© JUN 2026 | IRE Journals | Volume 9 Issue 12 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I12-1718925

Human Wildlife Conflict in a Developing India: Projections, Mitigation Strategies, and Legislative Needs by 2047

DR. MUKUL BAIJAL[1], RACHIT BAIJAL[2]
[1]*Assistant Professor, Department of Zoology, Narain College, Shikohabad, Dr. B.R.A. University, Agra*
[2]*Director General, Artha-Niti Institute for Governance*

Abstract- ***Human-wildlife conflict has become a central ecological, livelihood, public safety and governance challenge in India. By 2047, the pressure points are expected to intensify because economic expansion, linear infrastructure, peri-urban growth, changing cropping systems, climate variability and the recovery of some large mammals will increasingly overlap in shared landscapes. This paper examines the contemporary Indian conflict landscape, with particular attention to elephants, tigers, leopards, wild pigs, blue bulls, bears, crocodiles, snakes and urban-adapted wildlife. It uses a scenario-based method to project conflict pathways to 2047 and argues that India cannot rely only on compensation, capture or relocation after an incident has occurred. A national transition is required from episodic conflict response to statutory coexistence planning. The analysis finds that the existing framework has important strengths, including the Wild Life (Protection) Act, 1972, Project Tiger and Elephant, the National Wildlife Action Plan 2017-2031, the National Human-Wildlife Conflict Mitigation Strategy and Action Plan, and the recent species-specific guidelines issued by the Ministry of Environment, Forest and Climate Change. However, it also identifies major gaps: fragmented data systems, uneven compensation delivery, weak corridor protection outside protected areas, inadequate integration of agriculture and insurance policy, limited legal status for rapid response teams and insufficient recognition of local communities as co-managers of coexistence. The paper recommends a 2047 legal and institutional package built around a National Human-Wildlife Coexistence Mission, a statutory conflict registry, legally secured ecological corridors, time-bound compensation and insurance, district-level rapid response units, infrastructure impact audits, local coexistence committees and a clearer procedure for handling dangerous individual animals while preserving the high protection standard of Indian wildlife law. The conclusion is that human safety and wildlife conservation need not be treated as opposing goals. They can be reconciled through landscape planning, accountable governance and community-centered risk reduction.***

Keywords: Human Wildlife Conflict, Coexistence, India 2047, Wildlife Protection Act, Elephant Conflict, Leopard Conflict, Wildlife Corridors, Compensation, Conservation Governance

I. INTRODUCTION

Human-wildlife conflict is commonly understood as the set of direct and recurring threats that arise when the presence or behaviour of wildlife affects human life, livelihood, property, crops, livestock, psychological security or public infrastructure, and when human responses produce negative consequences for wildlife or conservation institutions [1, 18]. In India, this conflict is neither a marginal rural inconvenience nor a narrow zoological issue. It is an expanding governance problem at the intersection of ecology, agrarian distress, forest administration, local policing, infrastructure development, public health, disaster management and law.

India is simultaneously a megadiverse country, a rapidly developing economy and the world's most populous nation. The country supports globally important populations of Asian elephants, tigers, leopards, rhinoceros, lions, snow leopards, crocodilians, bears, primates and numerous snakes. It also supports dense human settlements, intensive agriculture, high livestock dependence and a growing network of roads, railways, transmission lines, canals and urban corridors. The resulting interface between people and wildlife is therefore structurally large. It is expected to become more complex by 2047, the centenary year of Indian independence and the target horizon for a developed India.

Historically, conservation policy in India was designed around the protection of species and habitats, especially through protected areas, hunting prohibitions and specialized flagship programmes. This approach has helped many species recover and has positioned India as a global conservation actor. At the same time, many conflicts occur outside national parks, sanctuaries and tiger reserves, in revenue villages, agricultural fields, tea estates, sugarcane landscapes, peri-urban edges, riverine belts, wetlands and infrastructure corridors. The success of species protection has therefore created a second-generation challenge: how can a densely populated democracy sustain wildlife recovery without imposing unequal risk on forest-fringe communities, small farmers, women, pastoralists, tribal groups and local administrations?

The official picture itself shows the scale and data challenge. The Ministry of Environment, Forest and Climate Change informed Parliament in July 2025 that human-wildlife conflict incidents are reported from many parts of the country, but that such data are not collated at the Ministry level [3]. A separate 2024 parliamentary reply reported human deaths caused by elephants and tigers during recent years and stated that ex-gratia relief for death or permanent incapacitation due to wild animal attacks under central schemes had been enhanced to Rs. 10.00 lakh in December 2023 [4]. These facts point to a paradox: conflict has become a national public issue, yet India lacks a single statutory national database capable of comparing incidents, compensation, response time, repeat hotspots and animal outcomes across states.

This paper proceeds from the premise that the next phase of Indian wildlife governance must be coexistence-centered. Coexistence does not mean the absence of risk. It means a socially legitimate, scientifically informed and institutionally accountable arrangement in which human life is protected, livelihoods are compensated and adapted, wildlife is conserved, and conflicts are reduced through prevention rather than only post-event reaction. The paper asks what India must do by 2047 to move from reactive conflict mitigation to proactive coexistence governance.

II. RESEARCH OBJECTIVES

The first objective is to describe the changing structure of human-wildlife conflict in India in relation to demographic, ecological and developmental drivers. The second objective is to develop scenario-based projections for conflict pressures by 2047, while recognizing that exact forecasts are limited by inconsistent data. The third objective is to evaluate mitigation strategies that are most suitable for India's developing context. The fourth objective is to identify legislative and institutional reforms required to protect both people and wildlife over the next two decades.

The research is guided by five questions. What are the main species, landscapes and socio-economic groups affected by conflict? Which drivers are likely to intensify or reduce conflict by 2047? Which mitigation tools have the strongest prospects for scalability in India? What legal gaps prevent timely compensation, corridor security and accountable response? What should a 2047-ready national coexistence framework look like?

