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Human–Wildlife Conflict in Chhattisgarh: Drivers, Case Studies, and Sustainable Coexistence Models

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Abstract:

Human–wildlife conflict (HWC) has emerged as a critical conservation and socio-economic challenge in the Anthropocene, driven by habitat loss, agricultural expansion, and human encroachment into natural ecosystems. In India, HWC manifests in diverse forms, from crop raiding by elephants in Odisha and West Bengal to livestock depredation by big cats in Maharashtra. Chhattisgarh, with its rich forest cover and biodiversity, faces unique conflict scenarios, particularly involving Asian elephants (*Elephas maximus*), leopards (*Panthera pardus*), and sloth bears (*Melursus ursinus*). Rapid mining, infrastructural growth, and agricultural expansion have intensified competition for space and resources, leading to economic losses, human injuries, and retaliatory killings of wildlife. This paper reviews the drivers, trends, and impacts of HWC with a special focus on Chhattisgarh, synthesizing case studies from across India. It further evaluates mitigation strategies—including habitat corridors, early-warning systems, compensation schemes, and community-based conservation—to propose sustainable coexistence models for the state.

Introduction:

Human–wildlife conflict (HWC) is defined as negative interactions between humans and wildlife that result in detrimental impacts on human social, economic, or cultural life, on the conservation of wildlife populations, or on the environment (Redpath *et al*., 2013). Such conflicts manifest through crop damage, livestock depredation, property destruction, and human casualties, often leading to retaliatory harm to wildlife (Treves & Karanth, 2003).

In the Anthropocene—an era marked by extensive human-induced environmental change—HWC has intensified due to habitat fragmentation, over-exploitation of natural resources, and rapid expansion of agriculture and infrastructure into biodiversity-rich landscapes (Ripple *et al*., 2017). India, with 8% of

global biodiversity, experiences complex HWC scenarios, especially with elephants (*Elephas maximus*), tigers *(Panthera tigris*), leopards (*Panthera pardus*), sloth bears (*Melursus ursinus*), and wild boars (*Sus scrofa*) (MoEFCC, 2020). Chhattisgarh, with 44% forest cover and significant tribal populations dependent on forest resources, has emerged as a major conflict hotspot (Government of Chhattisgarh, 2022).

Historical Context of Human–Wildlife Interactions:

Historically, human–wildlife relationships in India were shaped by coexistence, cultural reverence, and subsistence-based resource use. Sacred groves, traditional hunting regulations, and indigenous ecological knowledge helped maintain balance. However, colonial hunting policies (Champion & Seth, 1968) and post-independence industrialisation disrupted these dynamics. In Chhattisgarh, elephant migration from Odisha and Jharkhand was historically seasonal, but landscape changes, mining, and agricultural intensification have altered migratory routes, leading to year-round conflict in districts such as Surguja, Korba, and Raigarh.

Drivers of Human–Wildlife Conflict in Chhattisgarh:

- **Invasive Species & Habitat Degradation**: The spread of *Lantana camara* has degraded natural forage, forcing herbivores (e.g., elephants) toward human settlements, thus amplifying conflicts. Between 2019–2023, 250 people were killed, 84 injured, and over 60,000 crop-raid incidents recorded in the state.
- **Seasonal Resource Gathering**: During tendu leaf collection in Dharamjaigarh forest, villagers were attacked by wild boar, resulting in multiple injuries. Similarly, during coriander harvest, a wild bear mauled two people near Gomarda Wildlife Sanctuary.
- **Sloth Bear Encounters and Landscape Fragmentation**: In Marwahi Forest Division (Bilaspur), degraded, fragmented terrain interspersed with settlements led to 28 human deaths and 801 maulings (1990 onward), primarily by sloth bears.

