भारतीय वन्यजीव संस्थान
Wildlife Institute of India

HUMAN ELEPHANT CONFLICT IN THE STATE OF ODISHA

INDIA (2000 - 2025)

TRENDS, CHALLENGES & INSIGHTS

Final Project Report
TR-0042-2026

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EXECUTIVE SUMMARY

Odisha supports an important Asian elephant population within the east-central Indian elephant landscape. Across the state, elephant habitats and movement routes overlap with forests, croplands, settlements, mines, industries, roads, railways and electrical infrastructure. This study analyzed official Odisha Forest Department records from **2000** to **2025** to assess elephant mortality and human casualties, identify temporal and spatial hotspots, examine demographic and seasonal patterns, and assess the landscape factors associated with recorded mortality and conflict.

The Landscape in Numbers

912 (579-1246)
Wild Elephants (SAIEE-2025)

25 YEARS
Study Duration (2000-2025)

45 *Forest Divisions*

TOTAL AREA
155707 KM^2

Priority Areas and Management Implications

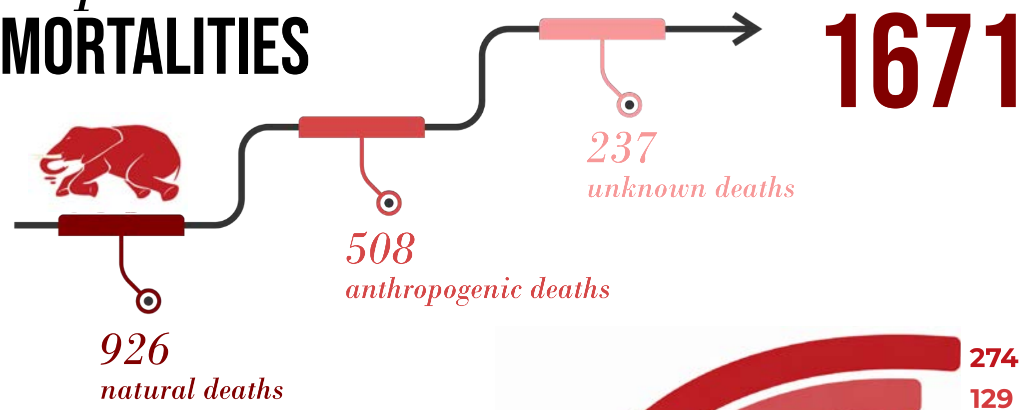
The combined results identify Dhenkanal, Athagarh, Angul, Keonjhar, Bonai and Rourkela as major priority landscapes. Management in these divisions should address the close overlap of forests, agriculture, settlements, mining, transport and electrical infrastructure. Similipal, Satkosia, Baripada and Balasore require strong disease surveillance, carcass detection and forest-village preparedness, while Sambalpur, Deogarh, Bargarh, Bamra and Redhakhol require targeted attention to electrocution, transport crossings and elephant movement alerts.

The principals recommended actions are:

1. Prioritise crossing structures as permanent mitigation measures alongside site-specific technological interventions.
2. Discourage live-wire fencing for crop protection, rectify electrical hazards and promote non-lethal alternatives.
3. Protection of habitat connectivity, including critical elephant movement bottlenecks, should receive greater attention.
4. The cumulative effects of mining, industries and infrastructure development on elephant movement should be considered during planning and project appraisal.
5. Community early-warning networks in recurrent hotspots should be further strengthened.
6. Rapid Response Teams should receive adequate support, alongside improved crowd management and safer crop-guarding practices.
7. Barriers should be limited to defined sites, with clear responsibility for their inspection and maintenance.
8. Interdepartmental coordination may be strengthened through defined responsibilities and regular compliance reviews.
9. Timely access to compensation, emergency medical care, rehabilitation and livelihood support should be facilitated for affected households.

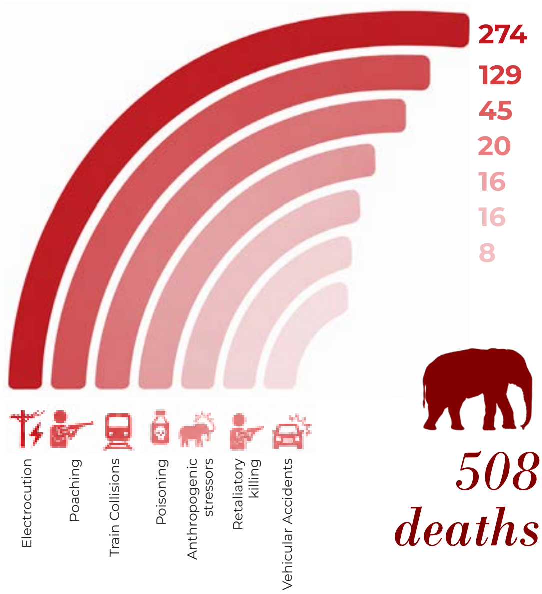
Reducing elephant deaths and human casualties in Odisha requires coordinated action across key departments and local communities. Annual hotspot assessments, geospatial monitoring, and targeted interventions in high-risk landscapes are essential to improve human safety while conserving elephant movement.

Elephant MORTALITIES

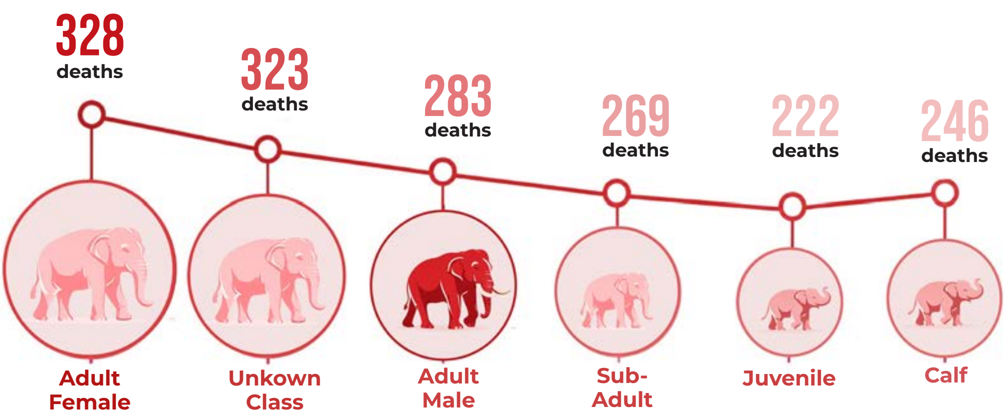


Anthropogenic DEATHS

Anthropogenic mortality occurred in every season but was highest during the southwest monsoon (163 deaths), followed by the post-monsoon (142), winter (121) and summer (82).



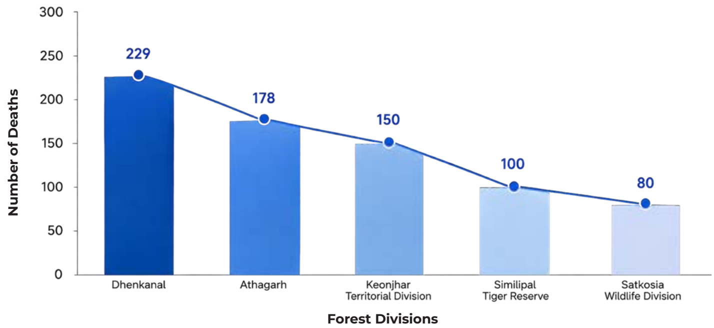
Age-Class DEMOGRAPHY



Spatial Distribution of

OVERALL ELEPHANT MORTALITY

These divisions were identified as major elephant-mortality hotspots.



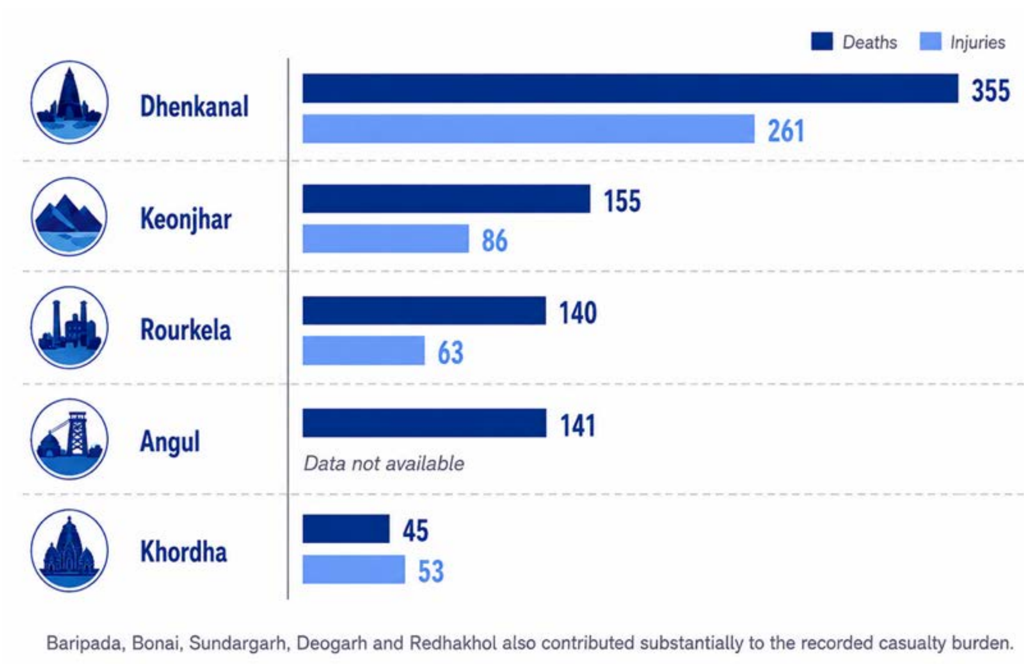
The best-supported mortality model (Akaike weight = 0.962) showed higher anthropogenic mortality near built-up areas, croplands, forests, mines, protected areas and railways, with mines showing the strongest association.

Human Fatalities

AND INJURIES

1677 *Human fatalities* *565* *Human injuries*

The highest annual total occurred in 2023, when 243 incidents were recorded, including 175 deaths and 68 injuries.



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INTRODUCTION

Adverse human-elephant interactions are a significant conservation concern across Asia and Africa, often resulting in crop and property damage, human casualties, and elephant mortality (Hoare, 2000; Shaffer *et al.,* 2019). Across elephant range countries, this interface has intensified under land use change that has reduced habitat area, fragmented movement corridors, and increased elephant use of cultivated and settled landscapes (Osborn and Parker, 2003; de Silva *et al.,* 2023). Elephants are increasingly attracted to cultivated crops and other food resources associated with human land use, making crop raiding one of the most widespread forms of conflict in developing landscapes (Sukumar, 1990; Webber *et al.,* 2011). Conflict risk follows spatial patterns linked to forest proximity, settlement structure, and broader landscape composition, highlighting the need for coexistence strategies (Gubbi, 2012; Pandey *et al.,* 2026a). The extent and consequences of conflict also vary across landscapes depending on ecological conditions, land-use patterns, and local socio-cultural factors (Naha *et al.,* 2019).

India supports the largest remaining population of wild Asian elephants, estimated at 22,446 individuals (range: 18,255-26,645), accounting for approximately 60% of the global wild Asian elephant population (Qureshi *et al.,* 2025). HEC persists where elephant ranges overlap densely settled landscapes, with incidents often concentrated near villages, forest refuges, and other human-used areas (Wilson *et al.,* 2015; Pandey *et al.,* 2024a). HEC in these landscapes involves recurrent crop depredation, property damage, human casualties, and elephant deaths, driven by landscape composition, crop availability, settlement patterns, and forest proximity (Thant *et al.,* 2021). HEC also imposes serious livelihood burdens on rural households through crop loss, labor diversion, persistent insecurity, and the need to guard fields and settlements in severely affected areas (Barua *et al.,* 2013). Collectively, these patterns indicate that HEC in India is more clearly understood as a landscape scale coexistence challenge in multifunctional rural environments than as a series of isolated local events (Natarajan *et al.,* 2025).
The distribution of wild elephants in India spans four major landscapes: the Shivalik and Gangetic Plains, Central India and the Eastern Ghats, the Western Ghats, and the North Eastern Hills and Brahmaputra Flood Plains (Qureshi *et al.,* 2025). Differences among these landscapes in biogeographic features, habitat connectivity, and human land use

contribute to regional variation in elephant distribution, ecological dynamics, and conservation challenges (Baskaran *et al.,* 2011). In the east-central Indian landscape, Odisha is one of the most important elephant-inhabited regions. The 2024 state census recorded approximately 2,103 elephants (State Wildlife Organization, Odisha, 2024), whereas the DNA-based All India Population Estimation reported a lower estimate of 912 individuals, with a range of 579-1,246 (Qureshi *et al.,* 2025). In Odisha, elephant habitats are interspersed with settlements, agricultural land and other human-modified areas, making the state important for understanding the ecological and management dimensions of HEC (Debata *et al.,* 2013).

Historical administrative records indicate that negative human elephant interactions have affected rural livelihoods in Odisha since colonial period. William Wilson Hunter, a British Indian civil servant and statistician, recorded elephant related crop losses and damage to crop storage structures in Mayurbhanj, Keonjhar, Athmallik, Angul and Dhenkanal in nineteenth century (Hunter, 1877). Subsequent gazetteers documented severe crop damage in forest adjacent areas of Angul and Sambalpur (O'Malley, 1908, 1932). These impacts persist today through recurrent crop raiding, which affects household livelihoods and food security in communities affected by human elephant conflict (Guru & Das, 2021).

Beyond these administrative reports, historical ecological accounts also describe seasonal elephant movements, particularly during the rainy season, and recurring incursions into cultivated areas (Mooney, 1929; Sanderson, 1879). These observations suggest that conflict developed through long-standing spatial overlap between elephant movement routes and agricultural land, rather than from recent development alone (Sahu & Das, 2012). Subsequent land-use change and habitat fragmentation have further influenced the distribution and intensity of these interactions and now constitute important drivers of HEC (Tripathy *et al.,* 2021a). Odisha therefore demonstrates how an established human elephant interface has been intensified due to modern landscape transformation.

These changes are closely linked to long term habitat modification across east central India. The east-central elephant range, comprising West Bengal, Jharkhand, Chhattisgarh and Odisha, is among India's most fragmented landscape, with its core forest area declining by approximately 39.6% between 1930 and 2013 (Padalia *et al.,* 2019). As habitats become increasingly fragmented and isolated, elephants more frequently cross agricultural land, roads, settlements and industrial areas to move between habitat patches and access resources (Chaiyarat *et al.,* 2023). Mining in Odisha has reduced ecosystem services and affected agriculture, forest-dependent livelihoods and human health (Hota & Behera, 2016). Mining, settlements and transport infrastructure also constrain elephant movement, increasing elephant use of human-dominated areas (Tripathy *et al.,* 2021b; Pandey *et al.,* 2024b). This increases the risk of crop damage and human casualties while exposing elephants to electrocution, train collisions and other anthropogenic causes of mortality (Pandey *et al.,* 2025a). Thus, HEC in Odisha reflects both habitat loss and declining connectivity across a fragmented, human-modified landscape (Palei *et al.,* 2024).

Elephant mortality from human-induced causes is a critical conservation concern in Odisha, reflecting both immediate demographic losses and increasing exposure to anthropogenic threats (Palei *et al.,* 2021). Mortality therefore provides an important measure of conservation risk, with implications for population persistence and long-term stability (Goswami *et al.,* 2014). Across Asian elephant range countries, mortality patterns by cause, demographic class, location and time reveal differences in vulnerability among demographic groups and regions (LaDue *et al.,* 2021). In Odisha, analyzing these patterns is important for identifying major mortality sources, vulnerable demographic groups and areas with high concentrations of elephant deaths.

Human casualties are among the most serious and socially visible consequences of HEC in Odisha, affecting public safety and rural livelihoods (Guru & Das, 2021). Odisha's elephant habitats and movement areas extend across the Northern Plateau, Central Region, Eastern Ghats and parts of the coastal belt, creating geographically diverse interfaces between elephant movement and human land use (Palei *et al.,* 2024). As a result, human casualties remain a persistent outcome of recurring elephant presence in cultivated and settled areas across the state. In Odisha, human casualties are concentrated in agrarian forest-edge regions, where paddy cultivation and settlements near forests increase human-elephant encounters as elephants forage in crop fields and adjoining villages (Pradhan *et al.,* 2013). Habitat suitability and connectivity assessments show that, although suitable habitat persists across parts of Odisha, its continuity depends on fragile linkages that are becoming increasingly difficult for elephants to use safely (Palei *et al.,* 2024). New conflict hotspots are also emerging around settlements, agricultural lands and infrastructure corridors where land-use pressure and human activity coincide with elephant movement (Wang *et al.,* 2025; Tripathy *et al.,* 2021; G *et al.,* 2026).

Addressing these challenges requires integrated landscape management that combines corridor protection, habitat restoration, safer infrastructure and land-use planning, early warning systems and rapid response (Pandey *et al.,* 2025b; Muliya *et al.,* 2026). In the absence of such measures, conflict in Odisha is likely to persist as a major consequence of the interaction between elephant ecology and rural land use change in eastern India. Current understanding of HEC in Odisha is derived mainly from geographically localized studies of specific forest divisions, elephant movement corridors, crop depredation, interstate movement, electrocution and conflict hotspots (Tripathy *et al.,* 2021a; Palei *et al.,* 2014). Although these studies provide important local insights, integrating their findings could provide a more comprehensive understanding of landscape-scale conflict dynamics across Odisha's diverse elephant landscapes (Mohanty & Khuntia, 2015).

The present study addresses this gap by assessing human elephant interactions in Odisha using long-term elephant mortality and human casualty records compiled from records of the Odisha Forest Department covering 2000-2025. It examines temporal patterns, spatial distribution, and the influence of landscape and anthropogenic factors to identify persistent conflict-prone areas and conditions associated with elevated risk. This state level assessment is intended to strengthen mitigation planning, improve corridor management, prioritize interventions in vulnerable areas, and support effective coexistence strategies across an important elephant bearing landscape in eastern India. Specifically, the study examines:

1. How have the causes of human and elephant mortality and human injury, and their spatial distributions across Odisha, changed during 2000-2025?

2. Is there a significant association between the age and demographic characteristics of deceased elephants and specific causes of mortality, with a focus on anthropogenic stressors?

3. How have changes in land use and land cover (LULC) during this period potentially influenced these mortality patterns?

By integrating ecological, spatial, and conflict related perspectives, the study provides a stronger basis for understanding the patterns and determinants of HEC in Odisha. Such an understanding is essential for improving mitigation planning, reducing both elephant and human deaths, and informing corridor management, land-use planning, and long-term conservation strategies in an increasingly fragmented elephant landscape.

Photo: Anshuman Gogoi.

Photo: Anshuman Gogoi.

STUDY AREA

The state of Odisha is located on the eastern coast of India, extending between latitudes 17°49' N and 22°34' N and longitudes 81°27' E and 87°29' E, and covers a geographical area of approximately 155,707 km². Odisha supports one of the most important elephant populations in the eastern Indian elephant landscape and contains a major proportion of elephant habitat within this region (Mohanty & Khuntia, 2015). Its physiography is diverse, comprising the Eastern Ghats hill ranges, plateaus, river systems, and coastal plains, with substantial elephant habitat occurring across northern and central districts such as Mayurbhanj, Keonjhar, Angul, Sundargarh, Dhenkanal, and Sambalpur (Palei *et al.,* 2024). Earlier ecological accounts described these landscapes as structurally suitable for wide-ranging herbivores because of extensive forest cover, bamboo forest, and perennial water sources (Mooney, 1929).

Odisha experiences a tropical monsoon climate with marked seasonal variation in rainfall and temperature, conditions that influence both agricultural activity and elephant movement (Palei *et al.,* 2016). A large proportion of the population depends on agriculture, especially paddy cultivation, and many cultivated areas occur along forest fringes and historical elephant routes, creating extensive zones of overlap between human land use and elephant habitat (Pradhan *et al.,* 2013).