III. CONCEPTUAL FRAMEWORK AND METHODOLOGY

This paper uses a qualitative policy-research method supported by official statistics, legal analysis and scenario building. The documentary base includes parliamentary replies of the Ministry of Environment, Forest and Climate Change, the National Human-Wildlife Conflict Mitigation Strategy and Action Plan, the National Wildlife Action Plan 2017-2031, the Wild Life (Protection) Act, 1972, the Wild Life (Protection) Amendment Act, 2022, the Forest Rights Act, 2006, the Biological Diversity (Amendment) Act, 2023, India State of Forest Report 2023, and national status assessments of tigers and leopards [2-14]. International guidance from the International Union for Conservation of Nature, the Food and Agriculture Organization of the United Nations, the United Nations Environment Programme, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and the Intergovernmental Panel on Climate Change is used

to situate India within wider conservation trends [1, 15-18].

For the projection exercise, three scenarios are constructed. The first is a status quo scenario, in which current policies continue and conflict response improves slowly but unevenly. The second is a high-pressure fragmentation scenario, in which infrastructure, mining, peri-urban expansion, climate extremes and weak corridor protection increase the probability of encounters. The third is a coexistence transition scenario, in which India adopts statutory conflict registries, rapid response units, corridor security, compensation reform, insurance integration, early-warning systems, community governance and conflict-sensitive infrastructure planning.

The scenario method is intentionally conservative. It does not claim to predict exact annual deaths, crop losses or animal removals in 2047. Instead, it projects the direction, intensity and governance implications of conflict under different policy choices. This is appropriate because the available national data are incomplete, many state-level records are not comparable, and the Ministry itself has stated that national incident data are not collated at the central level [3]. Where numerical indications are used, they are treated as minimum indicative values rather than comprehensive national estimates.

The paper also uses a conflict pressure framework. Conflict pressure is understood as a function of habitat fragmentation, human density, crop attractiveness, livestock exposure, animal density outside protected areas, corridor obstruction, climate stress, response delay, compensation uncertainty and social trust. This framework helps to explain why similar wildlife populations may produce different levels of conflict in different districts. For example, a leopard in a sugarcane landscape with high livestock availability and poor waste management creates a different risk profile from a leopard in a large contiguous forest. Similarly, elephant conflict is strongly shaped by corridor disruption, crop palatability and the timing of human movement in forest-fringe areas.

The main limitation of this paper is that India lacks a harmonized national database that records every conflict event with date, location, species, human impact, animal impact, response time, compensation status and final legal action. The paper therefore combines official data, legal provisions and scientifically established drivers, while explicitly avoiding false precision.

IV. BASELINE: THE CHANGING GEOGRAPHY OF CONFLICT IN INDIA

Human-wildlife conflict in India is best understood as a landscape phenomenon rather than as an isolated encounter between a person and an animal. The highest risks often arise where wildlife movement routes, high-value agriculture, livestock grazing, forest dependency, fragmented habitats and weak public response systems overlap. Conflict is visible in both rural and peri-urban contexts. Elephants raid crops and cause human deaths in eastern, north-eastern, central and southern landscapes. Leopards use sugarcane fields, tea estates, degraded scrub and urban edges as cover. Tigers disperse outside reserves into territorial forest divisions and agricultural mosaics. Wild pigs and blue bulls damage crops across large parts of India. Crocodiles and gharials create riverine risks. Snakes are a major public health risk in farms and homes, although snakebite management is often institutionally separated from wildlife management. Rhesus macaques and other primates generate urban and institutional conflicts, especially where provisioning, garbage and habitat modification alter animal behaviour.

The national recovery of some species has changed the risk map. The detailed tiger estimation released in 2023 reported an average tiger population estimate of 3,682, with an upper limit of 3,925 and an annual growth rate of 6.1 percent in the preceding assessment period [6]. The leopard population estimation released in 2024 estimated 13,874 leopards across the sampled landscapes and emphasized that conservation outside protected areas is vital because rising conflict poses challenges for both leopards and communities [7]. For elephants, the 2017 official enumeration counted 29,964 elephants,

and subsequent policy discussions have recognized the importance of scientifically robust population estimation and corridor protection [8]. Recovery is a conservation achievement, but the governance question is whether India can manage dispersal, crop-raiding, livestock predation and public fear without resorting to indiscriminate removal or neglecting affected communities.

Forest and tree cover also has to be interpreted carefully. India State of Forest Report 2023 assessed total forest and tree cover at 8,27,356.95 square kilometres, equal to 25.17 percent of the geographical area [9]. While aggregate cover is important, conflict depends more on habitat quality, connectivity, forage availability and movement permeability than on headline cover alone. A district may gain plantations or tree cover but lose functional connectivity for elephants or carnivores. Linear infrastructure can split habitats even where total cover appears stable. Therefore, 2047 policy must shift from area accounting to connectivity accounting.

The National Wildlife Action Plan 2017-2031 recognized increasing human-animal conflict and emphasized species-specific and region-specific mitigation plans, community participation, training and equipment for local response [10]. The National Human-Wildlife Conflict Mitigation Strategy and Action Plan further encourages a holistic approach involving multiple departments and local stakeholders [2]. The policy direction is therefore clear. The remaining challenge is legal and administrative execution.

