

Human-wildlife Conflict: Adaptive Coexistence Strategies

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Introduction

This article emphasizes the increasing prevalence of human-wildlife conflict globally, driven by habitat loss, climate change, and human population growth. It discusses the severe consequences for both wildlife populations and human livelihoods, highlighting the need for integrated, community-based conservation strategies. The authors stress that effective management requires a deep understanding of local social, economic, and ecological contexts to foster coexistence[1].

This review synthesizes current knowledge on human-wildlife conflict, focusing on the underlying drivers and the efficacy of various mitigation strategies. It explores both traditional and innovative approaches, including land-use planning, deterrents, compensation schemes, and community engagement. The authors conclude that successful conflict resolution requires a holistic approach that integrates ecological, social, and economic considerations, advocating for adaptive management and continuous monitoring[2].

This comprehensive review focuses specifically on conflicts involving large carnivores, which often pose significant threats to human livelihoods and safety. It examines the ecological and socio-economic factors driving these conflicts and evaluates the effectiveness of various mitigation measures, such as livestock protection, translocation, and educational programs. The article underscores the importance of public perception and stakeholder collaboration in achieving sustainable coexistence with carnivores[3].

This research investigates the patterns of human-wildlife conflict in agricultural settings, identifying key spatial and temporal variables influencing crop damage and livestock depredation. It highlights how land-use changes, seasonality, and proximity to protected areas contribute to conflict intensity. The authors suggest that understanding these dynamics is crucial for developing targeted and timely interventions to reduce economic losses for farmers while promoting wildlife conservation[4].

This study explores local community perceptions of human-wildlife conflict within and around protected areas, emphasizing how these perceptions influence conservation attitudes and behaviors. It reveals that negative experiences with wildlife can erode support for conservation efforts, underscoring the importance of addressing human needs and concerns. The authors advocate for participatory approaches that involve local communities in conservation planning and management to foster greater acceptance of wildlife[5].

This systematic review investigates the integration of local ecological knowledge (LEK) and traditional practices in addressing human-wildlife conflict. It demonstrates how indigenous and local communities often possess valuable insights into wildlife behavior and effective mitigation strategies that can complement scientific

approaches. The article argues that recognizing and incorporating LEK can lead to more culturally appropriate, sustainable, and effective conservation outcomes, enhancing community ownership and reducing conflict[6].

This comparative study examines human-elephant conflict across different regions, identifying common drivers and successful mitigation strategies. It highlights the importance of understanding elephant behavior, movement patterns, and human land-use practices. The article emphasizes that solutions often involve a combination of approaches, including habitat restoration, early warning systems, crop protection methods, and community education, all tailored to specific local contexts to foster coexistence[7].

This review delves into the economic dimensions of human-wildlife conflict, quantifying the costs incurred by human communities (e.g., crop damage, livestock loss) and the financial investments required for mitigation. It also considers the economic benefits of wildlife presence (e.g., ecotourism). The authors argue that a comprehensive economic analysis is vital for designing cost-effective conservation strategies and securing sustainable funding mechanisms to support coexistence efforts[8].

This systematic review explores the complex interplay between climate change and human-wildlife conflict, highlighting how shifting species ranges, altered resource availability, and extreme weather events exacerbate existing tensions. It discusses the emergent challenges for both human communities and wildlife, emphasizing the need for climate-adaptive conservation strategies. The authors call for proactive planning and integrated approaches to manage conflicts in a rapidly changing environment[9].

This article advocates for a truly interdisciplinary approach to human-wildlife conflict, emphasizing the necessity of integrating both social science perspectives (e.g., human behavior, governance, policy) and ecological data (e.g., wildlife population dynamics, habitat use). It argues that focusing solely on one aspect often leads to unsustainable solutions. The authors propose frameworks for combining these disciplines to develop more effective, equitable, and durable strategies for coexistence[10].

Description

Human-wildlife conflict is an intensifying global issue, primarily driven by interconnected factors such as widespread habitat loss, the pervasive impacts of climate change, and the continuous growth of human populations worldwide [1]. This escalating friction between humans and wildlife generates severe consequences, negatively affecting both wildlife populations through displacement and reduced viability, and human communities through impacts on livelihoods and overall well-

being [1]. Effectively tackling these complex interactions demands a profoundly holistic and integrated strategy. Such an approach must weave together ecological insights, social dynamics, and economic realities, all while embracing adaptive management and continuous monitoring to cultivate sustainable coexistence [2].