Case Studies & Regional Patterns:

1. Elephant–Human Interface:

- **Radio-Collar & Early Warning Systems (EWS)**: Wildlife SOS, in collaboration with the State Forest Department, radio-collared a matriarch of a 22-member elephant herd in Mahasamund. The resulting EWS broadcasts specific location alerts every four hours, allowing timely warnings to nearby villagers.
- **AI-Based 'Elephant Tracking and Alert App'**: Deployed in Udanti Sitanadi Tiger Reserve, this AI-powered app alerts villagers within a 10 km radius via voice calls, SMS, and WhatsApp when elephant movement is detected. Since its launch, the reserve saw zero human casualties reported.
- **Hathi Mitra Community Network**: Across villages in Mahasamund (and adjacent districts),

volunteers termed *Hathi Mitras* track elephant movements and communicate alerts using WhatsApp groups and public address systems. A related outreach—*Gaj Yatra*—uses elephant-costumed vehicles to raise awareness through schools and villages.

- **Radio Bulletin Programme**: Since 2017, the state's *Hamar Haathi, Hamar Goth* radio bulletin, broadcast daily via All India Radio, informs locals of elephant locations just before evening—a high-risk period. Listener reach expanded from 450,000 to 1.2 million in five years.

2. Sloth Bears and Other Mammals:

- **Sloth Bear Attacks**: Marwahi's human–bear conflict remains serious, with fragmented landscapes contributing to frequent incidents. Sloth bear population also declined by 40% over six years, necessitating both human safety education and species monitoring.
- **Wild Boar & Forest Edge Threats**: Incidents of wild boar attacking tendu leaf collectors, and sloth bears approaching temple sites (possibly due to hunger and old age), underscore the need for on-the-ground vigilance and public safety messaging.

Species-Specific Conflict Patterns in Chhattisgarh:

Species	Conflict Type	Districts Affected	Notable Incidents
Asian Elephant	Crop raiding, property damage, human fatalities	Surguja, Jashpur, Raigarh, Korba	2022 Surguja incident with 5 human deaths
Leopard (*Panthera pardus*)	Livestock depredation, occasional attacks	Dhamtari, Rajnandgaon	2021 Rajnandgaon cattle predation case
Sloth Bear (*Melursus ursinus*)	Human injury during surprise encounters	Mahasamund, Kanker, Dhamtari	2020 Mahasamund fatal mauling
Wild Boar (*Sus scrofa*)	Crop damage (maize, paddy)	Balrampur, Koriya	Annual losses reported by Agriculture Dept.

Integrated Mitigation Strategies:

Strategy	Example & Outcome
High-Tech Early Warning	Radio collars + AI-app in USTR effectively minimize elephant incursions.
Community Networks	*Hathi Mitras* and **Volunteer Rapid Response Teams (VRRTs)** serve as ground watch and alert channels, enhancing villagers' preparedness.
Mass Communication	Radio bulletins and gaj-yatra outreach raise awareness and reduce risky behaviors.
Education & Awareness Workshops	Conducted by Wildlife SOS, these focus on elephant behavior, safe practices, fire as deterrents, and evacuation planning.
Habitat Management & Corridor Protection	Removal of *Lantana* over 4.41 lakh ha improved habitat quality; anti-poaching efforts in USTR and Sunabeda removed grazing camps threatening prey base.

Discussion & Way Forward:

Chhattisgarh exemplifies the integration of community-inclusive prevention (seed ball drives), tech-based detection (radio-collar tracking), institutional capacity-building (workshops), and landscape-level planning (corridors, tiger reserve expansion). Moving forward, recommendations include:

- **Scaling Early-Warning Across Wildlife Types:** Extending proven techniques to sloth bear and leopard hotspots using community-based mobile alerts and bulletins.
- **Accelerated Ecological Restoration:** Sustained habitat enhancement through seed ball planting and invasive species control to reduce resource-driven wildlife incursions.
- **Deepening Community Engagement:** Empowering local volunteers, Gram Panchayats, and Tribal communities in monitoring, response systems, and eco-tourism ventures.
- **Trans-state Collaboration in Conflict Zones:** Formalizing shared alert systems, data exchange, and patrol coordination with Odisha for border landscapes.

Conclusion:

In Chhattisgarh, human–wildlife conflict is a complex outcome of ecological stress and human expansion. By harmonizing habitat restoration, community awareness, technological foresight, and administrative support, the state is building a template for coexistence. Embedding these models into policy and fostering grassroots ownership will be critical for long-term resilience.

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