Odisha had a population of 41.97 million, with a population density of 270 persons per km² and approximately 83.3% living in rural areas; Scheduled Tribes constituted about 22.8% of the population and comprised 62 recognized communities (Census of India, 2011; Kshatri *et al.,* 2023). Across Odisha's elephant range, the proximity of rural settlements, farmland and forests increases human-elephant interactions, with cultivation and marginal agriculture positively associated with HEC (Tripathy *et al.,* 2022).

During recent decades, mining, industrial expansion, agricultural growth, roads, railways, irrigation systems, and power infrastructure have substantially altered elephant habitat and disrupted traditional movement pathways across the state (Padalia *et al.,* 2019). In districts such as Keonjhar and adjacent industrial belts, habitat modification has been associated with shifting conflict patterns and increasing elephant use of human dominated areas (Tripathy *et al.,* 2021b). Human elephant conflict in Odisha is spatially heterogeneous but consistently pronounced in several northern and central forest divisions, where recurring crop loss, house damage, and human casualties have been documented over extended periods (Mohanty & Mishra, 2017). An important feature of conflict in Odisha is the role of interstate elephant movement, particularly from neighbouring states such as West Bengal and Chhattisgarh under conditions of fragmentation and reduced corridor functionality (Palei *et al.,* 2016).

These cross-border movements frequently introduce elephants into landscapes with limited preparedness and intensify conflict in border regions (Palei *et al.,* 2017). The socio-economic burden of HEC falls largely on marginal and smallholder farming households that experience repeated crop loss, damage to houses, and human casualties (Guru & Das, 2021). Studies from Odisha identify crop raiding as the most frequent and economically damaging form of conflict, with direct implications for food security and household stability (Nayak & Swain, 2022). As part of the east-central Indian elephant landscape, Odisha is linked to broader regional patterns of elephant mortality and human casualties documented in neighboring conflict-prone landscapes of central India. (Pandey *et al.,* 2025 a; Roy *et al.,* 2025).

Photo: Anshuman Gogoi.

METHODS

Collection of HEC Occurrences

Records on Human-Elephant Conflict (HEC) incidents was compiled from 45 Forest Divisions of Odisha covering the period 2000 to 2025. The dataset included detailed records of elephant mortality due to both natural and anthropogenic causes and human fatalities and injuries caused by wild elephants, along with associated variables such as division name, village name, date of incident, gender of the victim, and contextual notes provided by field staff. All data were obtained directly from the Odisha Forest Department, and divisional authorities cross verified the entries to ensure completeness and accuracy. Only officially documented and field confirmed cases were included in the final dataset to maintain data reliability for spatial temporal analysis.

Categorization of Datasets

A comprehensive database of elephant mortality cases in Odisha was compiled for the period 2000-2025. For temporal analysis, the records were organized into five reporting periods: 2000-2005, 2006-2010, 2011-2015, 2016-2020 and 2021-2025. These were categorized into human-induced causes and natural causes, following the classification system used by the Odisha Forest Department. For each mortality incident, the following parameters were compiled: (1) cause of death, (2) timing of the incident (year, month, and season, monsoon, post-monsoon, summer, and winter), (3) forest division where the death occurred, and (4) age and demographic characteristics of the deceased elephant.

For both elephant-mortality and human-casualty analyses, seasons were defined as summer (March-May), southwest monsoon (June-September), post-monsoon (October-November) and winter (December-February).

Elephant mortality was classified into 10 broad categories, within this broad natural mortality category, deaths were further classified into three mutually exclusive subcategories: disease, natural causes, and territorial fights. Natural causes included non-disease physiological and environmental factors such as old age, heart failure, malnourishment, heat stress, dehydration, stillbirth, and neonatal mortality, whereas disease-related deaths involved diagnosed or suspected pathological conditions. Territorial fights included deaths resulting from interactions between elephants. These three subcategories were presented separately in the descriptive summaries and statistical analyses (Table 1.1) but were collectively treated as natural mortality at the broader classification level.

Therefore, the dataset contained 12 specific cause categories corresponding to 10 broad mortality categories. Accidental deaths included drowning, lightning strikes, falls from cliffs or steep terrain, and entrapment in natural obstacles. Human-casualty records were classified separately as either fatalities or injuries. Chi-square tests were performed in R version 4.3.1 to examine variation in anthropogenic elephant mortality among cause categories, demographic classes and seasons. Records with unknown demographic information were excluded from tests involving demographic classes. Elephant age classes followed Arivazhagan and Sukumar (2008): calves (0-1 year), juveniles (1-5 years), sub-adults (6-15 years) and adults (≥16 years).

This analytical framework was used to identify vulnerable demographic groups and highlight patterns relevant for targeted conservation interventions in Odisha.

Table 1.1: *Classification of elephant mortality causes recorded in Odisha during 2000-2025.*

Main category	Subcategories	Examples
Natural	Disease; Natural Physiological causes; Territorial fights; Accidental	Disease: Anthrax, acute fascioliasis, endoparasitism and other recorded diseases.
		Natural Physiological causes: Stillbirth, old age, heart failure, malnourishment, heat stress, dehydration and neonatal mortality.
		Territorial fights: Injuries sustained during fights between elephants, including tusk-related injuries.
		Accidental: Drowning, lightning strikes, falls from hills or steep slopes and entrapment in natural obstacles.

Anthropogenic	Electrocution; Poaching; Train accidents; Poisoning; Anthropogenic stressors; Retaliatory killing; Road accidents	Electrocution: Illegal electrical lines, low-hanging wires, live-wire fencing and exposed electrical conductors.
		Poaching: Ivory removal, snares, traps and other poaching-related injuries.
		Train accidents: Collisions between elephants and trains.
		Poisoning: Poisoned bait, pesticide exposure and other confirmed poisoning incidents.
		Anthropogenic stressors: Entrapment in wells, open tanks, canals, trenches, drains and other human-made structures.
		Retaliatory killing: Direct attacks and other deliberate killings following crop or property damage.
		Road accidents: Collisions with trucks, cars or other motor vehicles.
Unknown	Undetermined causes	Decomposed carcasses, insufficient field evidence or inconclusive post-mortem findings.

Land Use and Land Cover (LULC) Change Analysis

LULC analysis was conducted for Odisha during 2000-2025 to examine how landscape transformation was associated with patterns of elephant mortality and human elephant conflict incidents. Satellite-based LULC maps were generated for 2000, 2005, 2010, 2015, 2020 and 2025. Google Earth Engine (GEE) was used for image preprocessing, classification, and temporal comparison. ArcGIS Pro was used for sub-setting the Odisha study area, raster dataset compilation, fragmentation analysis, distance calculations (e.g., distance to settlements, plantations, water bodies, roads), and map preparation. Landsat imagery was classified using a Random Forest (RF) classifier from the "smileRandomForest" library (Bhungeni *et al.*, 2024), with six spectral bands (blue, green, red, near-infrared, and two shortwave infrared bands). The spatial resolution was maintained at 30 m, and data were projected to UTM Zone 45N for Odisha.

10 major LULC categories were mapped: (1) Forest (2) Water bodies, (3) Barren/ open land, (4) Crop land, (5) Human settlements, (6) Scrub land, (7) Grass Land, (8) Mangrove, (9) Plantation, (10) Non-Forest Tree Cover. Temporal LULC changes across the study period were analysed to quantify habitat loss, fragmentation and the expansion of human-modified land uses. Particular emphasis was placed on areas showing increases in agriculture, settlements, and plantations, as these transitions are closely linked to conflict-prone zones and elephant movement pathways in Odisha. A multi-temporal comparison (Fig. 1.1) highlights how land-use transitions correlate with spatial patterns of elephant mortality, providing insights for landscape-level conservation planning.

LULC layers for Odisha for 2000 and 2025 were used to calculate the fragmentation metrics Largest Patch Index (LPI) and Edge Density (ED). A 7 km × 7 km fishnet grid was overlaid on the fragmentation layers, and LPI and ED values were reclassified into five classes: Very Low, Low, Medium, High, and Very High. For LPI, higher classes indicate larger and more continuous forest patches, whereas lower classes indicate greater fragmentation. Conversely, higher ED classes represent greater forest fragmentation due to increased edge density, while lower classes indicate more compact and less fragmented forest landscapes. The proportion of each fragmentation class within every 7 km × 7 km grid was calculated and summarized as percentages to compare changes in forest fragmentation between 2000 and 2025 and to assess changes in forest landscape dynamics across Odisha.

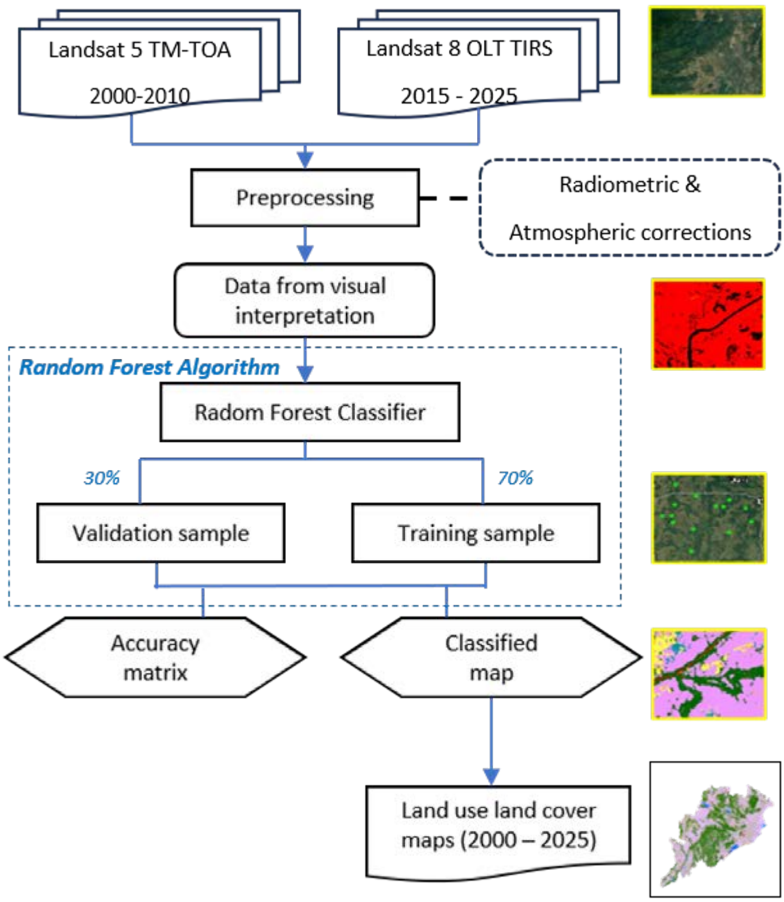

Figure 1.1: *Land use and land change pattern methodology flowchart for the state of Odisha.*

Spatial Distribution of Elephant Mortality

Elephant mortality incidents in Odisha were georeferenced using GPS coordinates and systematically mapped to examine their spatial distribution patterns across the state. A heat map was generated using R (version 4.3.1) to investigate the relationship between mortality frequency and geographic location. Kernel Density Estimation (KDE) was applied to identify zones with elevated mortality intensity, enabling the visualization of spatial hotspots where elephant deaths were disproportionately concentrated (Poledník *et al.,* 2023). Administrative boundaries, divisions, and village limits, were used as primary spatial units to contextualize mortality patterns and evaluate spatial clustering across the major elephant bearing landscapes of Odisha.

Landscape Fragmentation Analysis

Landscape fragmentation in Odisha was assessed using FRAGSTATS (version 4.2) with LULC data reclassified into two primary categories: forest and non-forest. Key landscape metrics, including Patch Density (PD), Edge Density (ED), and Largest Patch Index (LPI), were computed to quantify forest structure across the five temporal intervals (2000, 2005, 2010, 2015, 2020, 2025). These metrics provided insights into the degree of habitat fragmentation, changes in forest patch configuration, and implications for habitat connectivity across Odisha's elephant ranges (Table 1.2).

Fragmentation metrics were further examined to assess their potential influence on elephant mortality patterns across divisions. Spatially explicit maps of PD, ED, and LPI were generated to visualize fragmentation gradients and to identify high-risk zones where reduced habitat connectivity may contribute to increased elephant movement into human-dominated landscapes. This analysis forms an important basis for understanding how changing land-use patterns affect elephant ecology and conflict risk in Odisha.

Table 1.2: *Landscape Metrics: Definitions and Computational Formulas*

Landscape Metric	Description	Formula
Patch Density (PD)	Number of patches per unit area	PD = (N / A) × 10,000 × 100
Edge Density (ED)	Total edge length per unit area	ED = (Σe_{ik}/A) × 10,000
Largest Patch Index (LPI)	Percentage of total landscape area comprised by the largest patch	LPI = (max(a_{ij}) / A) × 100

Where: N = number of patches, A = total landscape area (m^2), Σe_{ik} = sum of all edge lengths, $max(a_{ij})$ = area of the largest patch, i, j, k = patch/edge identifiers, Units: PD (patches/100 ha), ED (m/ha), LPI (%)

Predictors of Elephant Mortality

To examine landscape factors associated with anthropogenic elephant mortality, a generalized linear model (GLM) with a binomial distribution and logit link was fitted in R version 4.3.1. The analysis included 508 anthropogenic elephant-mortality incidents, with each mortality location coded as 1. An equal number of pseudo-absence locations (n = 508), coded as 0, were randomly sampled from non-mortality landscape units within the same study extent in Odisha, excluding locations with recorded mortality events. The final dataset therefore comprised 1,016 observations including pseudo points. The total 1,671 elephant deaths were included in the descriptive mortality analysis but not in the GLM.

The initial predictor set represented forest configuration and proximity to ecological and human-modified landscape features. It included Patch Density (PD), Edge Density (ED), Largest Patch Index (LPI), and distances to forest, cropland, water bodies, built-up areas, elephant reserves, protected areas, mines, railways, and roads (Table 1.3). Predictor values were extracted for both mortality and pseudo-absence locations, and continuous variables were z standardized before model fitting.

Multicollinearity was assessed using pairwise correlation coefficients and variance inflation factors (VIF). Patch Density was excluded because of its collinearity with Edge Density, which was retained in the analysis. Candidate models were ranked using the small-sample corrected Akaike information criterion (AICc), with ΔAICc values and Akaike weights calculated across the complete candidate-model set. Models with ΔAICc ≤ 2 were considered competitive. As only one model occurred within this range, parameter estimates and response curves were obtained from the best-supported model.

Feature	Variable	Description and source	A priori hypothesis for elephant mortality	A priori hypothesis for Human casualties
Land cover	Distance from built-up areas (db)	Classified landcover types, such as built-up areas, cropland, forests, waterbodies, and plantation were used to calculate distances between conflict points and each landcover type using the "Near Table" tool in ArcPro 3.0.0	Closer proximity to built-up areas was expected to increase mortality risk because of greater interaction with settlements and associated infrastructure.	Closer proximity to built-up areas was expected to increase HEC by increasing encounters between people and elephants
	Distance from cropland (dc)		Closer proximity to croplands was expected to increase mortality risk because of crop raiding, retaliatory actions and exposure to electrical infrastructure.	Closer proximity to croplands was expected to increase HEC because cultivated crops can attract elephants.
	Distance from forest (df)		Mortality risk was expected to be higher closer to forests because elephants frequently use forest edges and adjoining human-dominated areas	Closer proximity to forests was expected to increase HEC because elephants frequently move between forests and adjoining human-used areas.
	Distance from waterbodies (dw)		Proximity to waterbodies was expected to influence mortality risk by concentrating elephant movement around water-associated landscapes.	Closer proximity to water sources was expected to increase HEC because elephants regularly use water-associated landscapes.
Anthropogenic	Distance from mines and quarries (dmn)	Mines and quarries were identified using Indian Geomorphology layer and further digitised using Google Earth Pro. Distance from each observation location was calculated using the "Near Table" tool in ArcGIS Pro 3.0.0.	Closer proximity to mining areas was expected to increase mortality risk because of habitat disturbance, fragmentation and increased anthropogenic activity.	Closer proximity to mines was expected to increase HEC because mining and associated development can fragment habitat and disrupt elephant movement

Anthropogenic	Distance from roads (dr)	Road-network and Railway network shapefiles were sourced from OpenStreetMap. Distance from each observation location was calculated using the "Near Table" tool in ArcGIS Pro 3.0.0.	Closer proximity to roads was expected to increase mortality risk because of vehicle collisions, habitat disturbance and fragmentation.	Closer proximity to roads was expected to increase HEC because roads increase habitat fragmentation, human accessibility and encounter risk
	Distance from railways (drail)		Closer proximity to railways was expected to increase mortality risk because of train collisions and disruption of elephant movement routes.	Closer proximity to railways was expected to increase HEC because railway corridors can fragment habitat and constrain elephant movement.
Protected areas	Distance from protected areas (dpa)	Distance from each observation location to the nearest protected-area boundary and elephant reserve boundary (Elephant Cell, Wildlife Institute of India) was calculated using the “Near Table” tool in ArcGIS Pro 3.0.0.	Mortality risk was expected to be lower closer to protected areas because of comparatively lower anthropogenic pressure and greater habitat protection.	HEC was expected to be lower near protected areas and increase with distance because protected landscapes generally experience lower human pressure
	Distance from elephant reserves (der)		Mortality risk was expected to be lower closer to elephant reserves because of greater habitat availability and conservation management	Closer proximity to elephant reserves was expected to increase HEC because elephant occurrence and boundary movements may be concentrated near these areas.

	Patch Density (pd)		Higher patch density was expected to increase elephant-mortality risk because greater forest subdivision may increase elephant movement through human-used landscapes.	Higher patch density was expected to increase HEC because greater forest subdivision may increase elephant movement through human-used landscapes.
Landscape metrics	Edge Density (ed)	Patch density, Edge density and largest patch index were calculated using the FRAGSTATSv4.2 and the value is extracted using "Extract Multi Values to Points" tool in ArcGIS Pro 3.0.0.	Higher edge density was expected to increase elephant-mortality risk by expanding the interface between forests and human-dominated areas.	Higher edge density was expected to increase HEC by expanding the interface between forests and human-dominated areas.
	Largest Patch Index (lpi)		Higher LPI was expected to reduce elephant-mortality risk because it represents larger and more continuous forest patches.	Higher LPI was expected to reduce HEC because it represents larger and more continuous forest patches.

Categorizing Villages Based on Intensity of Elephant Mortalities

Villages in Odisha were categorized into four mortality-intensity classes based on the total number of elephant mortality incidents recorded within or near their administrative boundaries. The categories included: high-incident villages (> 20 elephant mortalities), medium-incident villages (11-20 mortalities), low-incident villages (1-10 mortalities), and no-incident villages. This classification was used to investigate potential relationships between mortality intensity and key landscape variables such as forest cover, crop cover, built-up areas, and plantation/mining areas.

A Kruskal-Wallis rank sum test, a non-parametric statistical method, was employed to evaluate whether statistically significant differences existed in the median values of landscape variables among the four village categories. This approach is appropriate for datasets that violate normality assumptions and provides a robust comparison across multiple independent groups.

To further explore pairwise differences among the incident categories, a Dunn test was conducted as a post-hoc analysis. This test identifies which specific pairs of village categories (e.g., high vs. low, medium vs. no-incident) exhibit significant differences in landscape characteristics while applying appropriate corrections for multiple comparisons.

Village boundary data were obtained from ArcGIS Online, using the shapefile Indian Administrative Layer. These boundaries were used to extract landscape metrics and link them with mortality-intensity categories for statistical analysis.