The nature of human-wildlife conflict often varies depending on the species involved and the specific landscape. Conflicts become particularly acute when large carnivores are present, as these animals frequently pose significant threats to human safety and economic activities, particularly livestock [3]. Mitigating these specific conflicts often involves a combination of direct measures like enhanced livestock protection, controlled translocation of problem animals, and comprehensive educational programs aimed at local communities [3]. Success in such scenarios crucially depends on understanding public perception and fostering strong stakeholder collaboration. Beyond carnivores, detailed comparative studies on human-elephant conflict across different regions underscore the critical need to comprehend intricate elephant behavior, their movement patterns, and prevailing human land-use practices [7]. Solutions in these contexts often necessitate a blend of approaches including habitat restoration, advanced early warning systems, and innovative crop protection methods, all carefully tailored to specific local environments to encourage coexistence [7]. In agricultural landscapes, the patterns of conflict are deeply influenced by key spatial and temporal variables such as land-use changes, seasonal variations, and the proximity of farms to protected areas [4]. Grasping these intricate dynamics is vital for developing targeted and timely interventions designed to reduce economic losses for farmers while simultaneously advancing wildlife conservation goals [4].

The human element forms a fundamental layer in understanding and resolving these conflicts. Local community perceptions of human-wildlife conflict, particularly within and around protected areas, are profoundly influential in shaping broader conservation attitudes and behaviors [5]. Evidence shows that negative experiences with wildlife can significantly undermine local support for conservation initiatives, powerfully underscoring the critical need to directly address human needs and concerns [5]. Consequently, proponents advocate for participatory approaches that actively involve local communities in conservation planning and management, fostering greater acceptance and ownership of wildlife initiatives. A key aspect of this engagement is the integration of local ecological knowledge (LEK) and traditional practices, which have proven highly effective in addressing human-wildlife conflict [6]. Indigenous and local communities often possess invaluable, time-tested insights into wildlife behavior and proven mitigation strategies that can powerfully complement conventional scientific approaches [6]. Recognizing and incorporating this LEK can lead to more culturally appropriate, sustainable, and effective conservation outcomes, crucially enhancing community ownership and thereby reducing conflict intensity.

A thorough understanding of the economic dimensions of human-wildlife conflict is indispensable for sustainable solutions. This includes quantifying the tangible costs incurred by human communities, such as crop damage and livestock loss, as well as the financial investments required for effective mitigation measures [8]. Equally important is considering the economic benefits derived from wildlife presence, like ecotourism, which can offset some costs [8]. The argument here is that a comprehensive economic analysis is not just beneficial, but vital for designing cost-effective conservation strategies and establishing secure, sustainable funding mechanisms to support long-term coexistence efforts. Adding to these complexities, climate change is emerging as a critical factor, systematically exacerbating existing human-wildlife tensions [9]. Shifting species ranges, altered resource availability due to extreme weather, and other climate-induced ecological changes present new challenges for both human communities and wildlife [9]. This underscores an urgent need for the development of climate-adaptive conservation strategies and proactive, integrated planning to manage conflicts effectively within an increasingly volatile environment.

Ultimately, effective resolution of human-wildlife conflict necessitates a truly interdisciplinary approach, moving decisively beyond a sole focus on either social or ecological aspects in isolation [10]. Research strongly advocates for the necessity of integrating robust social science perspectives—which encompass areas like human behavior, governance structures, and policy frameworks—with comprehensive ecological data, including wildlife population dynamics and intricate habitat use patterns [10]. The argument is clear: focusing exclusively on one discipline often results in unsustainable or short-lived solutions. By proposing and implementing frameworks that systematically combine these diverse disciplines, it becomes possible to develop more effective, equitable, and durable strategies that genuinely foster coexistence between humans and wildlife [10].

Conclusion

Human-wildlife conflict is an escalating global issue, largely fueled by habitat loss, climate change, and growing human populations. This conflict poses significant threats to biodiversity and human livelihoods, necessitating integrated, community-based conservation strategies. Effective management hinges on a deep understanding of local social, economic, and ecological contexts to foster coexistence.

Research highlights various mitigation strategies, from traditional methods like land-use planning and deterrents to innovative approaches such as compensation schemes and direct community engagement. Successful resolution requires a holistic view, integrating ecological, social, and economic considerations alongside adaptive management. Specific conflicts, like those involving large carnivores, demand tailored measures such as livestock protection and educational programs, emphasizing public perception and stakeholder collaboration.

In agricultural settings, understanding spatial and temporal conflict dynamics, including land-use changes and proximity to protected areas, is crucial for targeted interventions. Local community perceptions are vital, as negative experiences can erode conservation support, making participatory approaches essential. Furthermore, integrating local ecological knowledge (LEK) and traditional practices often yields more culturally appropriate and sustainable solutions. The economic dimensions, including costs, benefits, and funding, also play a critical role in designing cost-effective strategies. Finally, climate change is increasingly exacerbating these conflicts by altering species ranges and resource availability, underscoring the need for climate-adaptive and truly interdisciplinary approaches that combine social and ecological perspectives for durable coexistence.

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Conflict of Interest

None.

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