Table 1: Indicative Species and Conflict Typology in India

Species Or Group	Common Conflict Form	Typical Landscape	Main Governance Need
Elephant	Human injury or death, crop loss, property damage, retaliatory harm to elephants	Eastern India, North-East, Western Ghats, Central India, forest-fringe agriculture, corridors	Corridor protection, early warning, crop planning, response teams, compensation within fixed timelines
Tiger	Human injury or death, livestock predation, fear during dispersal outside reserves	Tiger reserves, territorial forest divisions, buffer areas, sugarcane and riverine mosaics	Conflict protocols, prey and habitat management, community alerts, safe capture only when legally justified
Leopard	Livestock predation, occasional human attacks, peri-urban anxiety, rescue pressure	Sugarcane fields, tea gardens, scrub, urban edges, fragmented forests	Waste and livestock management, enclosure support, science-based rescue decisions, communication strategy
Wild Pig And Blue Bull	Large-scale crop loss, farmer resentment, illegal retaliation	Agricultural mosaics, dryland farms, forest edges	Crop insurance, legal clarity, fencing support, population management based on science
Snake	Bites in farms and homes, fear-based killing, public health burden	Agricultural fields, rural homes, peri-urban settlements	Snakebite treatment, rescue networks, awareness, safe habitat management
Macaque And Urban Wildlife	Bites, food snatching, institutional nuisance, garbage-related behaviour change	Temple towns, cities, campuses, tourist sites	Waste regulation, no-feeding enforcement, sterilization only where scientific and legal standards are met
Crocodile And Riverine Wildlife	Human injury or death during fishing, bathing or water collection	Rivers, reservoirs, wetlands, village water access points	Safe access infrastructure, signage, rescue, local monitoring and compensation

© JUN 2026 | IRE Journals | Volume 9 Issue 12 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I12-1718925

V. CONTEMPORARY OFFICIAL DATA AND WHAT IT REVEALS

Official figures on human deaths provide only a partial view of human-wildlife conflict because they do not include non-fatal injury, crop damage, livestock loss, trauma, time lost, school disruption, retaliatory killing, administrative cost or ecological consequences. Nevertheless, recorded fatalities are important because they reveal the seriousness of the problem and indicate where public confidence in conservation can weaken quickly.

In the 2024 parliamentary reply on wild animal attacks, the Ministry provided annexures on human deaths caused by elephants and tigers during recent years. The elephant annexure recorded totals of 574 in 2019-20, 444 in 2020-21, 520 in 2021-22, 583 in 2022-23 and 606 in 2023-24 for the listed states, while Kerala was presented separately with elephant-related deaths ranging from 12 to 35 annually during 2019-20 to 2023-24 [4]. The tiger annexure recorded 49 deaths in 2019, 49 in 2020, 59 in 2021, 110 in 2022 and 82 in 2023, with some state entries marked as information not received [4]. These figures show that conflict cannot be dismissed as exceptional or localized.

The same reply stated that ex-gratia relief under central schemes had been enhanced from Rs. 5.00 lakh to Rs. 10.00 lakh for death due to wild animal attacks during December 2023, with Rs. 2.00 lakh for grievous injury and treatment cost up to Rs. 25,000 for minor injury [4]. This is a significant welfare measure, but it remains a response after loss. A 2047-ready system must treat compensation as one part of a broader prevention, insurance, livelihood adaptation and social trust framework.

The 2025 parliamentary reply on management of human-wildlife conflicts is equally important because it records the policy instruments already issued by the Ministry. These include a February 2021 advisory on coordinated interdepartmental action, conflict hotspot identification, standard operating procedures, rapid response teams, state and district committees, and expeditious relief payments preferably within 24 hours in cases of death and injury. It also records the June 2022 guidelines on crop damage, use of Pradhan Mantri Fasal Bima Yojana add-on coverage, promotion of unpalatable crops in fringe areas and agroforestry models. Further, species-specific guidelines were issued on 21 March 2023 for Elephant, Gaur, Leopard, Snake, Crocodile, Rhesus Macaque, Wild Pig, Bear, Blue Bull and Blackbuck [3].

This policy architecture is substantial. The weakness lies in enforceability, funding, institutional capacity and data integration. Advisories and guidelines can shape administrative practice, but they do not automatically create enforceable rights for affected households, binding duties for every department, or statutory standards for district-level response. By 2047, India will need to legalize key elements of coexistence governance.

Table 2: Selected Official Fatality Data Relevant to Human-Wildlife Conflict

Indicator	2019 Or 2019-20	2020 Or 2020-21	2021 Or 2021-22	2022 Or 2022-23	2023 Or 2023-24	Interpretation
Human deaths caused by elephants in listed state annexure	574	444	520	583	606	Annual fatalities remain high and geographically concentrated in elephant landscapes
Kerala elephant deaths reported separately	13	27	35	27	12	State-level reporting differences complicate national aggregation

Indicator	2019 Or 2019-20	2020 Or 2020-21	2021 Or 2021-22	2022 Or 2022-23	2023 Or 2023-24	Interpretation
Human deaths caused by tiger attacks in tiger annexure	49	49	59	110	82	Tiger conflict is lower than elephant conflict in absolute fatality terms but highly sensitive politically and socially
Central ex-gratia for death or permanent incapacitation	Not applicable	Not applicable	Not applicable	Enhanced in December 2023	Rs. 10.00 lakh applicable	Compensation reform has begun but needs faster delivery and better integration with insurance

VI. DRIVERS OF HUMAN-WILDLIFE CONFLICT TOWARD 2047

The first driver is habitat fragmentation. Protected areas are often too small to contain the full ecological range of elephants, tigers, leopards and other wide-ranging species. Animals use corridors, reserve forests, private lands, plantations, riverbeds and agricultural mosaics. When highways, railways, canals, mines, fences, walls, townships or unplanned tourism interrupt these pathways, wildlife movement becomes riskier and more likely to intersect with people.

The second driver is agricultural attraction. Elephants often prefer high-calorie crops such as paddy, maize, sugarcane and fruit crops. Wild pigs and blue bulls can cause significant crop loss in a single night. Leopards can benefit from livestock availability, feral dogs and cover provided by sugarcane. Cropping patterns therefore shape conflict intensity. A 2047 strategy cannot be designed only by forest departments; it must involve agriculture, horticulture, insurance, rural development and food processing departments.

The third driver is demographic and spatial transformation. India's population was estimated at 1.4639 billion in 2025 by the United Nations Population Fund [24]. Urban expansion, peri-urban sprawl and new industrial corridors will bring more people into contact with wildlife that has adapted to human-dominated spaces. An urban transformation projection for India at 2047 estimates a major rise in urban population and a much larger urban footprint [25]. The peri-urban wildlife interface will therefore be as important as the traditional forest-fringe interface.