Land Use and Land Cover, Spatial Distribution of HEC, and Village level of HEC

The human casualty dataset comprised 2,242 incidents caused by wild elephants, including 1,677 fatalities and 565 injuries recorded in Odisha during 2000-2025. The records were organized into five reporting periods: 2000-2005, 2006-2010, 2011-2015, 2016-2020 and 2021-2025. The incidents were categorized by death and injury, gender, year, season, division, and whether they occurred inside or outside protected areas. To illustrate spatial conflict hotspots, kernel density estimation maps were generated using ArcGIS with a 200-meter output cell size for precise geolocation. The severity of Human-Elephant Conflict (HEC) was evaluated by examining the frequency of incidents across villages within the forest divisions. Villages were classified by conflict intensity: high (more than 20 incidents), medium (11-20), and low (1-10).

The village boundaries were obtained from the ArcGIS Online, shapefile: Indian Administrative Layer. Land Use Land Cover (LULC) maps for Odisha were developed using Landsat 5 TM and Landsat 8 OLT imagery for the years for 2000, 2005, 2010, 2015, 2020 and 2025. Landscape fragmentation was analysed with FRAGSTATS (v4.2) to compute key landscape metrics. The input data from LULC maps were reclassified into forest and non-forest categories using the ArcGIS reclassify tool. Metrics like Patch Density (PD), Edge Density (ED), and Largest Patch Index (LPI) were calculated to effectively capture landscape characteristics and to run GLM analysis. A 7 km moving window analysis, consistent with the average elephant movement patterns (Hassan *et al.,* 2023), was used to produce continuous surfaces that represent both localized and broader spatial conflict patterns.

Chi-square tests were performed in R version 4.3.1 to examine associations between gender and incident type and between gender and season.

For the age-wise analysis of human fatalities, victims were classified as children (0-9 years), teenagers (10-19 years), adults (20-59 years) and older adults (≥60 years) based on their recorded age at the time of the incident. Records without age information were classified as unknown. Age-class distributions were summarized descriptively by gender, and no inferential statistical test was performed.

Factors Influencing Human Fatalities & Injuries

To examine the factors influencing HEC incidents, spatial data were used for variables such as distances to forests, croplands, built-up areas, roads, railways, waterbodies, protected areas, elephant reserves and mines. Forest-cover fragmentation metrics, including Patch Density (PD), Largest Patch Index (LPI) and Edge Density (ED), were calculated from the classified forest-cover layer to assess forest-patch structure and fragmentation. These variables were derived from satellite imagery and relevant spatial layers and aligned with the incident and pseudo-absence points for the corresponding periods. The Generate Near Table tool in ArcGIS Pro 3.0.0 was used to calculate the shortest distances between the sampling points and the respective landscape features. These distance variables and fragmentation metrics were used as predictors, while HEC occurrence was used as the binary response variable (Table 1.3). Binomial Generalized Linear Models (GLMs) with a logit-link function were fitted in R version 4.3.1. Candidate models were constructed from predefined hypotheses representing variables potentially associated with HEC occurrence.

Before model construction, all continuous predictor variables were z-standardized, and multicollinearity was assessed to avoid including highly correlated predictors within the same additive model. Each HEC event involving a human fatality or injury was coded as 1, whereas randomly generated pseudo-absence points were coded as 0. Pseudo-absence points were generated within the study area and placed at least 1 km from recorded incident locations to maintain spatial separation between presence and background observations. Candidate models were ranked using the small- sample corrected Akaike Information Criterion (AICc), and the model with the lowest AICc was considered the best-supported model. Models with ΔAICc ≤ 2 were considered to have comparable empirical support (Burnham and Anderson, 2002). The MuMIn package was used for model ranking and the calculation of AICc values and Akaike weights, which were used to evaluate the relative support for each candidate model.

Photo: Anshuman Gogoi.

RESULTS

Forest Fragmentation Pattern

The temporal distribution of landscape fragmentation metrics in Odisha showed noticeable changes between 2000 and 2025. The largest patch index shifted towards lower classes, with a decline in the proportion of grid cells in the very high class and corresponding increases in the high, medium, low, and very low classes. This indicates a reduction in the dominance of large, contiguous forest patches and an increase in smaller and less continuous patches. In contrast, the edge density distribution showed a decrease in the very low class, accompanied by increases in the low, medium, high, and very high classes, reflecting greater edge formation and habitat fragmentation. Overall, these changes suggest that Odisha's forest landscape became progressively more fragmented between

2000 and 2025, with reduced patch continuity and increased edge complexity that may influence habitat connectivity and elephant movement.

The spatial distribution of landscape metrics shows a different pattern of forest fragmentation across the study area. Patch Density (PD) indicated higher fragmentation in the northern and south-western regions, where numerous small and isolated forest patches were observed, while the central and eastern regions were characterized by larger and more continuous forest patches. The Largest Patch Index (LPI) showed that large, connected forest patches were primarily located in the central forest belt, whereas lower LPI values in the peripheral areas reflected fragmented landscapes with reduced patch connectivity. Similarly, Edge Density (ED) was highest in the northern, western, and south-western regions, indicating extensive forest edges resulting from fragmentation. Overall, the combined landscape metrics indicate that forest fragmentation is more in the peripheral regions, whereas the central forest areas remain comparatively well connected (Figure 1.3).

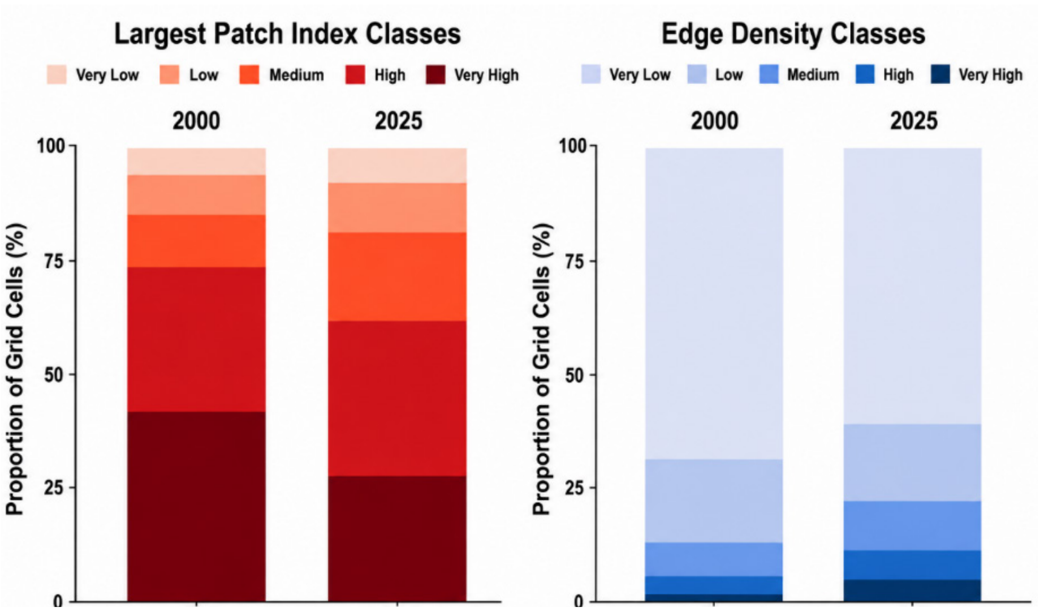

Figure: 1.2(a): *Temporal changes in Largest Patch Index (LPI) and Edge Density (ED) classes in Odisha between 2000 and 2025.*

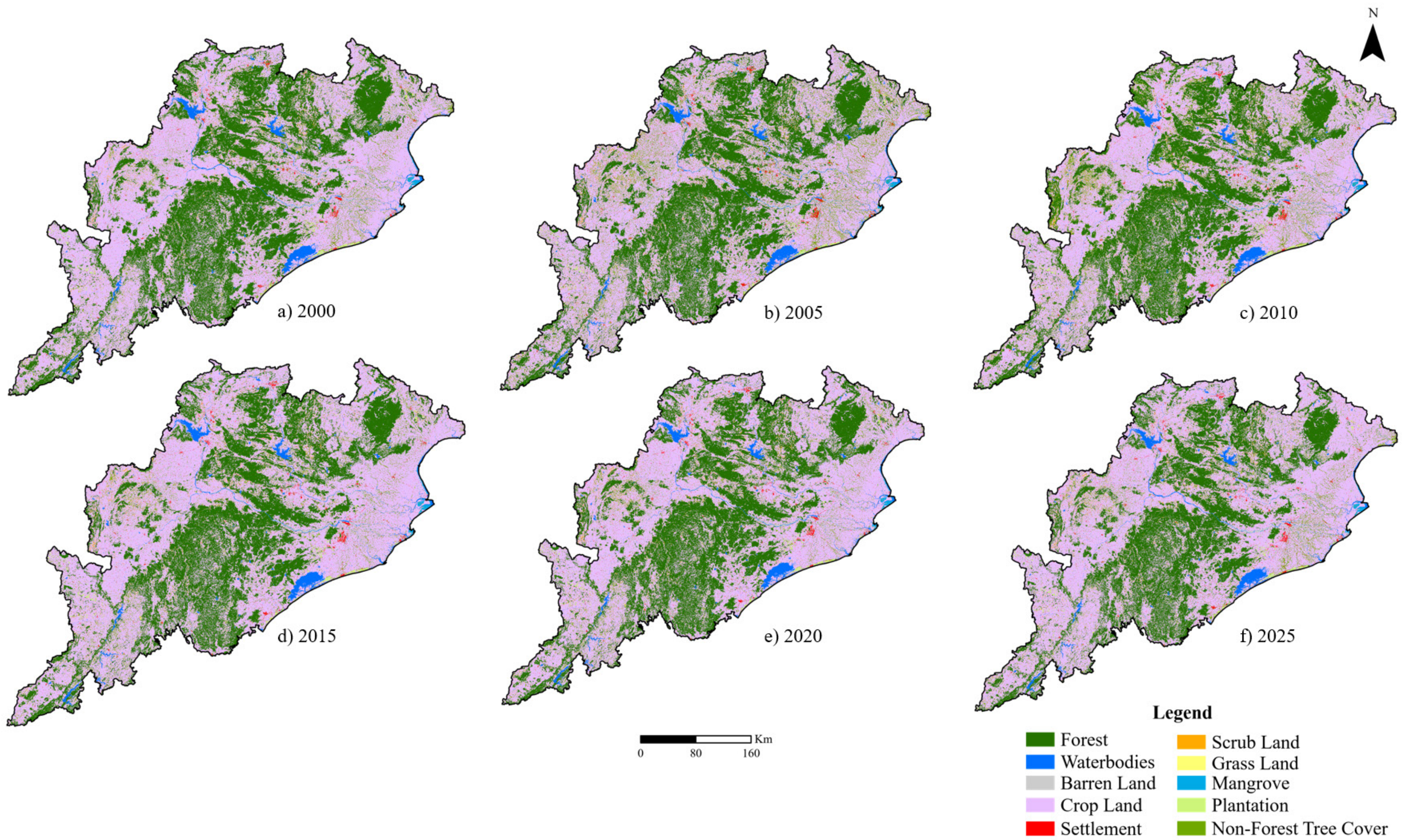

Figure: 1.2(b): *Land Use Land Cover (LULC) of Odisha from year 2000-2025(a-f respectively).*

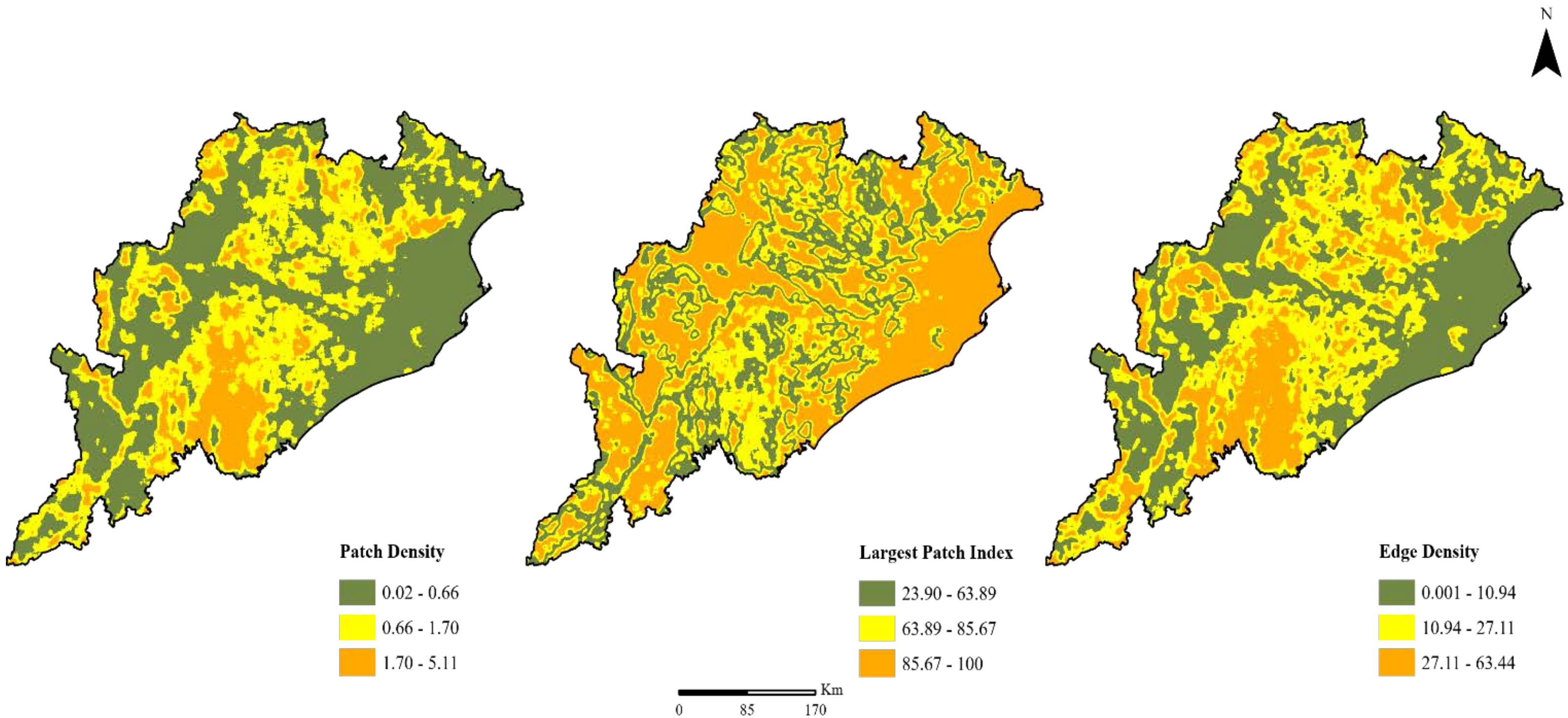

Figure: 1.3(a-c): *Spatial Distribution of Patch Density, Large Patch Index and Edge Density in Odisha respectively*

Temporal trends and spatial distribution of elephant mortality

A total of 1,671 elephant mortality cases were recorded across 45 forest divisions in Odisha during 2000-2025. Elephant mortality occurred consistently throughout the study period and varied considerably across years (Fig. 1.4), with the highest number of deaths recorded in 2022 (n= 102), followed by 2024 (n = 96) and 2021 (n = 87), indicating that elephant mortality remained a persistent conservation concern in the state. Disease was the most frequently recorded cause of mortality (n = 469), followed by natural causes (n = 309) and electrocution (n = 274). Unknown causes accounted for a substantial proportion of deaths (n = 237), while poaching (n = 129) and accidental causes (n = 95) also contributed considerably to overall mortality. Other recorded causes included territorial fights (n = 53), train accidents (n = 45), poisoning (n = 20), anthropogenic stressors (n = 16), retaliatory killing (n = 16) and road accidents (n = 8).

Among anthropogenic causes, electrocution (n = 274) emerged as the predominant cause of elephant mortality, accounting for more than half of all anthropogenic deaths, followed by poaching and train accidents. Overall, the frequency of elephant deaths differed significantly among anthropogenic causes ($\chi^2 = 797.17$, df = 6,$p < 0.0001$), indicating that anthropogenic mortality was not uniformly distributed across causes.

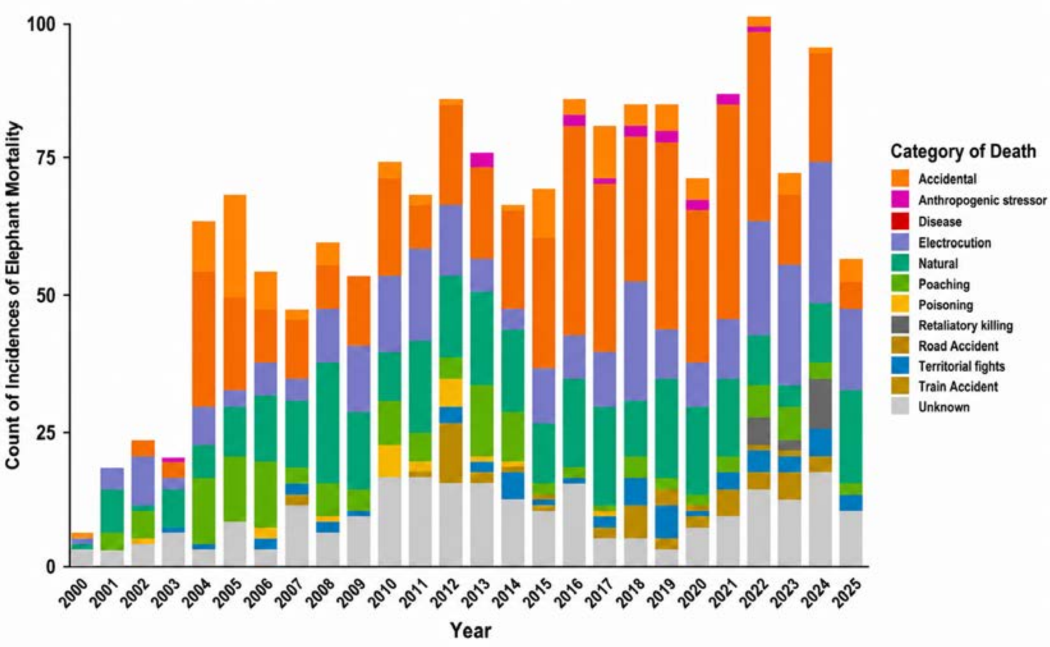

Figure 1.4: *Temporal trends of elephant mortality in Odisha from 2000 to 2025*

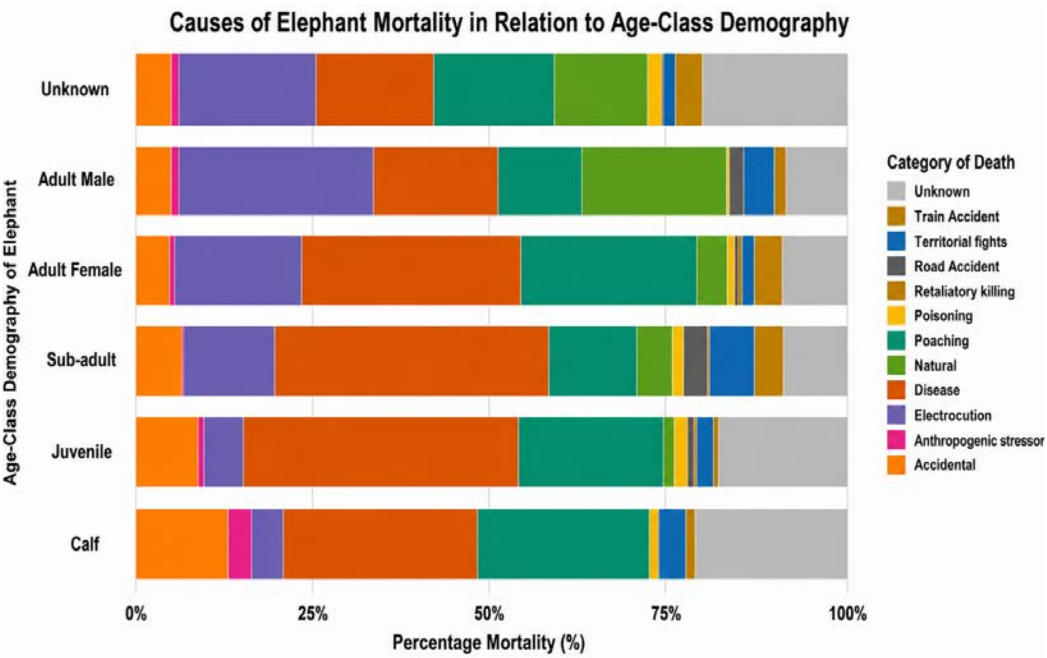

Figure 1.5: *Causes of elephant mortality in relation to age class demography in Odisha during 2000-2025*

Among the 377 anthropogenic deaths with known demographic information, mortality differed significantly among demographic classes (χ^2 = 152.59, df = 4, p < 0.0001). Adult males recorded the highest mortality (n = 152), followed by adult females (n = 99), sub-adults (n = 76), juveniles and calves (n = 25 each). Records with unknown demographic information (n = 131) were excluded from this test. Distribution of anthropogenic elephant mortality across seasons also differed significantly (χ^2 = 28.21, df = 3, p < 0.0001), with the highest number of anthropogenic elephant deaths recorded during the southwest monsoon season (163), followed by the post-monsoon (142), winter (121) and summer (82) seasons.

