despite these successes, numerous challenges and limitations persist in wildlife conservation in India. Habitat fragmentation due to urbanization, agriculture, and infrastructure development poses a significant threat to wildlife. Encroachment into protected areas and human wildlife conflicts exacerbate these issues, often leading to retaliatory killings of animals.

Funding constraints and limited resources hamper the effective implementation of conservation programs. Additionally, inadequate enforcement of wildlife laws and corruption can undermine conservation efforts. Climate change also presents a growing threat, altering habitats and affecting species' survival (*Karanth et al., 2010*).

Moreover, balancing development needs with conservation goals remains a complex issue. Ensuring community participation and addressing the socioeconomic needs of local populations are crucial for the longterm success of conservation initiatives.

Recommendations for Future Conservation Strengthening Legal Enforcement and Penalties for Wildlife Crimes:

Enhancing the legal framework and enforcement mechanisms is crucial for protecting wildlife in India. Despite stringent laws like the Wildlife Protection Act of 1972, illegal activities such as poaching and wildlife trafficking persist. Strengthening penalties and ensuring stricter enforcement can act as deterrents against such crimes. Additionally, improving training for forest officials and equipping them with advanced technologies like drones and GPS tracking can enhance monitoring and protection efforts (*Madhusudan & Mishra, 2020*).

Promoting Community Based Conservation Initiatives:

Involving local communities in conservation efforts has proven to be an effective strategy. Community based conservation initiatives not only provide alternative livelihoods to reduce dependency on wildlife resources but also empower locals to become stewards of their natural environment. Programs like the Joint Forest Management (JFM) and initiatives by nongovernmental organizations (NGOs) such as the Nature Conservation Foundation have demonstrated success in fostering community participation (*Kothari, 2018*). Scaling up these initiatives can significantly contribute to sustainable conservation outcomes.

Sustainable Land Use Planning and Habitat Restoration:

Habitat loss and fragmentation are major threats to wildlife in India. Sustainable land use planning that integrates wildlife conservation into broader developmental agendas is essential. This includes creating wildlife corridors to connect fragmented habitats and implementing reforestation projects to restore degraded areas. Policies should promote agroforestry and other land use practices that are compatible with wildlife conservation. Successful examples include the restoration efforts in the Western Ghats, which have helped revive ecosystems and improve biodiversity (*Gadgil, 2017*).

Increasing Public Awareness and Education about Wildlife Conservation:

Raising public awareness and education about the importance of wildlife conservation can foster a culture of conservation and responsible behaviour towards the environment. Educational programs in schools and communities, along with media campaigns, can help disseminate information about the ecological roles of wildlife and the threats they face. Collaborations with celebrities and influencers can further amplify these messages. Public participation in citizen science projects, such as bird counts and wildlife monitoring, can also enhance awareness and engagement (*Sukumar, 2016*).

Collaboration with International Organizations and Neighbouring Countries:

Wildlife conservation is a global challenge that requires international cooperation. Collaborating with international organizations such as the World Wildlife Fund (WWF) and the International Union for Conservation of Nature (IUCN) can bring in technical expertise, funding, and global best practices. Additionally, transboundary conservation efforts with neighbouring countries are vital for protecting migratory species and shared ecosystems. Initiatives like the South Asia Wildlife Enforcement Network (SAWEN) have shown promise in fostering regional cooperation to combat wildlife crime (*Challender & MacMillan, 2014*).

Conclusion:

India's wildlife faces significant threats from habitat loss, poaching, human wildlife conflict, and environmental pollution. Effective conservation requires a multifaceted approach that includes legal enforcement, community involvement, sustainable planning, public education, and international collaboration. Addressing these environmental issues is critical for the survival of India's diverse wildlife. Healthy ecosystems provide invaluable services such as climate regulation, water purification, and soil fertility, which are essential for human wellbeing and biodiversity conservation.

Stakeholders and policymakers must prioritize wildlife conservation in their agendas. This involves allocating sufficient resources, enacting robust policies, and fostering partnerships across sectors and borders. Active involvement from all societal sectors, including government, private sector, and civil society, is imperative. The future of wildlife conservation in India looks promising if these recommendations are implemented. With concerted efforts and a commitment to sustainable practices, India can ensure the protection and preservation of its rich wildlife heritage for future generations.

References:

1. Arthur, R. (2000). Coral bleaching and mortality in three Indian reef regions during an El Niño southern oscillation event. *Current Science*, 79(12), 1723-1729.
2. Athreya, V., Odden, M., Linnell, J. D., Krishnaswamy, J., & Karanth, U. (2015). Big cats in our backyards: persistence of large carnivores in a human dominated landscape in India. *PloS one*, 10(3), e0119071.
3. Bavinck, M., et al. (2013). "Conflicts over Natural Resources in the Global South: Conceptual Approaches." CRC Press.
4. Biggs, D., et al. (2013). "Legal trade of Africa's rhino horns." *Science*, 339(6123), 1038-1039.
5. Birdlife International. (2020). "State of India's Birds 2020: Range, trends, and conservation status."
6. Challender, D. W. S., & MacMillan, D. C. (2014). Poaching is more than an enforcement problem. *Conservation Letters*, 7(5), 484-494.
7. Chaturvedi, R. K., et al. (2011). Impact of climate change on Indian forests: a dynamic vegetation modelling approach. *Mitigation and Adaptation Strategies for Global Change*, 16, 1191-1242.
8. Choudhury, B. C., et al. (2007). Gharial Conservation in India. *Journal of Wildlife Management*.
9. Dinerstein, E. (2013). "The Return of the Unicorns: The Natural History and Conservation of the Greater One Horned Rhinoceros." Columbia University Press.
10. Fernando, P., et al. (2008). Review of human elephant conflict mitigation measures practiced in South Asia. *Gajah*, 29, 415-2.
11. Forrest, J. L., et al. (2012). Conservation and climate change: Assessing the vulnerability of snow leopard habitat to treeline shift in the Himalaya. *Biological Conservation*, 150(1), 129-135.
12. Gadgil, M. (2017). Restoring India's Western Ghats. *Biodiversity and Conservation*, 26(5), 1043-1057.
13. Gupta, A. K., Karar, K., & Srivastava, A. (2006). Chemical characterization of PM2.5 and