The fourth driver is climate variability. Climate change can alter water availability, fire regimes, crop calendars, fruiting patterns, prey movement and animal dispersal. The Intergovernmental Panel on Climate Change has found that species in biodiversity hotspots already show changes in response to climate change and that geographic ranges have shifted in response to warming [15]. In practical terms, drought years, heatwaves, floods and erratic monsoon patterns can push animals toward crops, settlements and stored water.

The fifth driver is institutional trust. Human-wildlife conflict is intensified when affected communities believe that the state values animals more than human life, that compensation is slow or corrupt, that forest staff are absent during emergencies, or that local knowledge is ignored. Dickman's review of human-wildlife conflict emphasizes that social factors and perceptions strongly shape conflict outcomes [19]. Thus, even a technically sound intervention may fail if it is imposed without legitimacy.

The sixth driver is data poverty. Many conflict events are reported through paper applications, local forest registers, police information, media reports, compensation files or informal phone calls. These systems are not always linked. Without geotagged event records and standardized definitions, it is difficult to identify repeat hotspots, evaluate

mitigation spending or determine whether translocation, fencing, crop change or early warning actually reduced risk.

VII. PROJECTIONS TO 2047

By 2047, three broad pathways are plausible. The first pathway is status quo continuity. In this pathway, India continues to invest in conservation, compensation and some mitigation infrastructure, but the response remains uneven across states. Conflict persists at high levels because prevention is not fully integrated into land-use planning and agriculture. Elephant-related human deaths remain in the approximate range of recent annual figures, tiger and leopard conflicts remain politically sensitive, and crop losses continue to generate resentment in forest-fringe districts.

The second pathway is high-pressure fragmentation. In this pathway, economic growth, infrastructure and climate stress outpace corridor protection, social safeguards and local response capacity. Elephants face increased corridor bottlenecks; tigers and leopards disperse more frequently through human-dominated mosaics; wild pigs and blue bulls cause persistent crop losses; primate conflicts rise in cities and pilgrimage towns; and riverine conflicts increase where safe water access is not planned. Under such conditions, the number of conflict reports and compensation claims may rise sharply even if conservation populations remain stable.

The third pathway is coexistence transition. In this pathway, India treats conflict reduction as a statutory public safety and conservation mission. Corridors are legally mapped, infrastructure is audited before approval, compensation is automatic and time-bound, district rapid response teams are professionalized, local coexistence committees are funded, and agriculture policy reduces high-risk cropping in hotspots. Under this pathway, fatalities and crop losses can be reduced even if wildlife populations remain viable.

Scenario projections based on recent official fatality ranges suggest that, if elephant-related human deaths are treated as an indicative baseline of roughly 550 to 570 per year, a high-pressure pathway could push annual fatalities toward 850 or more by 2047, while a coexistence transition pathway could reduce the annual toll toward 350 or lower. For tiger-related deaths, a recent indicative baseline near 70 annual deaths could remain around 75 to 80 under status quo, rise toward 110 or more in high-pressure conditions, or decline toward 40 to 50 with systematic response, safer livelihood practices and better management of dispersing individuals. These are not deterministic forecasts. They are scenario estimates that show the scale of policy choice.

The most important projection is qualitative: the conflict map will expand beyond classical protected-area buffers. By 2047, major conflict zones are likely to include elephant corridors in eastern and north-eastern India, central Indian dispersal landscapes for tigers and leopards, peri-urban leopard and macaque interfaces, riverine crocodile landscapes, agricultural belts affected by wild pigs and blue bulls, and climate-stressed villages near forests and wetlands. The governance unit for conflict cannot be only the protected area. It must be the district landscape.

Table 3: Scenario-Based Conflict Outlook for India by 2047

Scenario	Core Assumption	Likely Outcome by 2047	Policy Implication
Status Quo Continuity	Current laws, advisories and compensation continue with uneven state implementation	High conflict persists; response improves in some states but national comparability remains weak	Guidelines must be converted into enforceable standards and funded district systems

© JUN 2026 | IRE Journals | Volume 9 Issue 12 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I12-1718925

Scenario	Core Assumption	Likely Outcome by 2047	Policy Implication
High-Pressure Fragmentation	Infrastructure, land-use change, climate stress and corridor loss outpace mitigation	Conflict reports, compensation claims and public hostility increase; animal removals become more frequent	Mandatory cumulative impact assessment and corridor law become urgent
Coexistence Transition	Prevention, rapid response, compensation, insurance, community participation and corridor protection are institutionalized	Human fatalities and livelihood losses decline despite continued wildlife recovery	A National Human-Wildlife Coexistence Mission becomes the central 2047 instrument

VIII. MITIGATION STRATEGIES FOR A COEXISTENCE-CENTERED INDIA

Mitigation must be organized in layers. The first layer is avoidance: preventing risky encounters through spatial planning, corridor protection, safe movement infrastructure, crop selection and warning systems. The second layer is preparedness: ensuring that communities, schools, health centres, police stations, panchayats and forest staff know what to do before an incident occurs. The third layer is response: professional rapid response, veterinary care, safe crowd control, rescue only when necessary and legal clarity. The fourth layer is recovery: compensation, insurance, livelihood repair, trauma support and community dialogue after the event. The fifth layer is learning: data analysis, public reporting and adaptive management.

For elephant landscapes, the priority should be corridor security, early warning and crop-risk reduction. Physical barriers can be useful, but they must be scientifically placed, maintained and socially accepted. Solar fencing, trenches and rail barriers may reduce conflict in some locations but can shift the problem if they block movement without providing alternative pathways. Bio-fencing, chilli-based deterrents, beehive fences, watch towers, community alert networks, geofenced radio-collars for specific herds, and night movement advisories can be combined where appropriate. The purpose should be to guide movement, not to imprison animals in fragmented patches.