Mortality was recorded across all age classes, indicating that elephant deaths were distributed throughout the demographic structure of the population. Adult Female elephants accounted for the highest number of mortality records (n= 328), followed by unknown individuals (n= 323), adult Males (n= 283), sub-adults (n= 269), juveniles (n= 222) and calves (n= 246) (Fig. 1.5). This pattern shows that mortality in Odisha was not confined to a single demographic segment, but affected individuals across multiple life-history stages.

Cause-specific patterns also varied among age classes (Fig. 1.5). Among adult females, disease was the leading cause of death (n= 103), followed by natural causes (n= 81) and electrocution (n= 63). Adult Male mortality was dominated by electrocution (n= 83), followed by poaching (n= 56) and disease (n= 49). Among Sub-adults, disease was again the principal cause (n= 107), with electrocution (n= 36) and natural causes (n= 32) contributing substantially. In Calves, mortality was highest from disease (n= 69), followed by natural causes (n= 61) and unknown causes (n= 52), whereas in Juveniles, disease (n= 87), natural causes (n= 46), and unknown causes (n= 41) were the most frequent categories. Among individuals recorded as Unknown age class, electrocution (n= 68) and unknown causes (n= 65) were most prominent, followed by natural causes (n= 55). Overall, these results indicate that mortality in Odisha affected all age classes, but the dominant causes differed across demographic categories, with disease being especially important in younger age classes and sub-adults, while electrocution and poaching were more pronounced among adult males.

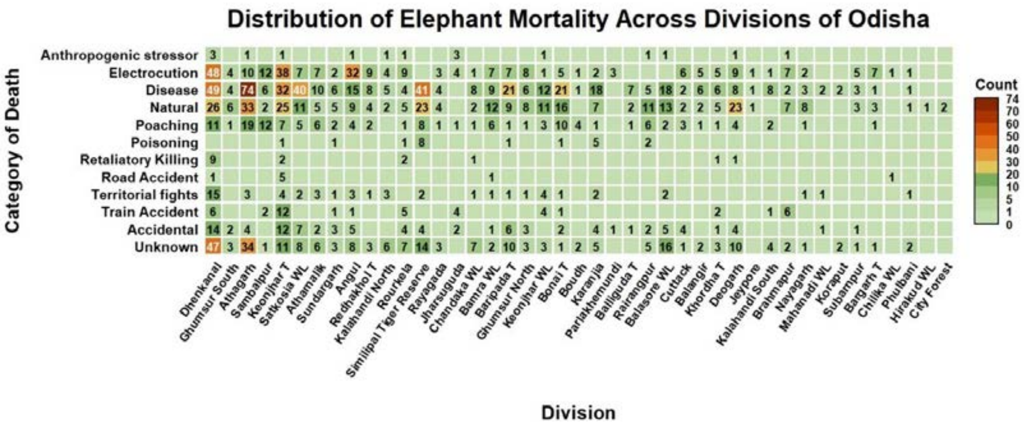

Figure 1.6: *Heatmap showing distribution pattern of elephant mortality in the different forest divisions of Odisha*

The division wise analysis revealed marked spatial heterogeneity in elephant mortality across Odisha, with mortality records concentrated in a limited number of divisions (Fig 1.6), Dhenkanal recorded the highest number of elephant deaths (n= 229), followed by Athagarh (n= 178) and Keonjhar Territorial (n= 150). Other divisions with comparatively high mortality included Similipal Tiger Reserve (n= 100), Satkosia Wildlife Division (n= 80), Angul (n= 78), Deogarh (n= 60), Bonai (n= 58), Balasore Wildlife Division (n= 57), and Baripada Territorial Division (n= 56). These results show that elephant mortality in Odisha is not evenly distributed across administrative units, but is strongly concentrated in a subset of divisions that contribute disproportionately to the total mortality burden.

At the lower end of the distribution, Hirakud Wildlife Division recorded the lowest mortality (n= 1), followed by Chilika Wildlife Division (n= 2) and City Forest (n= 2). Other divisions with low mortality included Jeypore (n= 3), Koraput (n= 4), Mahanadi Wildlife Division (n= 4), Parlakhemundi (n= 4), Phulbani (n= 6), and Boudh (n= 8). Thus, the observed distribution indicates clear spatial clustering of elephant mortality, with high mortality divisions readily distinguishable from divisions that recorded only occasional mortality events.

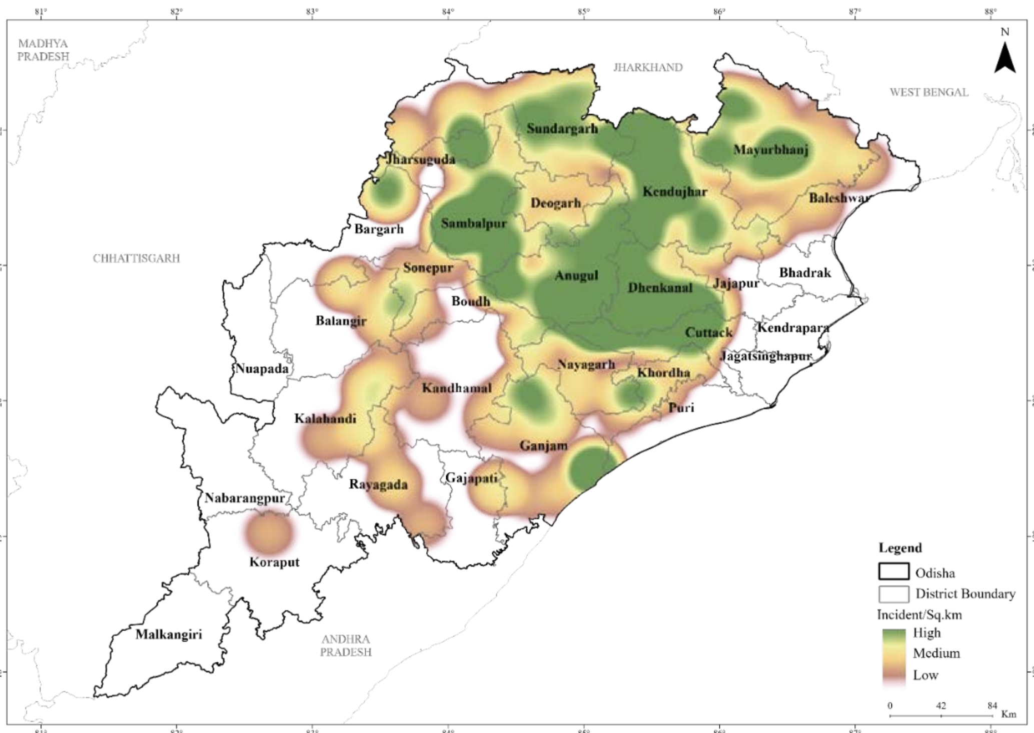

Figure 1.7: *Kernel density map of Odisha highlighting the high, medium and low mortality zones for elephant 2000-2025*

Natural and Anthropogenic Causes of Elephant Mortality in Odisha

During 2000-2025, the broader natural-mortality category accounted for 926 elephant deaths (Fig. 1.8). Within this category, disease-related mortality was highest (n = 469), followed by physiological causes (n = 309), Natural accident (n=95) territorial fights (n = 53). Among demographic classes, adult females recorded the highest number of deaths within the broader natural-mortality category (n = 188), followed by sub-adults (n = 156), calves (n = 139), juveniles (n = 138), individuals of unknown demographic class (n = 114) and adult males (n = 96). Across nearly all demographic classes, disease-related mortality was higher than mortality attributed to physiological causes, while territorial fights accounted for a relatively small proportion of records. These findings indicate that disease-related mortality constitutes a major component of the broader natural-mortality pattern in Odisha.

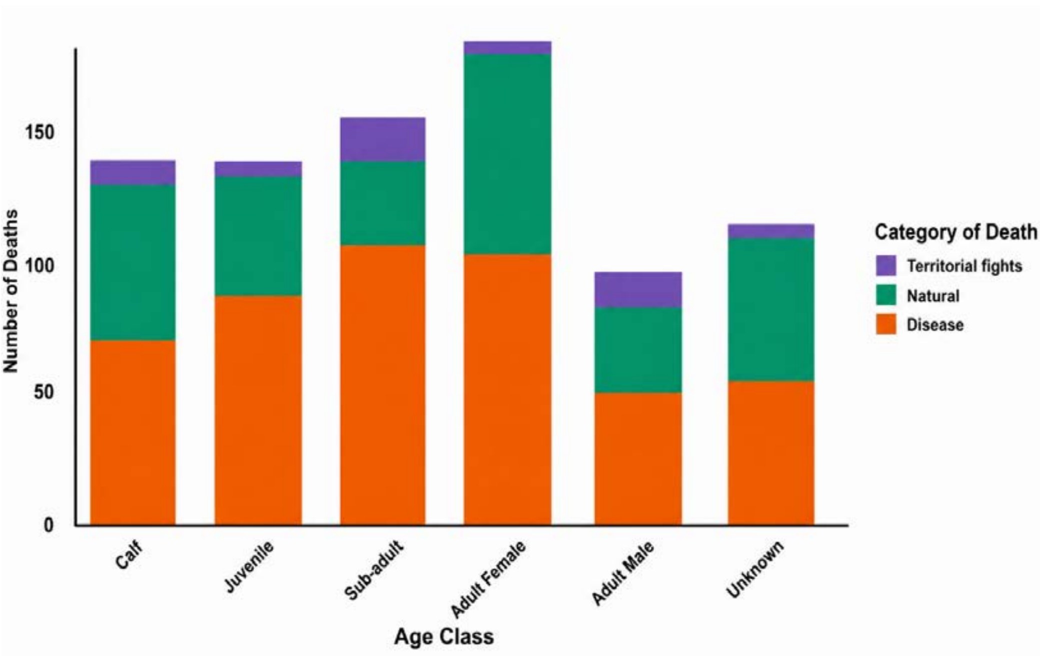

Figure 1.8: *Distribution of elephant deaths among the natural-mortality subcategories of disease, Natural-physiological causes and territorial fights across demographic classes in Odisha during 2000–2025.*

The anthropogenic causes of mortality analysis (Fig. 1.9) included Anthropogenic stressor, Electrocution, Poaching, Poisoning, Retaliatory killing, Road Accident, and Train Accident. Electrocution emerged as the most prominent anthropogenic cause across age classes, followed by poaching and, to a lesser extent, transport related and other direct human induced causes. Adult Male elephants recorded the highest anthropogenic mortality, followed by Unknown, Adult Female, Sub-adult, Calves, and Juveniles. These findings indicate that direct human-related causes are a major contributor to elephant mortality in Odisha, with adult elephants, particularly males, being highly affected.

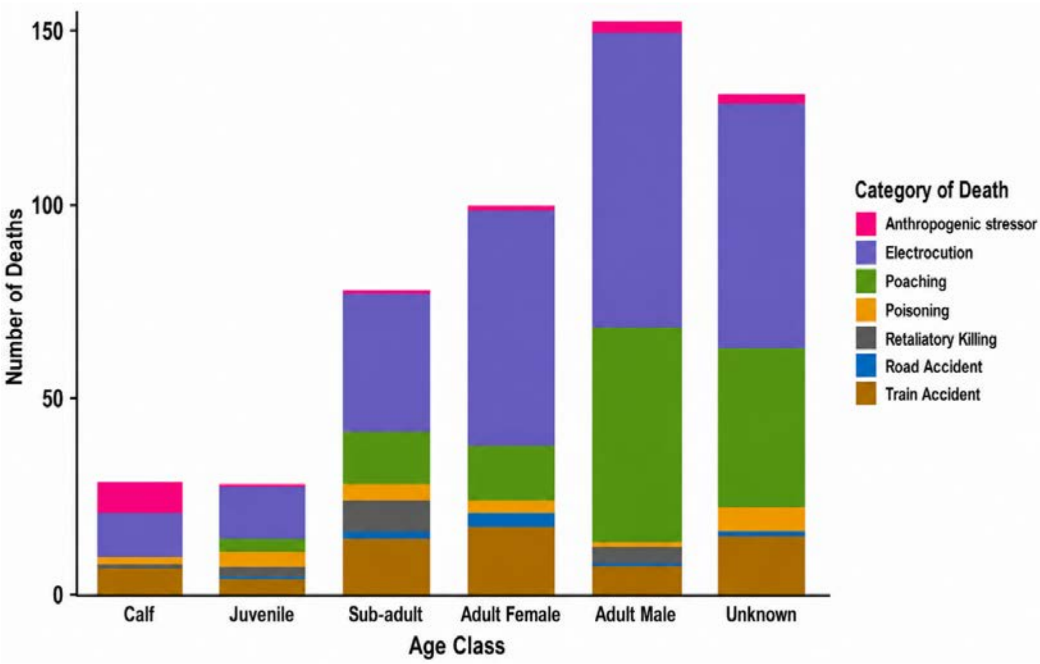

Figure 1.9: *Distribution of anthropogenic causes of elephant deaths across age classes in Odisha 2000-2025*

A similar spatial concentration was evident when only anthropogenic causes of elephant mortality were considered. Dhenkanal recorded the highest anthropogenic mortality (n= 78), followed by Keonjhar Territorial (n= 66), Angul (n= 38), and Athagarh (n= 30). Other divisions with comparatively high anthropogenic mortality included Sambalpur (n= 26), Rourkela (n= 19), Bonai (n= 17), Similipal Tiger Reserve (n= 16), Deogarh (n= 15), and both Bamra Wildlife Division and Brahmapur (n= 14 each). These divisions therefore represent the principal recorded hotspot of anthropogenic elephant mortality in the state.

However, no anthropogenic mortality records were observed in City Forest, Koraput, Mahanadi Wildlife Division, and Hirakud Wildlife Division, which are characterized by relatively low elephant population densities. Similarly, divisions with relatively low elephant population, such as Jeypore, Balliguda Territorial, and Phulbani, recorded only one anthropogenic mortality each ($n = 1$), whereas Chilika Wildlife Division recorded two ($n = 2$), and Chandaka Wildlife Division, Nayagarh, and Parlakhemundi recorded three each ($n = 3$). In consideration, these patterns show that anthropogenic elephant mortality in Odisha is strongly localized rather than evenly distributed. Importantly, these findings should be interpreted as patterns in recorded mortality rather than as direct measures of absolute risk or elephant abundance; nevertheless, they provide strong evidence of spatial heterogeneity and support the need for division specific monitoring and mitigation, particularly in divisions where anthropogenic causes form a substantial proportion of total deaths.

Factors influencing elephant mortality and Village characteristics

A total of 244 villages were identified in the state where elephant mortality occurred during the study period. Out of seven environmental variables considered to assess the characteristics of villages where deaths occurred, variation was observed among mortality categories. High-incident villages had higher forest cover (Kruskal–Wallis: $\chi^2 = 1.68$, $p = 0.641$; Fig. 1.10a). High-incident villages had lower crop percentage than non-incident and low-incident villages ($\chi^2 = 6.98$, $p = 0.072$; Fig. 1.10b). High-incident villages had higher water percentage ($\chi^2 = 2.14$, $p = 0.544$; Fig. 1.10c), mining percentage ($\chi^2 = 2.17$, $p = 0.538$; Fig. 1.10d), and built-up area ($\chi^2 = 2.63$, $p = 0.452$; Fig. 1.10e). High-incident villages had lower road density, whereas medium-incident villages showed comparatively higher road density ($\chi^2 = 10.14$, $p = 0.017$; Fig. 1.10f). Post-hoc Dunn's test showed significant differences between non-incident and medium-incident villages ($p = 0.030$) and between medium- and low-incident villages ($p = 0.030$). High-incident villages also showed higher railway density, although the difference among village categories was not significant ($\chi^2 = 2.31$, $p = 0.511$; Fig. 1.10g). No significant differences were observed for forest cover, crop cover, water percentage, mining percentage, built-up area, and railway density.