- PM10 in an urban area of Kolkata, India. *Atmospheric Research*, 87(1), 6272.
14. Historical Perspective on Indian Wildlife and Conservation." National Center for Biotechnology Information. [NCBI](#).
 15. Jayasiri, H. B., et al. (2013). "Quantitative analysis of plastic debris on recreational beaches in Mumbai, India." *Marine Pollution Bulletin*, 77(12), 107112.
 16. Joshi, S. K., Jadhav, S., & Sharma, R. M. (2020). Status of Environmental Pollution in India: A Review. *Air Pollution*. Intech Open.
 17. Karanth, K. U., & Gopal, R. (2005). "An ecology based policy framework for humantiger coexistence in India." *Population Ecology*, 47(3), 7989.
 18. Karanth, K. U., & Nichols, J. D. (2000). Monitoring tigers and their prey: a manual for researchers, managers, and conservationists in tropical Asia. Centre for Wildlife Studies.
 19. Karanth, K. U., et al. (2010). Conservation Challenges in India. *Biological Conservation*.
 20. Kaziranga National Park. (2020). Rhino Census Report. Kaziranga National Park.
 21. Kothari, A. (2018). Community involvement in wildlife conservation: A model from India. *Environmental Conservation*, 45(2), 132-141.
 22. Madhusudan, M. D., & Mishra, C. (2020). Enhancing the effectiveness of wildlife protection in India. *Conservation Science*, 3(1), 12-20.
 23. Menon, V. (2014). *Indian Mammals: A Field Guide*. Hachette India.
 24. Menon, V., & Kumar, A. (1999). "Signed and Sealed: The Fate of the Asian Elephant." Asian Elephant Research and Conservation Centre.
 25. Ministry of Environment, Forest and Climate Change. (2020). Annual Report. MoEFCC.
 26. Mondal, I., & Singh, R. (2018). Wildlife and climate change: a review. *Indian Forester*, 144(11), 11261135.
 27. Mondol, S., et al. (2009). "Genetic structure and diversity in recent, historically fragmented populations of the endangered Bengal tiger (*Panthera tigris tigris*)." *Molecular Ecology*, 18(5), 808818.
 28. Myers, N., et al. (2000). "Biodiversity Hotspots for Conservation Priorities." *Nature*.
 29. National Tiger Conservation Authority (NTCA). (2019). All India Tiger Estimation Report. NTCA.
 30. National Tiger Conservation Authority (NTCA). (2020). Project Tiger Overview. NTCA.
 31. Patil, V., et al. (2020). "Status and Conservation of Coral Reefs in India." In "Marine Pollution and Microbial Remediation." Springer.
 32. Prasad, R., et al. (2020). "Impact of climate change on Indian avifauna: a review." *Journal of Climate Change*, 6(2), 115.
 33. Rangarajan, M. (2001). *India's Wildlife History: An Introduction*. Permanent Black.
 34. Raza, R., et al. (2012). "Poaching of tigers in India: a national perspective." *Tropical Conservation Science*, 5(1), 7587.
 35. Reddy, C. S., et al. (2018). Quantifying the extent of deforestation and forest fragmentation in India during 2001–2010. *Environmental Monitoring and Assessment*, 190(9), 552.
 36. Rosen, G. E., & Smith, K. F. (2010). Summarizing the evidence on the international trade in illegal wildlife. *Eco Health*, 7(1), 2432.
 37. Sekhar, N. U. (2016). Forty years of deforestation and biodiversity loss in India. *Current Science*, 111(6), 10311036.
 38. Sukumar, R. (2006). "A brief review of the status, distribution, and biology of wild Asian elephants *Elephas maximus*." *International Zoo Yearbook*, 40(1), 18.
 39. Sukumar, R. (2006). A brief review of the status, distribution, and biology of wild Asian elephants. *International Zoo Yearbook*, 40(1), 18.
 40. Sukumar, R. (2016). *Living with Giants: Understanding Human-Elephant Conflict in South Asia*. National Book Trust, India.
 41. Sundar, K. S. G., & Kittur, S. (2013). Can wetlands maintained for human use also help conserve biodiversity? *Biological Conservation*, 168, 4956.
 42. Sundar, K. S. G., & Subramanya, S. (2010). "Bird use of rice fields in the Indian subcontinent." *Waterbirds*, 33(sp1), 4470.
 43. Vijayan, V. S., & Chellam, R. (2015). Wildlife forensics in India: A case study of tiger poaching. In *Wildlife Forensics: Methods and Applications* (pp. 5770). John Wiley & Sons.
 44. Western Ghats: A Global Biodiversity Hotspot. UNESCO World Heritage Centre. [UNESCO](#). India's Key Wildlife Species and Their Conservation. Wildlife Institute of India. [WII](#).
 45. Wildlife Protection Act, 1972. Ministry of Environment, Forest and Climate Change. [MoEFCC](#).
 46. WWF India. (2020). Annual Report. WWF India.