For tiger and leopard landscapes, the priority should be managing dispersal, livestock exposure and public fear. Not every carnivore sighting is an emergency. Unnecessary capture can create worse conflict, especially where translocated animals attempt to return or enter unfamiliar territories. Conflict protocols should distinguish between sighting, livestock predation, repeated presence near settlements, injury and confirmed dangerous behaviour. Livestock enclosure schemes, predator-proof sheds, compensation for verified livestock kills, feral dog management, waste control and community alert systems are often more effective than repeated rescue operations.

For crop depredation by wild pigs, blue bulls and other herbivores, forest policy alone is insufficient. Agricultural extension must identify alternative crops, community fencing models, insurance products, crop guarding safety standards, community grain banks and market support for less palatable crops. The 2025 parliamentary reply specifically records that states and union territories may use add-on coverage under Pradhan Mantri Fasal Bima Yojana for crop loss due to wild animal attacks and that unpalatable crops and agroforestry models may be promoted in vulnerable areas [3]. This recommendation should be developed into a national crop-risk adaptation programme for conflict districts.

For snakes, mitigation must bridge wildlife conservation and public health. Snakebite mortality is often driven by delayed medical treatment, lack of antivenom access, unsafe housing, night-time farm work and fear-based killing. Village-level awareness, protective footwear, safe grain storage, rodent management, trained rescuers and health-centre readiness should be treated as part of the conflict

framework. The inclusion of snakes in species-specific guidelines is therefore an important policy step [3].

For urban and peri-urban wildlife, the main tools are waste management, no-feeding enforcement, urban biodiversity planning, animal-proof public infrastructure, school awareness, and clear municipal protocols. Macaque conflicts, for example, are often worsened by feeding and garbage. Leopards in peri-urban areas often exploit feral dogs and livestock. Therefore, municipal governance is a wildlife governance issue.

Technology can assist but cannot replace trust. Drones, camera traps, thermal imaging, acoustic sensors, artificial intelligence-based alerts, mobile applications, WhatsApp warning groups and predictive analytics can help identify risk. Research on conflict prediction in Maharashtra has shown the potential of predictive analysis for targeted interventions in low-resource landscapes [21]. Agent-based modelling of elephant crop raids has also shown how behaviour, crop habituation and environmental variables can be simulated to support decision making [22]. However, technology must be auditable, affordable, multilingual and embedded within local institutions.

Table 4: Mitigation Toolbox for 2047

Mitigation Tool	Best Use	Risk If Poorly Designed	2047 Recommendation
Early Warning Systems	Elephant movement, carnivore presence, floodplain crocodile alerts	False alarms reduce trust; exclusion of people without phones	Use local volunteers, public sirens, multilingual mobile alerts and offline warning channels
Physical Barriers	Targeted crop protection and high-risk settlement edges	Barrier failure, ecological blockage, injury to animals	Use only after landscape assessment and maintain with community oversight
Crop Adaptation	Elephant, wild pig and blue bull hotspots	Income loss if markets are absent	Link unpalatable crops with procurement, agro-processing and insurance
Livestock Protection	Leopard and tiger predation zones	Exclusion of small herders due to cost	Subsidize predator-proof sheds and quick livestock compensation
Rapid Response Teams	High-risk incidents requiring crowd control, rescue or veterinary decision	Ad hoc capture pressure and unsafe operations	Create statutory district teams with training, equipment and public protocols
Compensation And Insurance	Death, injury, livestock, crop and property loss	Delay, paperwork burden and under-reporting	Mandate time-bound payments, digital tracking and PMFBY add-on coverage
Corridor Protection	Elephants, tigers, leopards and other wide-ranging species	Land conflict if imposed without consultation	Legally map corridors with compensation, easements, land pooling and community incentives
Community Coexistence Committees	Village and ward-level prevention and reporting	Tokenism without budget	Fund through state wildlife plans, local biodiversity funds and district mitigation grants

IX. LEGISLATIVE AND INSTITUTIONAL NEEDS BY 2047

India's legal framework has a strong conservation foundation. The Wild Life (Protection) Act, 1972 prohibits hunting and creates a framework for protected species and protected areas. Section 11 permits exceptional action where a protected animal has become dangerous to human life or is diseased or disabled beyond recovery, subject to safeguards and written reasons [11]. The 2022 amendment rationalized schedules and strengthened the

implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) [12]. These provisions should not be weakened. However, a 2047-ready framework must supplement species protection with a statutory architecture for coexistence.

The first legislative need is a National Human-Wildlife Coexistence and Conflict Mitigation Rules framework under the Wild Life (Protection) Act, or a dedicated Human-Wildlife Coexistence Act. Such a framework should define conflict categories, reporting duties, response timelines, minimum compensation standards, animal welfare protocols, data requirements, community roles and interdepartmental responsibilities. The purpose would not be to dilute protection but to ensure that human safety and livelihood repair are legally organized.

The second need is a statutory national conflict registry. Every state should record conflict events using standardized fields: species, date, time, GPS location, village or ward, type of loss, human injury, animal injury, response time, compensation application, compensation payment date, mitigation assets present and final legal action. Data should be anonymized where needed but made available for planning and public accountability. This directly addresses the current national collation gap identified in Parliament [3].

The third need is legal recognition of ecological corridors and conflict-sensitive land-use planning outside protected areas. India's future conflicts will be decided in the spaces between protected areas. Corridors should be mapped through scientific and participatory processes, notified under appropriate legal instruments, and integrated into district land-use plans, master plans, railway planning, highway planning, mining clearances and transmission infrastructure. Corridor law should include incentives for private and community lands through conservation easements, land pooling, payments for ecosystem services and voluntary relocation where appropriate.

The fourth need is time-bound compensation and insurance law. The 2025 parliamentary reply already refers to expeditious relief payments, preferably within 24 hours in death and injury cases [3]. By 2047, this should become an enforceable standard. Death and grievous injury should trigger immediate interim relief, followed by final settlement within a fixed period. Crop and livestock loss should be linked with digital verification, panchayat certification, remote sensing where relevant and PMFBY add-on coverage. Compensation should also cover the opportunity cost of repeated crop guarding in severe hotspots.