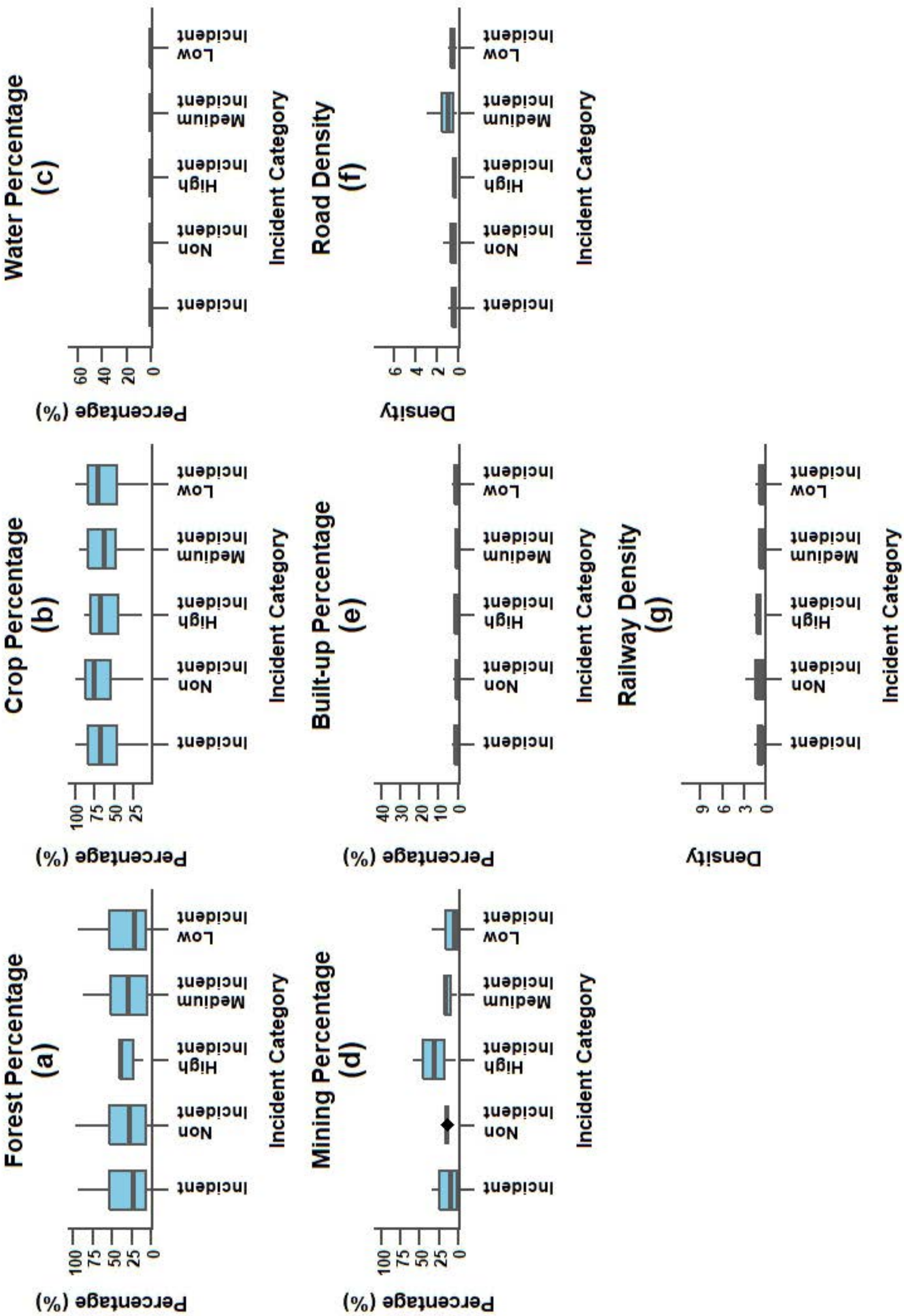

Figure 1.10: *Box plot showing the built-up density, road density, railway density, crop percentage, forest percentage and mining percentage in non-incident, low-incident, medium-incident and high-incident villages in Odisha.*

Table 1.4: *Summary statistics loglikelihood (LogL), degrees of freedom (df), Akaike Information Criteria (AICc), relative support for hypothesis (Δ AICc), Akaike weights (Wi) of candidate regression model explaining anthropogenic elephant mortality*

Model Description	LogL	df	AICc	Δ AICc	Wi
db + dc + df + dm + dpa + drail	-623.248	7	1260.607	0	0.962
ed + lpi + df + dc + dw + db + der + dpa + dm + drail + dr	-621.408	12	1267.127	6.52	0.037
df + dc + dm + dpa + drail	-631.355	6	1274.792	14.186	0.001
db + dc + df + dm + drail	-639.866	6	1291.815	31.208	0
df + dc + db + dm	-641.972	5	1294.003	33.396	0
df + dc + dm	-652.376	4	1312.792	52.185	0
lpi + df + dc + dm	-651.68	5	1313.42	52.813	0
db + drail + dm	-659.936	4	1327.912	67.306	0
dr + drail + dm	-660.306	4	1328.651	68.044	0
db + dr + drail + dm	-659.88	5	1329.819	69.212	0
db + dr + dm	-661.827	4	1331.694	71.087	0
dm	-664.266	2	1332.543	71.937	0
ed + lpi + df + dc + drail	-672.843	6	1357.769	97.162	0
df + dc + drail	-675.004	4	1358.048	97.441	0
db + der + dpa	-679.585	4	1367.21	106.603	0
Null	-704.238	1	1410.479	149.872	0

__Table 1.5:__ Parameter estimates effect (β) and probabilities of ecological and anthropogenic variables in determining mortality of Asian elephant due to various anthropogenic activity

Predictor	Beta Coefficient (β)	Z value	P value	Significance
(Intercept)	0.056	0.817	0.4137	
Distance to Built-up Area (db)	-0.369	-3.896	<0.0001	***
Distance to Croplands (dc)	-0.201	-1.971	0.0487	*
Distance to Forest (df)	-0.538	-5.085	<0.0001	***
Distance to Mines (dm)	-0.755	-7.362	<0.0001	***
Distance to Protected Areas (dpa)	-0.427	-5.417	<0.0001	***
Distance to Railway (drail)	-0.217	-2.358	0.0184	*

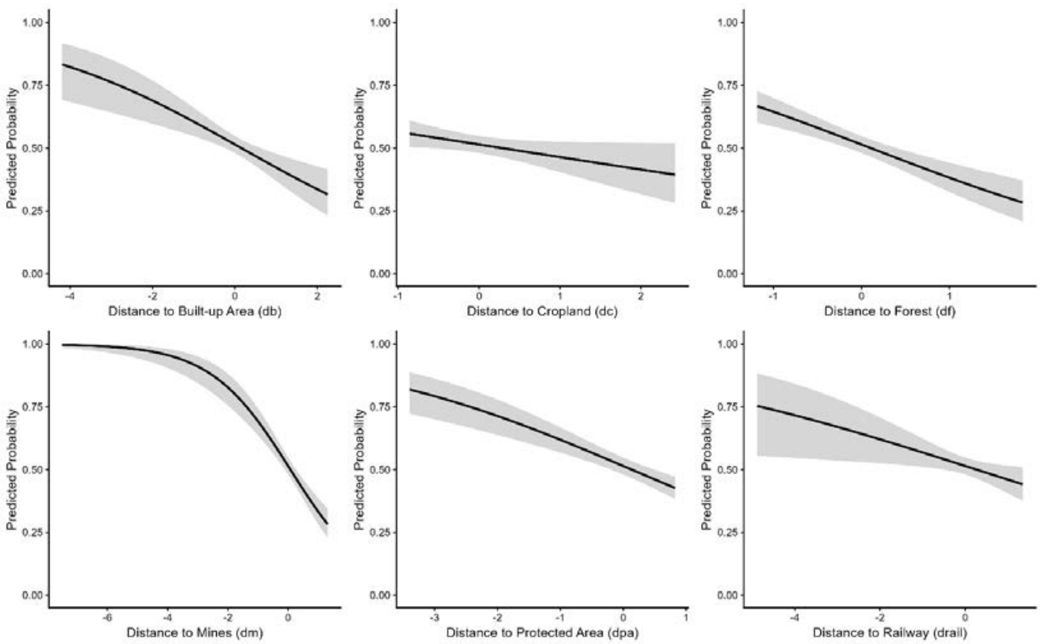

__Figure 1.11:__ Graphs showing the probability of elephant mortality in relation to the different ecological and anthropogenic variables in Odisha.

Temporal and Seasonal Patterns of Human Fatalities and Injuries

A total of 2,242 human elephant conflict incidents were recorded in Odisha during 2000-2025, comprising 1,677 human deaths and 565 injuries (Fig. 1.12). Annual incident numbers fluctuated considerably, with relatively fewer incidents during the earlier years and a marked increase during the later period. The highest annual total was recorded in 2023 ($n = 243$), comprising 175 deaths and 68 injuries. Human fatalities were also highest in 2023 ($n = 175$), whereas the highest number of injuries was recorded in 2024 ($n = 78$).

The spatial distribution of incidents was highly uneven across forest divisions. Dhenkanal was the most severely affected division, recording (n=355) deaths and (n=261) injuries, followed by Keonjhar with (n=155) deaths and (n=86) injuries, Rourkela with (n=140) deaths and (n=63) injuries, Angul with (n=141) deaths and no recorded injuries, and Khordha with (n=45) deaths and (n=53) injuries (Fig. 1.13). Baripada, Bonai, Sundargarh, Deogarh and Redhakhol also contributed considerably to the overall human casualty burden.

Male victims accounted for the highest number of both fatalities ($n = 1,204$) and injuries ($n = 443$), compared with females, which accounted for 473 fatalities and 122 injuries. A chi-square test showed a significant association between gender and incident type ($\chi^2 = 9.14$, df = 1, $p = 0.0025$), indicating that the relative distribution of fatalities and injuries differed significantly between male and female victims.

Season-wise distribution showed that conflict incidents were recorded in all four seasons, confirming that human-elephant conflict persists throughout the year in Odisha. Nevertheless, the southwest monsoon accounted for the highest number of incidents (672 cases), followed by winter (604 cases), summer (580 cases) and the post-monsoon season (386 cases) (Fig. 1.14). The seasonal pattern therefore suggests that, although conflict is perennial, the highest number of incidents occurs during the monsoon period. Male victims accounted for the highest number of both fatalities and injuries across all seasons. A significant association was observed between gender and season (Pearson's $\chi^2 = 33.88$, df = 3, $p < 0.0001$), indicating that the seasonal distribution of human elephant conflict incidents differed significantly between male and female victims.

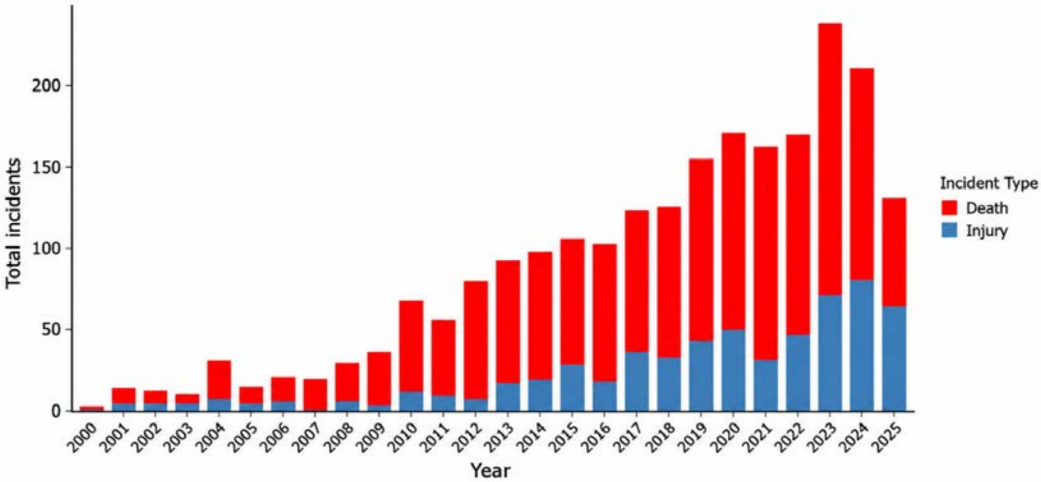

Figure 1.12: *Annual trends in human deaths and injuries caused by human-elephant conflict in Odisha during 2000–2025.*

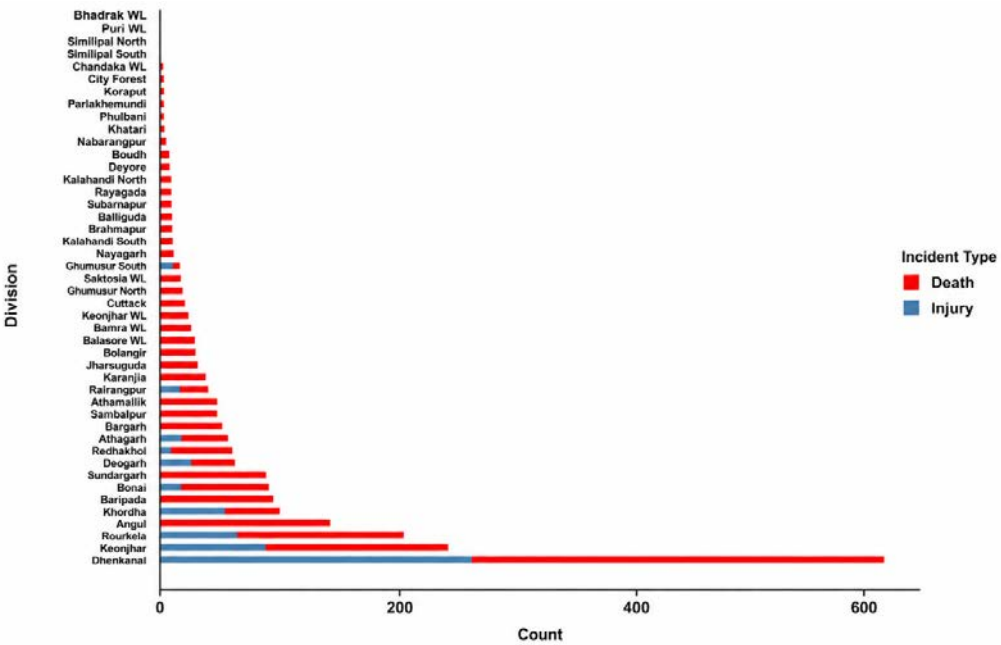

Figure 1.13: *Division-wise distribution of human deaths and injuries caused by elephants in Odisha during 2000-2025.*

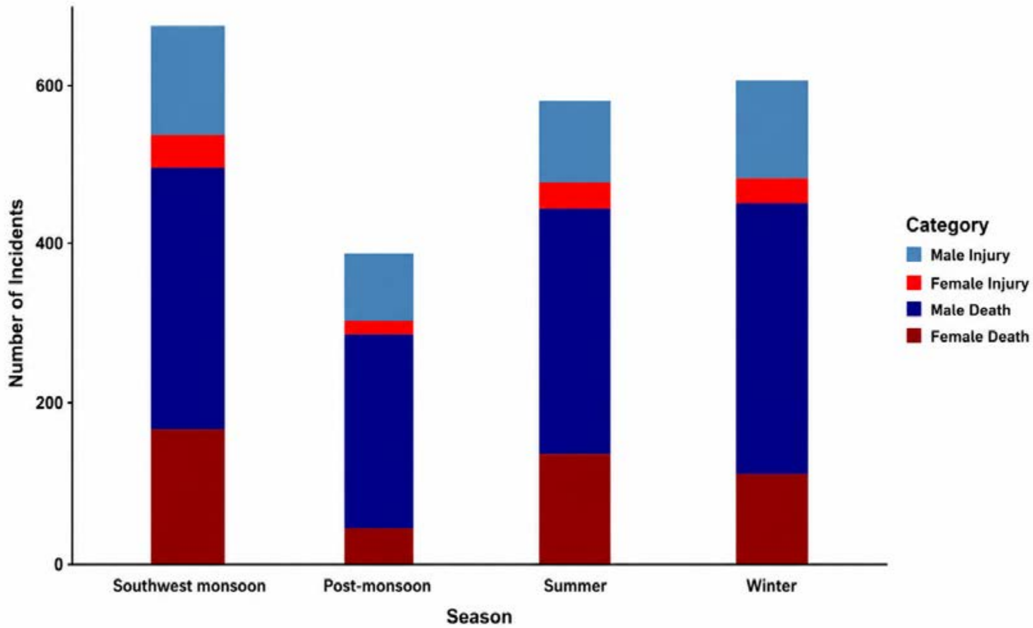

Figure 1.14: *Seasonal variation in human fatalities and injuries by gender in Odisha during 2000–2025.*

Among the 1,677 human fatalities, adults aged 20-59 years accounted for the highest number of deaths (n = 953; 56.8%), followed by older adults aged ≥60 years (n = 550; 32.8%). Records with unknown age accounted for 84 fatalities (5.0%), while children aged 0-9 years and teenagers aged 10-19 years accounted for 47 (2.8%) and 43 (2.6%) fatalities, respectively. Male casualties were higher than female casualties in every age class (Fig. 1.15).

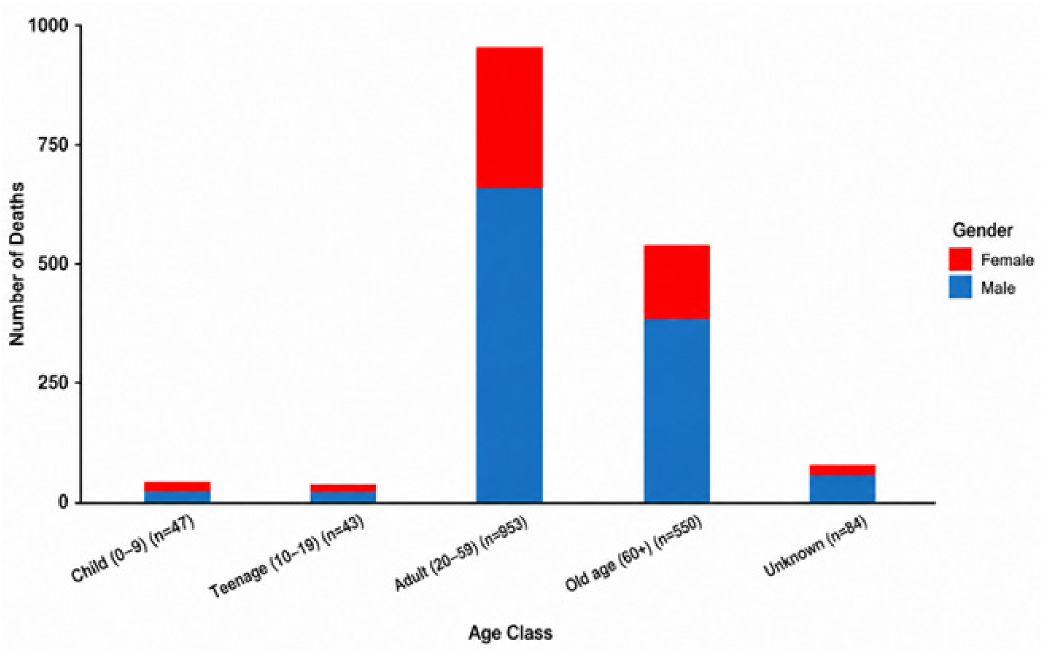

Figure 1.15: *Age-class distribution of human deaths by gender in Odisha during 2000–2025.*

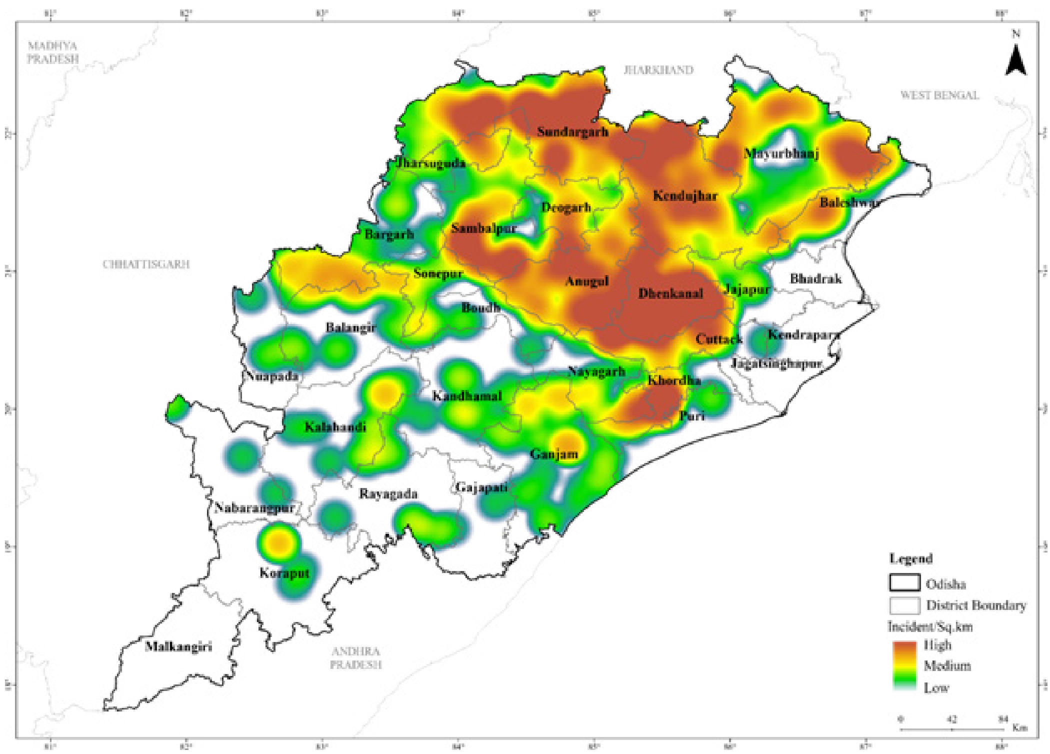

Figure 1.16: *Kernel Density map visualizing the intensity and distribution, highlighting areas with higher HEC occurrence in Odisha (2000-2025).*

Village-level analysis of ecological and anthropogenic drivers of human mortality and injuries

Village-level comparison of ecological and anthropogenic variables revealed distinct patterns across the different HEC intensity categories. Medium-conflict villages exhibited the highest median forest cover, whereas high-conflict villages had the lowest; however, forest percentage did not differ significantly among the categories (Kruskal–Wallis: $\chi^2 = 1.97$, df = 3, $p = 0.579$; Fig. 1.17a). Non-incident villages showed the highest median cropland percentage, followed by low-, high- and medium-conflict villages. Cropland percentage differed significantly among the categories ($\chi^2 = 29.68$, df = 3, $p < 0.0001$; Fig. 1.17b). Dunn's post-hoc test indicated that non-incident villages had significantly higher cropland percentages than high-conflict (padj = 0.033), medium-conflict (padj < 0.001) and low-conflict villages (padj = 0.005). Water percentage was highest in non-incident villages and lowest in high-conflict villages, with significant variation among the categories ($\chi^2 = 8.76$, df = 3, $p = 0.033$; Fig. 1.17c). Post-hoc analysis showed a significant difference between non-incident and medium-conflict villages (padj = 0.039). Built-up percentage was highest in high-conflict villages and lowest in low-conflict villages ($\chi^2 = 10.41$, df = 3, $p = 0.015$; Fig. 1.17d), with a significant difference between non-incident and low-conflict villages (padj = 0.049). Mining percentage was highest in non-incident villages, whereas the conflict categories generally showed lower median mining cover; however, these differences were not statistically significant ($\chi^2 = 4.11$, df = 3, $p = 0.250$; Fig. 1.17e). Road density was highest in non-incident villages and comparatively lower in conflict-affected villages ($\chi^2 = 8.49$, df = 3, $p = 0.037$; Fig. 1.17f). Dunn's post-hoc test showed a significant difference between non-incident and low-conflict villages (padj = 0.033). Railway density was highest in medium-conflict villages, but no significant variation was detected among the conflict-intensity categories ($\chi^2 = 4.93$, df = 3, $p = 0.177$; Fig. 1.17g).

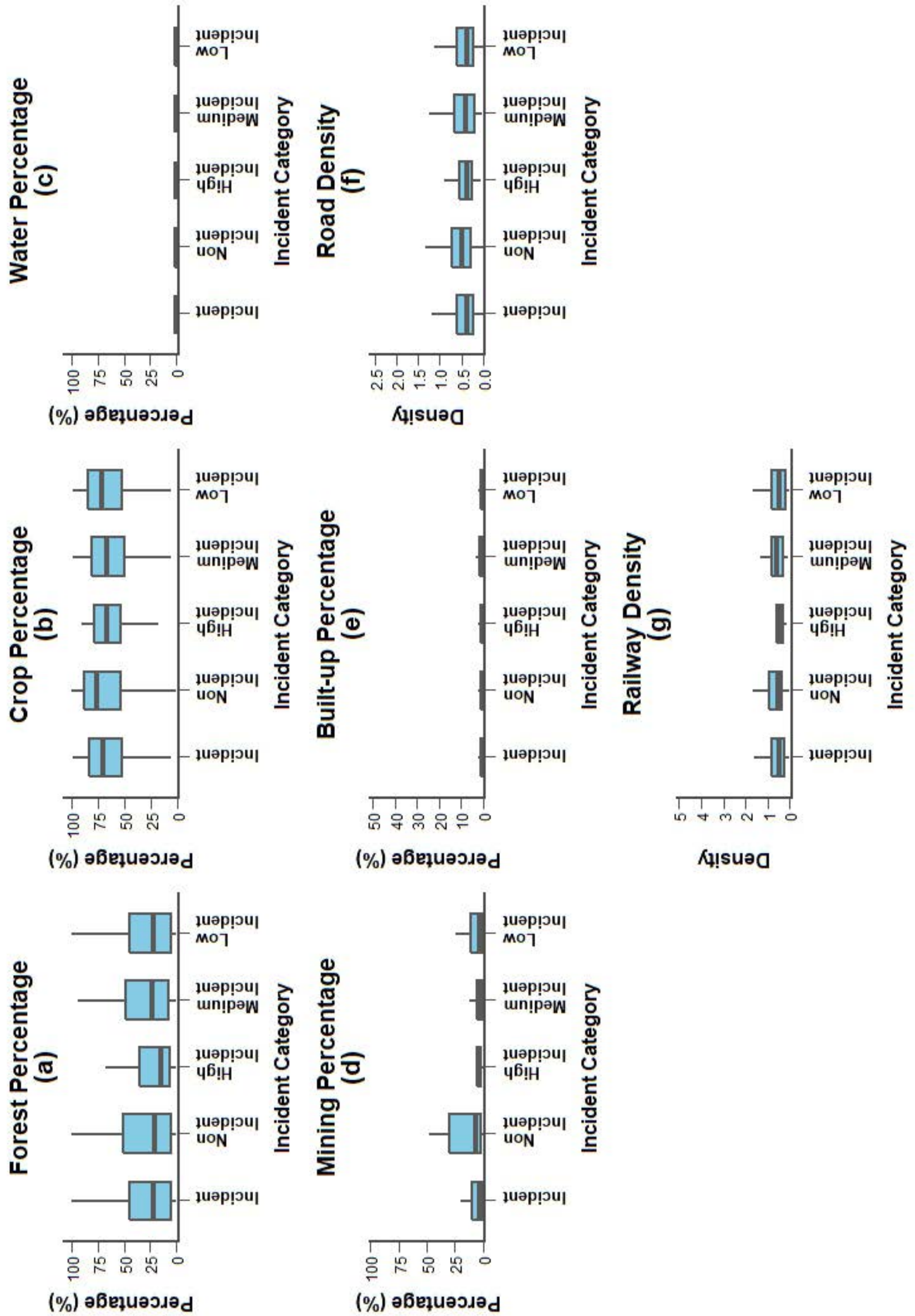

Figure 1.17: *Comparison of ecological and anthropogenic variables across different incident types and non-incidence villages of Odisha.*

Key Predictors of HEC

It is observed that landscape configuration and proximity to ecological and anthropogenic features significantly influenced human-elephant conflict in Odisha. Conflict probability decreased significantly with increasing patch density ($\beta = -0.320$, $p < 0.001$), largest patch index ($\beta = -0.270$, $p < 0.001$), distance from forests ($\beta = -0.132$, $p = 0.004$), distance from built-up areas ($\beta = -0.101$, $p = 0.005$) and distance from mines ($\beta = -0.162$, $p < 0.001$). These results indicate that HEC was more likely closer to forests, settlements and mining areas. In contrast, conflict probability increased significantly with increasing distance from protected areas ($\beta = 0.111$, $p < 0.001$), indicating greater conflict risk outside and farther from protected landscapes. Distance from cropland ($\beta = -0.056$, $p = 0.184$) and roads ($\beta = -0.015$, $p = 0.637$) did not have significant independent effects on HEC occurrence (Table 1.7).

Table 1.6: *Summary statistics loglikelihood (LogL), degrees of freedom (df), Akaike Information Criteria (AICc), relative support for hypothesis (Δ AICc), Akaike weights (Wi) of candidate regression model explaining HEC in Odisha*

Model Description	LogL	df	AICc	Delta AICc	Wi
pd + lpi + df + dc + db + dpa + dm + drd	-3042.529	9	6103.098	0.000	0.405
pd + lpi + df + dw + db + dpa + dm + drail + drd	-3041.999	10	6104.048	0.950	0.252
pd + lpi + db + dpa + dm + drail	-3045.470	7	6104.965	1.867	0.159
pd + lpi + df + dc + dw + db + der + dpa + dm + drail + drd	-3041.269	12	6106.608	3.510	0.070
pd + lpi + dc + dw + dpa + db + dm + drail	-3044.478	9	6106.997	3.899	0.058
pd + lpi + der + dpa + db + dm + drail + drd	-3045.468	9	6108.976	5.878	0.021
pd + lpi + dc + dw + db + dpa + dm + drd	-3045.865	9	6109.770	6.672	0.014
pd + lpi + df + dc + der + dpa + dm	-3047.248	8	6110.527	7.429	0.010
pd + lpi + df + dc + db + dm + drail	-3047.985	8	6112.002	8.904	0.005
pd + lpi + df + dw + der + db + dm + drail	-3047.438	9	6112.917	9.819	0.003
pd + lpi + df + dw + db + der + dm + drd	-3048.579	9	6115.198	12.100	0.001
pd + lpi + df + dc + dw + db + dm + drd	-3048.745	9	6115.530	12.432	0.001
pd + lpi + db + der + dm + drd	-3051.350	7	6116.726	13.628	0.000

pd + lpi + dc + dw + db + der + dm + drail + drd	-3049.385	10	6118.819	15.721	0.000
pd + lpi + df + dc + dm	-3053.829	6	6119.678	16.580	0.000
pd + lpi + dm + drail + drd	-3054.964	6	6121.947	18.849	0.000
Intercept only	-3107.379	1	6216.758	113.660	0.000

Table 1.7: *Parameter estimates effect (β), standard errors (S.E), and probabilities of ecological and anthropogenic variables in determining the human elephant conflict in Odisha.*

Predictor Variable	Beta Coefficient (β)	Std. Error	z value	P value	Significance
(Intercept)	-0.001	0.03	-0.028	0.978	
Patch Density (pd)	-0.32	0.041	-7.786	<0.001	***
Largest Patch Index (lpi)	-0.27	0.04	-6.781	<0.001	***
Distance to Forest (df)	-0.132	0.046	-2.892	0.004	**
Distance to Cropland (dc)	-0.056	0.042	-1.327	0.184	
Distance to Built-up Area (db)	-0.101	0.035	-2.839	0.005	**
Distance to Protected Area (dpa)	0.111	0.032	3.485	<0.001	***
Distance to Mines (dm)	-0.162	0.032	-5.036	<0.001	***
Distance to Road (drd)	-0.015	0.032	-0.472	0.637	

**Indicates the significance of result*

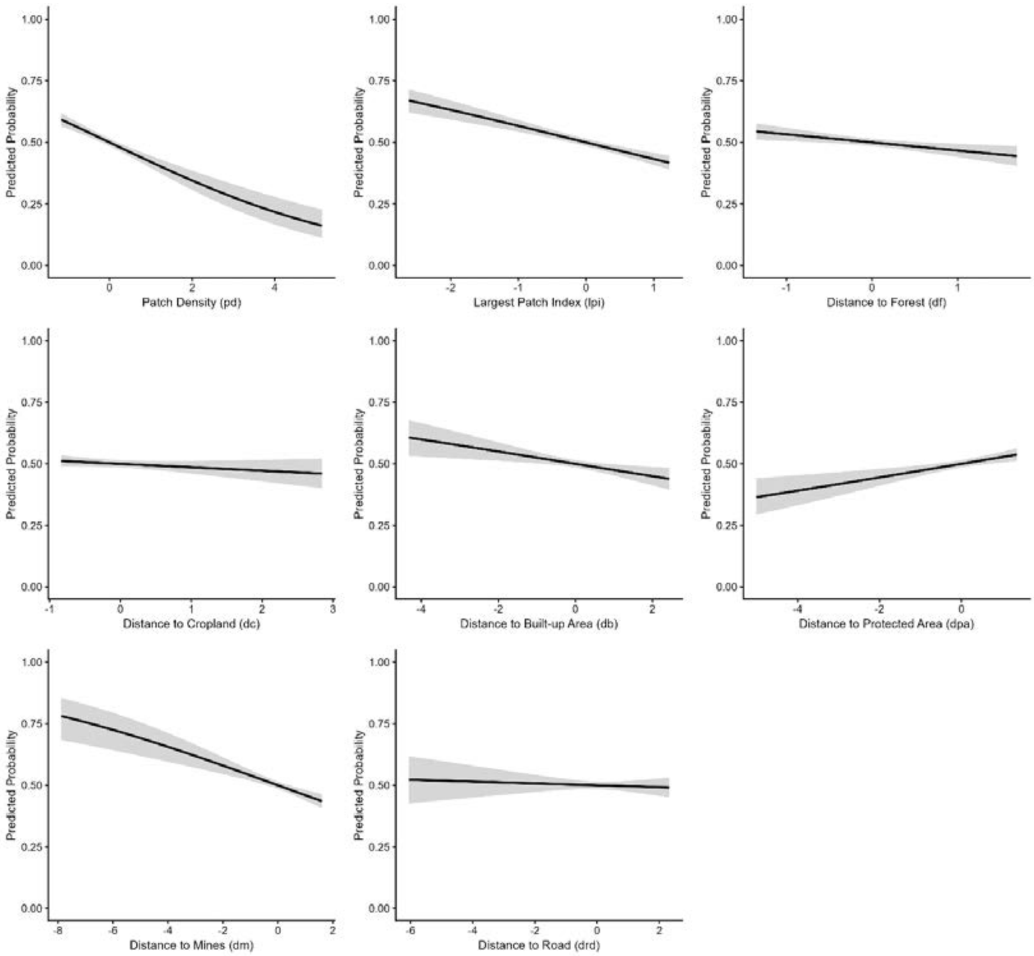

Figure 1.18: *Probability of Key Factors Affecting Human-Elephant Conflict (Human Fatalities and Injuries) in Odisha.*

Photo: Anshuman Gogoi.

DISCUSSION

In Odisha, human and elephants are increasingly drawn into the rapid changing landscape. Their encounters often result in crop raiding, property damage, injuries and deaths, creating serious consequences for both elephant and human communities. The assessment covering 2000–2025 shows that elephant mortality and human casualties in Odisha were persistent but unevenly distributed across years, seasons and forest divisions. Between 2000 and 2025, Odisha recorded 1,671 elephant deaths and 2,242 human casualty incidents, comprising 1,677 fatalities and 565 injuries.

The spatial analyses identified recurrent hotspots rather than an even distribution across the 45 forest divisions. Dhenkanal, Athagarh and Keonjhar Territorial Division recorded the highest overall elephant mortality, while Dhenkanal, Keonjhar, Rourkela and Angul contributed prominently to the human-casualty burden. Dhenkanal also recorded the highest anthropogenic elephant mortality. The convergence of these outcomes in the same broad landscapes indicates that elephants and people are exposed to different but related risks within forest-agriculture-settlement interfaces. Spatially concentrated HEC has similarly been reported from Dhenkanal and Keonjhar, where elephant movement overlaps with cultivation, settlements and infrastructure (Pradhan *et al.*, 2013; Tripathy *et al.*, 2021).

This pattern is consistent with the wider east-central Indian elephant range. Historical assessments identify central India as one of the country's most fragmented elephant regions, while research from Keonjhar shows that mines, croplands, settlements and transport networks can restrict elephant movement between habitat patches (Padalia *et al.*, 2019; Tripathy *et al.*, 2021). The overlap between elephant deaths and human casualties indicates shared risk landscapes, not identical immediate causes. The statistical models likewise identify spatial associations and do not prove direct causation.

SPATIAL AND TEMPORAL PATTERNS OF ELEPHANT MORTALITY AND HUMAN CASUALTIES

Elephant deaths were recorded throughout the study period. The highest annual total occurred in 2022, followed by 2024 and 2021. Disease was the leading recorded cause, followed by natural causes and electrocution, while unknown causes formed a substantial part of the dataset. These unresolved records limit the distinction between natural mortality and preventable human-related deaths. Rapid carcass detection, standardised post-mortem examination, toxicological testing and timely forensic investigation are therefore essential.

Dhenkanal recorded the highest elephant mortality, followed by Athagarh and Keonjhar Territorial Division. Similipal Tiger Reserve, Satkosia Wildlife Division, Angul, Deogarh and Bonai also contributed substantially. Research from Keonjhar has identified movement linkages constrained by croplands, mines, settlements and transport networks, while state wide modelling has identified bottlenecks and priority connections across Odisha (Tripathy *et al.,* 2021b; Palei *et al.,* 2024).

Human casualties were similarly concentrated, with the highest annual total in 2023. Dhenkanal was the most severely affected division, followed by Keonjhar, Rourkela and Angul. Their overlap with major elephant-mortality areas identifies these landscapes as priorities for coordinated conservation and public-safety action. Earlier work from Dhenkanal also documented substantial human deaths, injuries, crop loss and property damage where forests, cultivation and settlements occur close together (Pradhan *et al.,* 2013).

Both anthropogenic elephant mortality and human casualties were highest during the southwest monsoon. A comparable seasonal pattern was reported in Assam, where human fatalities and injuries were highest during the monsoon, particularly in areas near fragmented forests, agricultural fields and encroached elephant corridors (Habib *et al.,* 2025a). Seasonal changes in rainfall, crop development, water availability and human activity may alter where and when elephants encounter people. Crop-raiding studies show that elephant use of cultivated areas varies with crop development and seasonal movement, while an Odisha study found many electrocution deaths during the monsoon in agricultural areas (Sukumar, 1990; Palei *et al.,* 2014). Because these mechanisms were not measured directly, they remain plausible explanations rather than confirmed causes.

ANTHROPOGENIC ELEPHANT MORTALITY AND DEMOGRAPHIC VULNERABILITY

Electrocution was the dominant anthropogenic cause of elephant mortality, accounting for 274 deaths, followed by poaching and train accidents. A comparable pattern was reported in Chhattisgarh, where electrocution was the leading anthropogenic cause and adult males were particularly affected (Pandey *et al.,* 2025c). Most resulted from accidental contact with power lines while elephants entered agricultural areas, although deliberate electrification and poaching-related connections were also recorded (Palei *et al.,* 2014). The predominance of electrocution indicates that mitigation structures can become lethal when electric fences are illegal or poorly maintained (Chakraborty *et al.,* 2025).

Anthropogenic mortality differed significantly among demographic groups. Adult males recorded the highest number of human-induced deaths, followed by adult females and sub-adults. Evidence from Chhattisgarh also indicates pronounced adult-male vulnerability, with electrocution accounting for most recorded anthropogenic elephant deaths (Habib *et al.,* 2025b). Electrocution and poaching were the main threats to adult males, whereas disease contributed more strongly to deaths among younger elephants and sub-adults.

Adult males may be more exposed because they often range widely and use agricultural or human-dominated areas more than female led groups (Sukumar, 1990; Fernando *et al.,* 2023). However, individual movement was not examined here, so this explanation remains provisional for Odisha. Mortality among females, sub-adults, juveniles and calves shows that management cannot focus on males alone. Disease surveillance and pathological investigation remain necessary.

SHARED LANDSCAPE DRIVERS

The elephant mortality model received strong support for a combination of distance to built-up areas, croplands, forests, mines, protected areas and railways. All coefficients were negative, indicating that recorded elephant deaths were relatively more likely near these landscape features. Distance to mines showed the strongest association, followed by distance to forest, protected areas and built-up areas. This result is particularly relevant to the mineral rich belt of northern Odisha, where mining, transport expansion and settlement growth have altered forest continuity and elephant movement routes (Hota and Behera, 2016; Tripathy *et al.,* 2021b). The model does not imply that every nearby mine or railway caused a death. Rather, it identifies mortality concentration within the forest-mine-settlement patches.

The association with proximity to protected areas may also be interpreted as protected areas and reserve forests retain elephant habitat, but their edges often adjoin villages, croplands and transport infrastructure leads to the negative interaction between human and elephant. Mortality for both human and elephant may consequently become concentrated where elephants move between secure habitat and surrounding multi use landscape. Similarly,

proximity to cropland and built-up areas represents the forest village interface where elephants encounter people, fences and electricity networks.
The HEC model showed that recorded conflict was associated with lower patch density and Largest Patch Index, shorter distances to forest, built-up areas and mines, and greater distance from protected areas. These results indicate that conflict was concentrated in human-dominated landscapes outside protected areas but still close to forest and mining zones.

Patch Density and Largest Patch Index are scale-dependent measures of landscape configuration are evidence that either more or fewer forest patches independently increase conflict. Instead, conflict appears to depend on the combined arrangement of forest remnants, settlements, mines and movement pathways.