The fifth need is statutory rapid response teams. Many conflict situations deteriorate because crowds gather, rumours spread, police and forest staff coordinate late, and veterinarians or tranquilization experts are unavailable. District-level Human-Wildlife Rapid Response Units should be legally constituted with trained forest staff, veterinary doctors, police liaison officers, community volunteers, equipment, vehicles, crowd-control protocols and after-action reporting. Their decisions should be auditable and aligned with species-specific guidelines.

The sixth need is stronger integration with the Forest Rights Act, 2006 and the Biological Diversity Act, 2002 as amended in 2023. The Forest Rights Act recognizes rights of forest-dwelling Scheduled Tribes and other traditional forest dwellers and provides a framework for rights in forest resources [13]. The Biological Diversity Amendment Act confirms the role of Biodiversity Management Committees at local body level [14]. These institutions can support conflict mapping, local ecological knowledge, habitat restoration, safe access routes and community-led monitoring if they are linked with wildlife departments and funded properly.

The seventh need is a legal protocol for translocation, captivity and last-resort lethal control. Section 11 already treats killing as an exceptional last resort for protected animals that are dangerous to human life [11]. However, states need clearer, transparent and science-based procedures to decide when capture, translocation, captivity or euthanasia is justified. These procedures must include veterinary assessment, behavioural history, public safety risk,

release-site suitability, post-release monitoring and public disclosure. Indiscriminate translocation should be avoided because it can transfer risk to another community or create poor welfare outcomes for the animal.

The eighth need is mandatory conflict audits for infrastructure. Every major highway, railway, canal, mining, renewable energy, transmission and urban expansion project in or near wildlife movement areas should include a human-wildlife conflict risk assessment, not only a biodiversity impact assessment. Mitigation should include underpasses, overpasses, fencing designed to funnel animals safely, speed restrictions, thermal warning systems, drainage-safe crossings and long-term monitoring. Project proponents should contribute to a district coexistence fund where their infrastructure increases conflict risk.

The ninth need is a jurisprudence of shared landscapes. Courts and tribunals are often approached after a crisis, when communities seek protection and conservation groups seek to prevent illegal killing or capture. A clearer statutory framework would help adjudication by defining the duties of the state, the rights of affected people, the standards for scientific decision making and the limits of emergency powers. By 2047, human-wildlife conflict should be treated as a recurring governance domain, not as a series of exceptional emergencies.

Table 5: Proposed Legislative Reform Package by 2047

Reform Area	Current Gap	Proposed 2047 Standard
National Data Registry	Conflict incidents are not collated centrally in a standardized system	Statutory geotagged registry with public dashboards and annual national reports
Compensation	Variable delays, paperwork and uneven crop or livestock valuation	Interim relief within 24 hours for death and grievous injury; final time-bound settlement; digital tracking
Corridors	Connectivity outside protected areas has weak legal protection	Legally notified ecological corridors with incentives, land-use integration and infrastructure safeguards
Rapid Response	Teams exist unevenly and often through administrative orders	Statutory district units with trained personnel, equipment, veterinary support and after-action audits
Agriculture And Insurance	Crop depredation is often outside mainstream agriculture planning	PMFBY add-on coverage, conflict-sensitive cropping schemes and market support for alternative crops
Community Governance	Local participation is often consultative rather than empowered	Village and ward coexistence committees linked to BMCs, Gram Sabhas and district wildlife committees
Dangerous Animals	Legal provisions exist but operational procedures are uneven	Transparent decision tree for capture, translocation, captivity and last-resort lethal control
Infrastructure	Project-level wildlife mitigation may not capture conflict consequences	Mandatory conflict risk audits and mitigation funding for linear and extractive projects

X. GOVERNANCE MODEL FOR A NATIONAL HUMAN-WILDLIFE COEXISTENCE MISSION

A National Human-Wildlife Coexistence Mission should be established as the institutional anchor for 2047. It should not replace existing conservation programmes. Instead, it should coordinate them with public safety, rural development, agriculture, disaster management, tribal affairs, animal husbandry, health and infrastructure ministries. The Mission should have a national secretariat, state coexistence cells and district landscape units. Funding should be outcome-linked, with states rewarded not merely for spending

on barriers or compensation but for reducing fatalities, delays, repeat incidents and retaliatory killing.

At the national level, the Mission should maintain the conflict registry, issue model rules, support predictive analytics, finance priority corridors, standardize compensation categories, commission independent audits and publish an annual State of Human-Wildlife Coexistence Report. At the state level, coexistence cells should prepare species-specific plans, train district teams, maintain equipment pools, coordinate with agriculture and insurance departments, and review high-risk infrastructure. At the district level, landscape units should map hotspots, run early warning systems, manage rapid response, verify compensation and convene local committees.

The Mission must be community-centered. Affected people should not be treated only as beneficiaries of compensation. They should be recognized as risk managers, monitors and knowledge holders. Gram Sabhas, Panchayats, Biodiversity Management Committees, women's self-help groups, school teachers, livestock keepers, forest guards and local health workers can all contribute to prevention. However, participation without budget is symbolic. Local committees should receive operational funds for warning systems, awareness, safe storage, crop protection, livestock enclosure and reporting.

The Mission should also include a scientific advisory platform. Zoologists, ecologists, veterinarians, social scientists, public policy experts, legal scholars, geographers and data scientists are required because conflict is interdisciplinary. Academic institutions and local colleges can help maintain conflict observatories, conduct field surveys, evaluate mitigation and train young professionals. This would make coexistence a national research and capacity-building agenda rather than a purely administrative burden.

XI. ETHICAL AND SOCIAL DIMENSIONS

Human-wildlife conflict raises difficult ethical questions. Conservation cannot ask the poorest households to bear the highest risks for a national or global ecological good. A farmer who loses crops repeatedly, a family that loses a wage earner, a child injured by a leopard, a woman afraid to collect water, or a livestock keeper who loses animals overnight experiences conflict as a failure of public protection. At the same time, retaliatory killing, mob violence, illegal electrocution, poisoning, snaring and indiscriminate capture undermine conservation and animal welfare. Ethical governance must recognize both harms.

A rights-based approach requires that human life, livelihood and dignity are protected without reducing wildlife to a nuisance category. This means timely compensation, honest communication, safe public infrastructure and participation. It also means that fear and anger must be addressed through trust-building rather than through denial. Conservation legitimacy depends not only on the number of animals saved but also on the fairness of the burden distribution.

The unequal burden of conflict is also a development issue. International research has emphasized that economically vulnerable communities often bear disproportionate costs of living with wildlife [20]. In India, forest-fringe communities, tribal groups, small farmers, landless labourers, women and pastoralists are often more exposed than urban beneficiaries of conservation. Therefore, coexistence policy should include livelihood support, insurance, safe access to forests and water, and recognition of community knowledge.

XII. IMPLEMENTATION ROADMAP

The roadmap to 2047 can be divided into three phases. The first phase, from 2026 to 2030, should focus on legal standardization and data. India should notify model Human-Wildlife Coexistence Rules, create the national conflict registry, identify the top 200 conflict districts, standardize compensation categories, and fund pilot district rapid response units. All species-specific guidelines should be translated into local languages and converted into field manuals.

© JUN 2026 | IRE Journals | Volume 9 Issue 12 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I12-1718925

The second phase, from 2030 to 2037, should focus on corridors, agriculture and infrastructure. Ecological corridors should be mapped and legally secured in priority landscapes. Crop insurance add-ons and alternative cropping packages should be scaled in elephant, wild pig and blue bull hotspots. New linear infrastructure in high-risk landscapes should be required to include conflict audits and mitigation finance. State agriculture universities and Krishi Vigyan Kendras should be involved in developing conflict-resilient cropping models.

The third phase, from 2037 to 2047, should focus on consolidation. The National Human-Wildlife Coexistence Mission should publish annual performance scorecards, rank states on response time and fatality reduction, and support adaptive management. Artificial intelligence and remote sensing should be used for prediction, but final decisions should remain accountable to trained officials and local institutions. By 2047, every high-conflict district should have a functioning coexistence plan, rapid response unit, compensation dashboard, corridor map and community monitoring system.

Table 6: Phased Roadmap to 2047

Phase	Period	Priority Actions	Expected Result
Phase 1	2026-2030	Model rules, national registry, top conflict districts, rapid response pilots, compensation standardization	A common national language and data architecture for conflict governance
Phase 2	2030-2037	Corridor notification, PMFBY add-ons, conflict-sensitive agriculture, infrastructure audits, district coexistence funds	Prevention becomes part of development planning
Phase 3	2037-2047	Universal district plans in high-risk landscapes, annual scorecards, predictive tools, community monitoring, adaptive legal review	Coexistence becomes a measurable public safety and conservation outcome

XIII. DISCUSSION

The central finding of this paper is that India's human-wildlife conflict problem is not caused simply by too many animals or too many people. It is caused by the unmanaged overlap of ecological movement, livelihood vulnerability and administrative delay. Where corridors are maintained, compensation is trusted, crops are adapted, warning systems function and local communities are respected, conflict can be reduced. Where development fragments habitat, response is slow, compensation is uncertain and fear is politicized, conflict escalates.

The present legal structure is strong in prohibiting hunting and protecting species, but weaker in creating enforceable prevention duties. Advisories and guidelines have advanced the policy conversation, yet the next stage requires legal codification. India does not necessarily need to weaken the Wild Life (Protection) Act. It needs to add a coexistence layer around it. This layer should make prevention, compensation, data, corridors and response legally routine.

A major policy risk is the demand for quick lethal solutions after tragic events. Public anger after deaths is understandable. However, indiscriminate killing or capture may undermine conservation, may not target the responsible animal, and may create new risks elsewhere. A transparent, evidence-based decision tree is therefore essential. The state must be able to act decisively when a specific animal is dangerous to human life, but that action must be documented, scientifically justified and legally reviewable.

Another risk is technological overconfidence. Sensors, drones and artificial intelligence can improve warning and planning, but they cannot substitute for trust, compensation, field staff and local legitimacy. A village that repeatedly reports crop loss without receiving relief will not be persuaded by a dashboard. Technology must shorten response time, reduce paperwork and improve accountability.

The future also requires urban wildlife governance. Many Indian cities and towns will become larger, greener and more connected by 2047. Without waste regulation, no-feeding rules, school awareness and municipal response protocols, conflicts with monkeys, snakes, leopards, birds and other urban-adapted species may intensify. Urban biodiversity planning should therefore be included in the coexistence framework.

XIV. CONCLUSION

Human-wildlife conflict in India is likely to become more visible, more data-rich and more politically salient by 2047. This does not mean that conflict must inevitably worsen. The future depends on whether India treats coexistence as a planned governance outcome or as a series of emergencies. The evidence reviewed in this paper shows that India has already created many important building blocks: strong wildlife law, flagship species programmes, national action plans, compensation enhancement, species-specific guidelines, forest and biodiversity institutions, and a growing scientific capacity. The missing element is integration.

A 2047-ready India should build a National Human-Wildlife Coexistence Mission, enact enforceable rules or legislation, create a national conflict registry, legally secure corridors, make compensation time-bound, integrate crop insurance and agriculture policy, professionalize rapid response teams, audit infrastructure for conflict risk and empower local communities as partners. The ethical basis of this framework is simple: people should not be abandoned in the name of conservation, and wildlife should not be destroyed in the name of development. India's conservation future depends on the ability to hold both commitments together.