Village-level results support this multivariate interpretation. For elephant mortality, road density was the only variable that differed significantly among incident categories. For human casualties, cropland, water, built-up cover and road density differed significantly, whereas forest, mining and railway variables did not. Thus, high conflict was not determined simply by the largest amount of cropland, forest or mining within a village. Findings from Jharkhand similarly showed that high-incident villages combined greater forest and built-up cover with lower cropland and road density, indicating that risk reflected the configuration of landscape features rather than any single variable (Habib *et al.,* 2025c). Risk depended on spatial configuration, accessibility, elephant movement and human activity. Across central and east-central India, conflict similarly intensifies where fragmented habitat, cultivation and infrastructure constrain movement and increase repeated contact with people (Padalia *et al.,* 2019; de Silva *et al.,* 2023).

CONCLUSION

Elephant mortality and human casualties in Odisha were concentrated within a connected belt of high-risk landscapes including Dhenkanal, Athagarh, Angul, Keonjhar, Bonai and Rourkela. Disease was the leading recorded cause of elephant death, while electrocution was the dominant preventable anthropogenic threat. Adult males experienced the highest anthropogenic mortality among known age classes, but deaths among females and younger elephants show that risk extended across the population. Human casualties occurred throughout the year and were highest during the southwest monsoon. Management should therefore be targeted to specific landscapes rather than applied uniformly across the state. Immediate priorities include correcting unsafe electricity infrastructure, removing illegal electric fences, monitoring railway and road crossings, protecting functional habitat linkages and strengthening early warning and rapid response systems in recurrent hotspot villages. Post mortem quality, disease surveillance and forensic investigation must improve.

Long-term reduction of avoidable human and elephant deaths will require coordinated action by forest, electricity, railway, road, mining and district authorities, with affected communities involved in planning. India's Elephant Conservation Plan framework emphasizes integrated habitat management, mortality monitoring, conflict mitigation and interdepartmental coordination (Pandey *et al.,* 2026b). While Odisha-based social research highlights the value of including community experience in conservation decisions. Effective coexistence will depend on sustained intervention in the northern and central landscapes where elephant movement, settlements and intensive land use overlap in the state of Odisha.

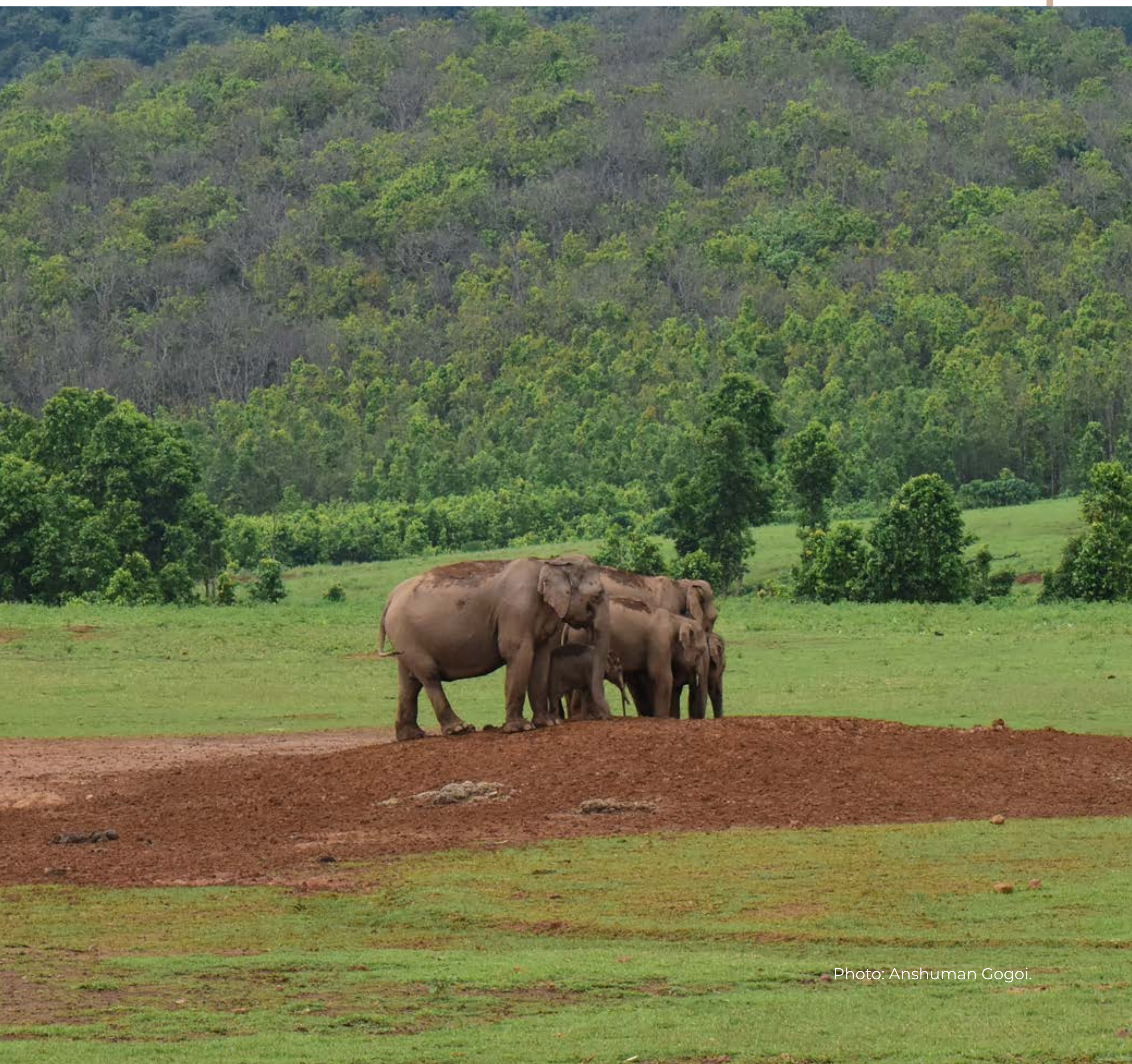

Photo: Anshuman Gogoi.

Suggested Measures to Minimize Human-Elephant Conflict in the State of Odisha

The observed variation in elephant mortality and human casualties across Odisha indicates the importance of considering landscape conditions and local management priorities in mitigation planning. Disease, natural causes, electrocution, undetermined causes and poaching were the leading recorded categories of elephant mortality. Human fatalities and injuries were frequently recorded where elephant movement overlapped with cultivation, settlements and fragmented forests. Mortality and casualties were concentrated mainly in northern, central and parts of western Odisha, although incidents occurred across much of the state.

In Keonjhar, Bonai, Rourkela, Angul, Dhenkanal and Sundargarh, elephants move through landscapes modified by mining, industries, railways, roads, power infrastructure and settlements. Management in these divisions should therefore prioritise infrastructure-related mortality and community safety. In more forested landscapes, including Similipal, Satkosia and Athagarh, greater attention may be required for wildlife health, habitat conditions and interactions along forest-village boundaries. Elephant mortality was associated with proximity to forests, croplands, built-up areas, mines, protected-area boundaries and railways, while human casualties were related to landscape structure and proximity to forests, settlements and mines. Areas where several risk factors overlap should be prioritised for field verification and preventive action.

The Government of Odisha has introduced several mechanisms to manage human-elephant interactions. Elephant squads and Gaja Sathis track elephant movement and alert vulnerable communities, while wildlife control rooms and the Elephant Monitoring App support field surveillance (Odisha Forest Department, 2024, pp. 47-48). Thermal drones are used in several forest divisions, including Keonjhar, for elephant tracking, hazard mapping, early warning and locating injured or distressed elephants (Odisha Forest Department, 2025, pp. 190-192). Rapid Response Teams respond to wildlife emergencies and rescue animals in distress (Odisha Forest Department, 2024, p. 180).

Physical interventions include trenches, solar streetlights, watchtowers and solar fencing in selected conflict-prone areas (Odisha Forest Department, 2025, pp. 44-45, 110). Habitat-management activities include meadow development, creation or restoration of water bodies, fruit and fodder plantations, and regeneration of degraded bamboo forests through CAMPA (Odisha Forest

Department, 2025, pp. 44-45, 102). Complementing these preventive and response measures, the Anukampa portal provides a digital mechanism for processing ex gratia and compensation claims, helping affected households access financial support following human-wildlife conflict incidents (Odisha Forest Department, 2025, p. 44).

LANDSCAPE AND PREVENTIVE MEASURES

Habitat connectivity and management of mining and industrial areas

Odisha requires a balanced approach to mineral development that supports economic priorities while protecting elephant habitats and movement routes. Confirmed routes should be incorporated into forest working plans, district land-use plans and environmental appraisals.

a. **Existing mining:** Active mines in elephant-use areas should prepare site-specific elephant-management plans covering blasting, night-time movement of mining vehicles, power lines, excavations, waste dumps, ponds, railway sidings and worker settlements. Riparian strips and forest linkages should be maintained as low-disturbance zones. Mine discharge should be treated before entering natural waterways. Controlled discharge through settling ponds improved elephant use of riverine habitat in the Singhbhum landscape (Singh & Chowdhury, 1999). Abandoned mines and unused roads should be restored with native vegetation. Mining, mineral transport and waste disposal can disturb elepshant habitats and influence conflict patterns (Tripathy *et al.,* 2021b).
b. **Proposed mining:** Proposed mineral blocks should undergo elephant-habitat screening before auction using multi-season data on elephant movement, forest connectivity, water sources and conflict locations. The combined effects of mines, industries, roads, railways, power lines and settlements should be evaluated. Alternative lease boundaries and infrastructure alignments should be examined to maintain elephant connectivity (WII, 2016). Broader drivers of forest loss should also be assessed before licences are granted (Mishra *et al.,* 2022). The Supreme Court of India affirmed the authority of Gram Sabhas to determine community and religious rights. In socially and ecologically sensitive areas, project appraisal should therefore consider forest-based livelihoods and local ecological knowledge, with consultation and verification of legally established claims completed before final clearance (*Orissa Mining Corporation Ltd*., 2013). Mining operators should implement prescribed mitigation and restoration measures, while government agencies retain responsibility for regulatory oversight, compliance monitoring and enforcement.

Irrigation canal management across elephant landscapes

Rivers and riparian vegetation should be protected as movement routes and sources of water, forage and cover (Kumar *et al.,* 2010). New canals, embankments and intensive riverbank development should avoid confirmed elephant routes. Where canals intersect established routes, the Forest and Water Resources departments should jointly identify and retrofit high-risk sections (Ament *et al.,* 2021).

Crossings should follow established elephant paths and use broad, soil-covered overpasses or covered-canal sections at surrounding ground level. Approaches should be gentle, unobstructed and surfaced with natural material. Open canals should include rough-surfaced escape ramps accessible under different water levels. Evidence from irrigation canals supports broad overpasses over narrow culverts (Azedo *et al.,* 2022), while a Subarnarekha canal design demonstrates the feasibility of a soil-covered elephant passage (Das *et al.,* 2026). Dimensions and spacing should reflect canal hydraulics, bank height, herd size and local movement data.

Physical Barriers

Physical barriers should be used only at clearly defined human-use sites and compact settlement interfaces. They should not enclose small forest blocks or form landscape-scale boundaries that restrict natural elephant movement. Before construction, proposed alignments should be assessed using maps of elephant locations, seasonal movement routes and corridors. Barriers are most suitable along clear, relatively straight boundaries that are not interrupted by roads, rivers or large streams (MoEFCC, 2023).

Solar fences should use certified non-lethal pulsed energisers, proper earthing, suitable insulators and regular vegetation clearance. They should not be connected directly to domestic or distribution electricity, as illegal or lethal electric fencing presents a serious electrocution.

Elephant proof trenches should be limited to firm and relatively stable ground with few streams or natural depressions. Eroded soil and silt should be removed after heavy rainfall to prevent the development of crossing points (Project Elephant, MoEFCC, & WWF-India, 2022). Wall barriers should be used selectively following site-specific evaluation because extensive walls may be costly and frequently breached by elephants (Natarajan *et al.,* 2021).

Local communities should be involved in planning and routine upkeep. Responsibility should be assigned to designated maintainers or barrier maintenance committees through clearly documented arrangements.

Maintenance systems should include defined duties, accountability, appropriate remuneration and technical training (Kamdar *et al.,* 2022).

Barrier performance should be monitored using structural condition, breach records and evidence of elephant entry. In North-East India, the assessed solar fence had significantly fewer elephant signs than nonprotected sites, whereas the assessed trench did not differ significantly from its nonprotected comparison site. Barrier type should therefore be selected using site conditions and demonstrated local performance rather than assumed effectiveness (Das *et al.,* 2022).

Protection of settlements and croplands

Village risk maps should identify recurrent entry points and exposed houses, schools, markets, grain stores, water points and roads. Site-specific measures may include secure storage of grain, fermented products, livestock feed and organic waste, together with lighting or observation facilities where field assessment confirms a safety benefit.

Crop diversification may be piloted where suitable markets and farmer support exist. Medicinal and aromatic plants were less attractive to elephants than rice and maize under experimental conditions, but village-scale effectiveness remains uncertain (Gross *et al.,* 2017). Trials should assess damage reduction, profitability, market access, farmer acceptance and displacement of elephant activity. Protection plans should reflect local settlement patterns, crop calendars and elephant movement.

Prevention of electrocution

Electrocution caused 274 elephant deaths and was the leading recorded anthropogenic cause in Odisha during 2000-2025. The high anthropogenic mortality among males is particularly concerning, especially where mature bulls are affected. Older bulls can influence collective movement and social regulation, and reduced presence of older males has been associated with increased aggression in African elephant populations; its relevance to Asian elephants should therefore be interpreted cautiously (Kopf *et al.,* 2025).

Priority hazards include low or sagging conductors, exposed components, unsafe transformers, illegal power tapping and live wire crop fencing. Odisha records indicate that both infrastructure defects and deliberate electrification of fences require attention (Palei *et al.,* 2021). Community awareness should emphasize that elephants also fall victim to illegally electrified fences or wires set for wild pigs and other crop raiding animals. Village outreach should promote reporting of unsafe wiring, distinguish approved pulse energisers from lethal connections, and encourage regulated non-lethal crop protection, while highlighting the additional risk from wires used for poaching (Palei *et al.,* 2014; Kalam *et al.,* 2018).

Each electrocution site and electrified barrier or fence should be georeferenced and jointly inspected by the Forest Department and the responsible electricity agency. Pre-monsoon and crop-season audits should prioritize recurrent locations, forest–cropland boundaries, elephant movement routes and private electricity networks associated with mines, industries and plantations. Spatial clustering of incidents can help identify high-risk areas and direct corrective action (Ghosh *et al.,* 2025).

Railway and road safety

The study recorded 45 train-related and eight road-related elephant deaths during 2000-2025. Collision hotspots and confirmed crossing sites should be mapped using mortality records, field signs, recent elephant movement, visibility and traffic conditions. High-risk railway stretches require enforceable speed restrictions, seasonal patrols, locomotive alerts and direct communication among forest staff, railway controllers and loco pilots. Variation in risk by location, season, time, train speed and track curvature supports site-specific intervention (Ahmed & Saikia, 2022; Joshi & Puri, 2019).

Passages, ramps and level crossings should be provided only at verified crossing sites, with clear approaches and safe exits (WII, 2016). Drains and embankments that obstruct elephant movement should be modified, while vegetation affecting driver visibility should be managed regularly.

On railway sections frequently crossed by elephants, DAS-based intrusion detection could use existing optical-fiber infrastructure to provide continuous monitoring without relying solely on visual detection. AI-enabled cameras remain useful for visual confirmation but require regular maintenance and can be affected by vegetation, weather, restricted fields of view and false or missed detections (Newey *et al.,* 2015; Glover-Kapfer *et al.,* 2019). Where suitable optical fiber is available, DAS could complement camera-based monitoring and reduce the number of trackside installations required. Its operational performance, maintenance needs and comparative cost-effectiveness should be assessed through site-specific trials before wider deployment (CAMTECH, 2025).

Roads and mining or industrial transport routes crossing elephant-use areas also require site-specific speed controls, warning systems and safe crossing provisions. The effectiveness of these measures should be assessed through collision records, alert-response times, compliance with speed restrictions and continued elephant use of crossing structure (PE–MoEFCC–WII, 2024).

Prevention of poaching, poisoning and retaliatory killing

The study recorded 129 deaths from poaching, 20 from poisoning and 16 from retaliatory killing. The higher occurrence of poaching among adult males requires focused protection of tusker-use areas and movement routes. Patrol planning should use mortality locations, ivory-removal records, snare recoveries and verified intelligence across adjoining divisions. Selective ivory poaching can alter sex and tusk structure within elephant populations (Sukumar *et al.,* 1998).

Poaching, poisoning and retaliatory killing have important social dimensions. It influenced by livelihood losses, fear, psychosocial stress and difficulties in accessing compensation, which can reduce tolerance towards elephants (Barua *et al.,* 2013; Karanth *et al.,* 2018). Poaching differs from immediate retaliation because it may also involve ivory demand and the selective killing of tuskers (Sukumar *et al.,* 1998). Prevention should combine timely compensation and livelihood support with community awareness, local participation, confidential reporting mechanisms and targeted enforcement.

Suspected poaching and poisoning cases should follow a standard wildlife-crime protocol. Sites must be secured, necropsies and forensic sampling completed promptly, and evidence handled through a documented chain of custody. Toxicological testing is essential in suspected poisoning cases (Radhakrishnan, 2018). Enforcement should be supported by local consultation, confidential information-sharing and review of conflict-related triggers. Investigation outcomes should be recorded in a state-level wildlife-crime database.

Disease surveillance and mortality investigation

Disease accounted for 469 deaths, while 237 cases remained of unknown cause. Disease was frequent among calves, juveniles and sub-adults, and delayed carcass detection may have reduced diagnostic certainty. Prompt necropsy and molecular testing are important for detecting infections such as elephant endotheliotropic herpesvirus (Zachariah *et al.,* 2013).

Carcasses should be examined by trained teams using a uniform state protocol. Records should cover location, demographic class, body condition, decomposition, lesions, trauma and possible human involvement. Samples should support pathological, microbiological, parasitological, toxicological and molecular examination. Unusual clusters and unresolved cases should receive multidisciplinary review. Odisha's protocol should follow the national procedure for elephant necropsy, sampling and carcass disposal (PE-MoEFCC-WII, 2023), with stronger surveillance in extensive forest landscapes where detection is often delayed.

Improvement and maintenance of existing mitigation structures

Existing structures should be assessed before new installations are approved. Each division should maintain a georeferenced inventory of structure type, construction year, condition, maintenance responsibility and inspection history. Funding and responsibility should be assigned at installation, with inspections before the monsoon and principal crop season and after major damage events. Sustained fence performance depends on clearly assigned maintenance arrangements (Kamdar *et al.,* 2022).

Damaged fences, collapsed trenches, non-functional lights, blocked passages and unsafe electrical components should be repaired promptly. Structures that no longer match current elephant movement or risk patterns should be modified, relocated or removed. Performance should be judged by condition, safety and incident reduction, not by the number or length of structures installed.

EARLY WARNING AND COMMUNITY PREPAREDNESS

AI-based early-warning systems

AI-based systems should initially be piloted at confirmed entry routes, bottlenecks, settlement approaches and high-risk railway crossings. Camera traps or thermal sensors can detect elephants and transmit alerts to control rooms and field teams. In West Bengal, one system recorded 266 detections and issued alerts within an average of about 42 seconds (Rastogi *et al.,* 2025). Initial field deployments should assess detection accuracy, missed events, false alarms, communication reliability and response time. Deployment requires reliable power, regular maintenance, trained operators and assigned response teams. AI should complement field tracking and community reporting. Wider expansion should occur only after initial assessments demonstrate timely and reliable alerts.

SMS- and app-based elephant alert systems

The Elephant Monitoring App, control rooms, elephant squads and Gaja Sathis provide a foundation for an integrated warning network in Odisha (Odisha Forest Department, 2024, pp. 47-48). Thermal drones can support tracking and hazard detection in selected divisions (Odisha Forest Department, 2025, pp. 190-192). Community reports through the Gaja Sanrakshana-Odisha app should be verified before alerts are issued along the likely movement route.