By 2047, the measure of success should not be only the number of tigers, elephants or leopards. It should also be the safety of forest-fringe households, the speed of relief, the continuity of corridors, the reduction of retaliatory killing, the quality of public data and the trust between citizens and conservation institutions. Human-wildlife conflict is therefore not merely a zoological problem. It is a test of India's ecological democracy.

XV. ACKNOWLEDGEMENT

The authors acknowledge the contribution of publicly available official reports, parliamentary replies, legal texts and scientific literature that informed this research. No financial support was received for the preparation of this paper.

REFERENCES

[1] International Union for Conservation of Nature Species Survival Commission Human-Wildlife Conflict and Coexistence Specialist Group, IUCN SSC Guidelines on Human-Wildlife Conflict and Coexistence, First Edition, IUCN, 2023. https://portals.iucn.org/library/sites/library/files/documents/2023-009-En.pdf

[2] Ministry of Environment, Forest and Climate Change, Government of India, National Human-Wildlife Conflict Mitigation Strategy and Action Plan of India, 2021. https://moef.gov.in/uploads/2022/01/National-Human-Wildlife-Conflict-Mitigation-Strategy-and-Action-Plan-of-India-2.pdf

[3] Press Information Bureau, Ministry of Environment, Forest and Climate Change, Government of India, Parliament Question: Management of Human-Wildlife Conflicts, 21 July 2025. https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2146354

[4] Press Information Bureau, Ministry of Environment, Forest and Climate Change, Government of India, Wild Animal Attacks, 22 July 2024.

https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=2035046&lang=2&reg=3

[5] National Tiger Conservation Authority, Wildlife Institute of India, Status of Tigers, Co-predators and Prey in India, 2022, 2023. https://ntca.gov.in/assets/uploads/Reports/AITM/status_of_tiger-copredators-2022.pdf

[6] Press Information Bureau, Ministry of Environment, Forest and Climate Change, Government of India, India Tiger Estimation 2022: Release of the Detailed Report, 29 July 2023. https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1943922

[7] Press Information Bureau, Ministry of Environment, Forest and Climate Change, Government of India, India Conducts Fifth Cycle Leopard Population Estimation, 29 February 2024. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2010001

[8] Ministry of Environment, Forest and Climate Change, Project Elephant Division, Proceedings of the 3rd Meeting of the CPEMC, 2023. https://moef.gov.in/uploads/2023/05/Proceeding-of-the-3rd-meeting-of-the-CPEMC.pdf

[9] Forest Survey of India, India State of Forest Report 2023, Volume 1, 2024. https://fsi.nic.in/uploads/isfr2023/isfr_book_eng-vol-1_2023.pdf

[10] Ministry of Environment, Forest and Climate Change, Government of India, National Wildlife Action Plan 2017-2031, 2017. https://ntca.gov.in/assets/uploads/Reports/Others/Wildlife_Action_Plan_2017_31.pdf

[11] Government of India, The Wild Life (Protection) Act, 1972, as amended. https://www.indiacode.nic.in/bitstream/123456789/6198/1/the_wild_life_%28protection%29_act%2C_1972.pdf

[12] PRS Legislative Research, The Wild Life (Protection) Amendment Act, 2022, 2022. https://prsindia.org/files/bills_acts/acts_parliament/2022/The%20Wild%20Life%20%28Protection%29%20Amendment%20Act%2C%202022.pdf

[13] Ministry of Tribal Affairs, Government of India, Forest Rights Act, 2006. https://tribal.nic.in/fra.aspx

[14] Gazette of India, The Biological Diversity (Amendment) Act, 2023, 3 August 2023. https://egazette.gov.in/WritereadData/2023/247815.pdf

[15] Intergovernmental Panel on Climate Change, Climate Change 2022: Impacts, Adaptation and Vulnerability, Cross-Chapter Paper 1: Biodiversity Hotspots, 2022. https://www.ipcc.ch/report/ar6/wg2/chapter/ccp1/

[16] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services, 2019. https://files.ipbes.net/ipbes-web-prod-public-files/inline/files/ipbes_global_assessment_report_summary_for_policymakers.pdf

[17] United Nations Environment Programme, Human-Wildlife Conflict One of the Greatest Threats to Wildlife Species, WWF and UNEP Report, 8 July 2021. https://www.unep.org/news-and-stories/press-release/human-wildlife-conflict-one-greatest-threats-wildlife-species-wwf

[18] Food and Agriculture Organization of the United Nations, Human-Wildlife Conflict, Protected Areas Portal, 2023. https://www.fao.org/wildlife-protected-areas/main-themes/human-wildlife-conflict/en

[19] Dickman A.J., Complexities of Conflict: The Importance of Considering Social Factors for Effectively Resolving Human-Wildlife Conflict, Animal Conservation, 2010, 13 (5), 458-466. https://doi.org/10.1111/j.1469-1795.2010.00368.x

[20] Braczkowski A.R., et al., The Unequal Burden of Human-Wildlife Conflict, Communications Biology, 2023, 6, 182.

https://www.nature.com/articles/s42003-023-04493-y

[21] Ghosh S., et al., Facilitating Human-Wildlife Cohabitation Through Conflict Prediction, arXiv, 2021. https://arxiv.org/abs/2109.10637

[22] Purathekandy A., Oommen M.A., Wikelski M., Subramani D.N., An Agent-Based Model of Elephant Crop Raid Dynamics in the Periyar-Agasthyamalai Complex, India, arXiv, 2024. https://arxiv.org/abs/2404.09024

[23] Jiang W., Yang Y., Isukapalli Y., Elephant-Human Conflict Mitigation: An Autonomous UAV Approach, arXiv, 2022. https://arxiv.org/abs/2201.02584

[24] United Nations Population Fund, India Population 2025, World Population Dashboard, 2025. https://www.unfpa.org/data/world-population/IN

[25] Jain A.K., Urban Transformation for India @ 2047, Indian Institute of Public Administration, 2023. https://www.iipa.org.in/publication/public/uploads/article/27911712048129.pdf