Alerts should state the location, time and direction of movement and provide brief safety instructions. Warnings should use SMS, mobile apps, voice calls and public-address systems in Odia and other locally used languages. A two-way system should allow authorised staff and volunteers to submit and acknowledge reports.

Safer practices in high-risk villages

Village safety plans should prioritise people engaged in crop protection, night travel and forest-based work, particularly adult and older men who formed most recorded victims. Non-essential movement along exposed field edges, forest paths and known routes should be restricted when elephants are nearby. Forest-produce collection and other outdoor work should occur during daylight and in groups where feasible.

Crop protection should use rostered teams with defined duties and a withdrawal procedure. Solitary guarding and close pursuit should be discouraged. Schools, markets and transport points in recurrent-risk villages should have coordinators, safe assembly locations and seasonal drills. Evidence from Indonesia supports organised community guarding when participant safety is maintained (Gunaryadi *et al.*, 2017).

EMERGENCY RESPONSE AND CROWD MANAGEMENT

Rapid Response Teams

Rapid Response Teams should be positioned according to conflict hotspots, seasonal risk and current elephant movement. Each team should include trained forest personnel and local community members, with clearly defined roles, standard operating procedures and direct links to control rooms, police, health services and other relevant agencies. Teams require dedicated vehicles, searchlights, protective equipment, reliable communication systems, first-aid supplies and measurable response-time standards. All deployments should be documented to assess response time, actions taken and outcomes. Odisha's existing response teams provide an institutional foundation for strengthening and expanding this system in high-risk divisions like Dhenkanal, Angul, Keonjhar etc., (Odisha Forest Department, 2024, p. 180).

Response should prioritize crowd control, safe separation and an open exit route for elephants. Police, health services, electricity agencies, railway personnel and wildlife veterinarians should assist when required. Each deployment should record the alert source, response time, actions, injuries, elephant movement and outcome.

Avoidance of forced elephant driving

Repeated or poorly coordinated driving should not be used routinely because it may shift elephants towards settlements, transport routes or adjoining jurisdictions and provide only temporary relief (Fernando *et al.,* 2008).

Directional driving should be limited to immediate threats and conducted under a single authorised command. Crowds must be controlled, a safe route to suitable habitat kept open and communities along the route warned. Long pursuits, driving from several directions and attempts to push elephants across administrative boundaries should be avoided.

Long-term monitoring of solitary males and crop-raiding herds

Adult males had the highest anthropogenic mortality among elephants of known demographic class during 2000–2025. However, elephants should not be classified as recurrent high-risk animals solely because they are male or have entered cropland once.

Individuals and herds repeatedly involved in incidents should be monitored through photo-identification, camera traps, field observations and, where justified, telemetry. Classification should require long-term evidence of repeated entry and reduced response to deterrents. Records should document movements, crop-entry sites, group composition, injuries, infrastructure encounters and responses to earlier interventions. Research linking elephant movement with crop-damage patterns supports individual-based monitoring for local planning (Fernando *et al.,* 2023).

Selective use of capture and translocation

A GPS study of 16 translocated male elephants in Sri Lanka found that two were killed within release parks and the remaining 14 left them. Some returned towards capture sites, while others wandered or established new ranges. Most continued conflict behaviour, sometimes in previously unaffected areas, and mortality increased (Fernando *et al.,* 2012).

Capture or translocation should therefore not be a routine response. It should be considered only where danger to human life persists, non-lethal measures have failed and independent technical review supports intervention. Approved operations require strict veterinary procedures and post-release monitoring, preferably through telemetry.

POST-INCIDENT SUPPORT

Compensation, medical care and livelihood support

The Anukampa scheme should adopt fixed timelines for verification, approval and payment, with regular claim-status updates (Odisha Forest Department, 2025, p. 44). Applicants should receive reasons for rejection and access to a simple appeal process. Assisted filing, village-level support and offline data collection are needed where digital access is limited.

Human death and serious injury cases should receive immediate interim relief, followed by final settlement, rehabilitation and livelihood support where earning capacity is affected. Claims should be georeferenced to identify repeatedly affected households and villages. Periodic reporting of pending claims, processing times and payments would strengthen transparency and planning.

COORDINATION AND EVALUATION

Coordination among forest divisions

Adjoining divisions should share movement maps, contact lists, alert formats and protocols because elephants frequently cross divisional boundaries. During high-risk periods, control rooms should exchange verified locations and movement directions in real time and share Rapid Response Teams, vehicles, drones and veterinary support where local capacity is insufficient.

Boundary incidents should be reviewed jointly to identify failures in warning, crowd management and response. Elephants should not be directed towards adjoining divisions without prior communication and alerts to receiving communities. Landscape-level planning and clear allocation of responsibilities may consistent with the national Elephant Conservation Plan framework (PE-WII-MoEF&CC, 2024).

Inter-state coordination

Odisha's elephant landscapes connect with West Bengal, Jharkhand and Chhattisgarh. Border divisions should appoint nodal officers and use standard protocols to share verified locations, movement direction, group composition and expected arrival time before elephants reach state boundaries.

Adjoining states should jointly review movement routes, mortality records, railway crossings, wildlife-crime intelligence and recurrent conflict villages before the monsoon and major crop seasons. Alert formats should be standardised, and elephants should not be driven across state boundaries without prior warning and coordinated response.

Monitoring and evaluation of mitigation measures

A common geospatial database should integrate elephant mortality, human casualties, crop and property damage, compensation claims, movement routes, infrastructure, warnings and response times. Incident records should include verified coordinates, date, time, relevant demographic information, circumstances and action taken.

Performance indicators should track preventable elephant deaths, human fatalities and serious injuries, electrical-hazard correction time, warning accuracy, Rapid Response Team response time, barrier condition, claim-settlement time and recurrence at treated sites. Interventions should be assessed through before-and-after comparisons and, where feasible, similar untreated locations. Surrounding villages should also be monitored to detect displacement of conflict, with community experience considered alongside ecological and administrative evidence.

Division-level plans should be reviewed annually. Measures that repeatedly fail, remain unmaintained or transfer risk should be modified or discontinued. Expansion should occur only after effectiveness, safety, cost and maintenance requirements have been demonstrated.

Photo: Anshuman Gogoi.

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APPENDIX I

Details of Villages which witnessed Elephant Mortality in the state of Odisha during (2000-2025)

Sl. No.	Elephant Mortality Count	Village name	Division
1	9	Tikarapada	Keonjhar (Territorial)
2	7	Kamalanga	Dhenkanal
3	7	Nalabenta	Brahmapur
4	6	Bandijharan	Sambalpur
5	6	Bidmal	Jharsuguda
6	6	Kanjipani	Keonjhar (Territorial)
7	5	Bhanga	Keonjhar (Territorial)
8	5	Bhanjapali	Bonai (Territorial)
9	5	Deogan	Karanjia
10	4	Andiadukura	Rairangpur
11	4	Birsinghagad	Sambalpur
12	4	Borapadakhamar	Dhenkanal
13	4	Deogan	Dhenkanal
14	4	Sialrama	Jharsuguda
15	4	Subarnapur	Athamalik
16	3	Alusinga	Dhenkanal
17	3	Bhuyanraida	Keonjhar (Territorial)
18	3	Domuhani	Ghumsur North
19	3	Gobardhanbadmal	Sambalpur
20	3	Jaganathpur	Angul
21	3	Kantalei	Keonjhar (Territorial)
22	3	Kutsira	Subarnpur
23	3	Lanjiberna	Rourkela
24	3	Masunihata	Angul
25	3	Mundapada	Athamalik
26	3	Purunadihi	Keonjhar (Territorial)
27	3	Purunakot	Satkosia Wildlife
28	3	Santhapur	Dhenkanal
29	3	Toradanali	Dhenkanal

30	3	Tumusingha	Dhenkanal
31	2	Alluni	Keonjhar (Territorial)
32	2	Badkuda	Redhakhol (Territorial)
33	2	Bagala	Khordha(Territorial)
34	2	Baghuabol	Angul
35	2	Bala	Karanjia
36	2	Balanga	Angul
37	2	Besarpani	Baripada (Territorial)
38	2	Betarjanga	Khordha (Territorial)
39	2	Bhubaneswar M Corp	Chandaka Wildlife
40	2	Debalayapur	Angul
41	2	Dudurokot	Dhenkanal
42	2	Ghungi	Keonjhar (Territorial)
43	2	Giridharprasad	Dhenkanal
44	2	Hidising	Angul
45	2	Jaduloisingh	Sambalpur
46	2	Jajanga CT	Keonjhar (Territorial)
47	2	Joda M	Keonjhar (Territorial)
48	2	Kalinga	Dhenkanal
49	2	Kanakhai	Brahmapur
50	2	Kantamegha	Angul
51	2	Karanda	Dhenkanal
52	2	Karanji	Cuttack
53	2	Kayalpada	Cuttack
54	2	Kolgan	Sambalpur
55	2	Kotam	Dhenkanal
56	2	Mahipani	Rourkela
57	2	Mottabadi	Ghumsur South
58	2	Musapali	Rourkela
59	2	Nandakishorepur	Athagarh
60	2	Nuabandha	Athagarh
61	2	Ostapanga	Keonjhar (Territorial)
62	2	Radhapriyapur	Athagarh
63	2	Ramachandrapur	Brahmapur
64	2	Ranjagola	Dhenkanal
65	2	Rasol	Dhenkanal

66	2	Ratnapravapodapada	Dhenkanal
67	2	Samarada	Ghumsur North
68	2	Sankhamur	Deogarh
69	2	Subalaya	Sundargarh
70	2	Suliamal	Balangir
71	2	Tendirahill Ii	Rairangpur
72	2	Terlo	Kalahandi North
73	1	Adaghat	Bonai (Territorial)
74	1	Aluajharan	Dhenkanal
75	1	Ambilijhari	Cuttack
76	1	Ambithi	Dhenkanal
77	1	Asarada	Dhenkanal
78	1	Badabalipasi	Deogarh
79	1	Badadumula	Brahmapur
80	1	Badnuagaon	Rourkela
81	1	Badsul	Baripada (Territorial)
82	1	Bagadiha	Bamra Wildlife
83	1	Bagpur	Kalahandi North
84	1	Bahalpadar	Balangir
85	1	Bahandei	Dhenkanal
86	1	Bakhartola	Bonai (Territorial)
87	1	Balimi	Dhenkanal
88	1	Ballabha	Dhenkanal
89	1	Bandhuabeda	Keonjhar (Territorial)
90	1	Baria	Karanjia
91	1	Barsal	Cuttack
92	1	Basira	Keonjhar (Territorial)
93	1	Batisuan	Deogarh
94	1	Bedapada	Dhenkanal
95	1	Beherasahi	Satkosia Wildlife
96	1	Belapada	Dhenkanal
97	1	Benipathara	Dhenkanal
98	1	Bhabanipali	Sambalpur
99	1	Bhadramunda	Deogarh
100	1	Bhatakumarada	Brahmapur
101	1	Bhimakand	Keonjhar (Territorial)
102	1	Bhimapur Bhuinpur	Keonjhar (Territorial)

103	1	Binjhabahal	Keonjhar (Territorial)
104	1	Biringadihi	Keonjhar (Territorial)
105	1	Biru	Angul
106	1	Bishnupur	Athagarh
107	1	Boneikela	Bonai (Territorial)
108	1	Chadhiapalli	Ghumsur North
109	1	Chandapur	Dhenkanal
110	1	Choudwar M	Cuttack
111	1	Dalamkucha	Bonai (Territorial)
112	1	Dangapal	Angul
113	1	Danla	Keonjhar (Territorial)
114	1	Debhuin	Athagarh
115	1	Deuli	Rairangpur
116	1	Dhansol	Baripada(Territorial)
117	1	Dhanurjoyapur	Keonjhar Wildlife
118	1	Dhaurakhaman	Angul
119	1	Digi	Ghumsur South
120	1	Domkarlakhunta	Kalahandi North
121	1	Dumuduma	Angul
122	1	Fuljhara	Rairangpur
123	1	Gadagovindpur	Dhenkanal
124	1	Gadgadbahal	Sambalpur
125	1	Gahamapankala	Ghumsur South
126	1	Gangai	Bargarh (Territorial)
127	1	Garda	Rourkela
128	1	Ghantapada CT	Angul
129	1	Gobindaprasad	Dhenkanal
130	1	Gopalpur Jungle	Angul
131	1	Guhalachatua	Keonjhar (Territorial)
132	1	Gurilo	Dhenkanal
133	1	Gurujanga	Cuttack
134	1	Haripurburudi	Chilika Wildlife
135	1	Humma	Brahmapur
136	1	Industrial and Educational Area OG Ward 18	Rayagada
137	1	Jadaloi	Bonai (Territorial)
138	1	Jagannathprasad	Chandaka Wildlife

139	1	Jamirita	Keonjhar (Territorial)
140	1	Jamsuli	Baripada (Territorial)
141	1	Jamunalia	Keonjhar (Territorial)
142	1	Jhhulakhuntia	Angul
143	1	Jujomura	Sambalpur
144	1	Kadala	Dhenkanal
145	1	Kadalibari	Khordha (Territorial)
146	1	Kadalijhola	Ghumsur North
147	1	Kaikateni	Dhenkanal
148	1	Kalipoi	Dhenkanal
149	1	Kalla	Deogarh
150	1	Kalmanga	Bonai (Territorial)
151	1	Kamarei	Angul
152	1	Kamarposh	Rourkela
153	1	Kandhabereni	Angul
154	1	Katranga Bada	Satkosia Wildlife
155	1	Khadiapali	Bamra Wildlife
156	1	Khandadhuan	Deogarh
157	1	Khankira	Dhenkanal
158	1	Kharachuli	Dhenkanal
159	1	Khuntuni	Athagarh
160	1	Khurashi	Sundargarh
161	1	Koida CT	Bonai (Territorial)
162	1	Kucheipal	Rairangpur
163	1	Kudalpal	Sambalpur
164	1	Kuhibahal	Subarnpur
165	1	Kuldiha	Balasore Wildlife
166	1	Kulei	Angul
167	1	Kumurisinga	Angul
168	1	Kumusi	Dhenkanal
169	1	Kundaposi Kunaposi	Keonjhar (Territorial)
170	1	Lachhadakindar	Bonai (Territorial)
171	1	Lether	Bargarh (Territorial)
172	1	Mahulmunda	Bamra Wildlife
173	1	Malapura	Dhenkanal
174	1	Manapur	Ghumsur North
175	1	Manastara	Kalahandi South

176	1	Matiali	Balasore Wildlife
177	1	Matiasahi	Angul
178	1	Muktapasi	Dhenkanal
179	1	Mundaamba	Khordha (Territorial)
180	1	Naibuga	Keonjhar (Territorial)
181	1	Nakichua	Baripada (Territorial)
182	1	Nimighera	Keonjhar (Territorial)
183	1	Nimihata	Deogarh
184	1	Nizigarh	Athagarh
185	1	Nuabarangamal	Sambalpur
186	1	Nuamahulpali	Sambalpur
187	1	Nuapada	Dhenkanal
188	1	Nuguda	Deogarh
189	1	Nukhuripada	Angul
190	1	Odapada	Dhenkanal
191	1	Padmapur	Keonjhar (Territorial)
192	1	Paikpada	Jharsuguda
193	1	Panabhuin	Angul
194	1	Panagobindapur	Angul
195	1	Para	Angul
196	1	Parajungle	Angul
197	1	Patapur	Baripada (Territorial)
198	1	Pathuria	Bamra Wildlife
199	1	Patradanger	Kalahandi South
200	1	Pograbahal	Rourkela
201	1	Pokatunga	Angul
202	1	Ragadiapada	Angul
203	1	Raigoda	Satkosia Wildlife
204	1	Raikakachhar	Rourkela
205	1	Rairatanpur	Deogarh
206	1	Rajia	Keonjhar (Territorial)
207	1	Rakashabudha	Sundargarh
208	1	Ramachandrapur	Keonjhar (Territorial)
209	1	Rameikhamar	Dhenkanal
210	1	Ranaspur	Jeypore
211	1	Randa	Khordha (Territorial)
212	1	Ranibeda	Keonjhar (Territorial)

213	1	Ranipokhari	Balasore Wildlife
214	1	Raurkela M	Rourkela
215	1	Rugudidihi	Keonjhar (Territorial)
216	1	Sadasivapur	Dhenkanal
217	1	Sagumirigilendi	Chilika Wildlife
218	1	Saida Dangadarahasahi	Deogarh
219	1	Salapada	Dhenkanal
220	1	Salapada	Cuttack
221	1	Sanahulla	Athamalik
222	1	Sanaraduan	Keonjhar (Territorial)
223	1	Sanfakirmunda	Rourkela
224	1	Satrusola	Brahmapur
225	1	Sauria	Athagarh
226	1	Singari	Rayagada
227	1	Solagan	Dhenkanal
228	1	Sukhanala	Rourkela
229	1	Sunakhandi	Rourkela
230	1	Sunaposi	Baripada (Territorial)
231	1	Sunariposi	Karanjia
232	1	Suniamunha	Athagarh
233	1	Surda	Balangir
234	1	Surupa	Deogarh
235	1	Talagarh	Angul
236	1	Talasakara	Ghumsur South
237	1	Tamanda	Dhenkanal
238	1	Tendra	Bonai (Territorial)
239	1	Tentoloi	Athamalik
240	1	Thakurjharmunda	Bamra Wildlife
241	1	Thelakudar	Rourkela
242	1	Tuluka	Satkosia Wildlife
243	1	Uparadiha	Keonjhar (Territorial)
244	1	Uparjhar	Balangir

** This appendix presents only anthropogenic elephant deaths recorded within village areas. Records from reserve forests and protected areas are excluded.*

APPENDIX II

Details of Villages which witnessed Human Casualties by Elephants in the state of Odisha during (2000-2025)

S.No.	Human Casualties Count	Village Name	Division
1	31	Balarampur	Dhenkanal
2	19	Kantiokateni	Dhenkanal
3	16	Kandabindha	Dhenkanal
4	13	Babandha	Dhenkanal
5	12	Gopalprasad	Angul
6	12	Mendhapada	Dhenkanal
7	11	Jorandapatana	Dhenkanal
8	10	Ranjagola	Dhenkanal
9	9	Ankurda	Dhenkanal
10	9	Kasiadihi	Dhenkanal
11	9	Kolgan	Sambalpur
12	9	Raurkela Its	Rourkela
13	9	Redhakhol Nac	Redhakhol
14	8	Garapalasuni	Dhenkanal
15	8	Ghodadian	Dhenkanal
16	8	Kutunia	Rourkela
17	8	Malapura	Dhenkanal
18	8	Nizgarh Hindol	Dhenkanal
19	7	Bedapada	Dhenkanal
20	7	Eleijanga	Dhenkanal
21	7	Sriramchandrapur	Dhenkanal
22	7	Tarkabeda	Dhenkanal
23	6	Badsahir	Sambalpur
24	6	Dangapathar	Redhakhol
25	6	Kamakshyanagar Nac	Dhenkanal
26	6	Kanarsuan	Rourkela
27	6	Kuldiha	Balasore WL
28	6	Lodhani	Dhenkanal
29	6	Nayakot	Khordha
30	6	Rajagangapur M	Rourkela

31	5	Badalo	Dhenkanal
32	5	Barabank	Dhenkanal
33	5	Chirulei	Dhenkanal
34	5	Handifuta	Dhenkanal
35	5	Hariharpur	Rourkela
36	5	Khalibahal	Dhenkanal
37	5	Khankira	Dhenkanal
38	5	Mahakurpali	Sambalpur
39	5	Mohadia	Dhenkanal
40	5	Senaghati	Redhakhol
41	5	Sunaparbat	Rourkela
42	5	Tulasipasi	Dhenkanal
43	4	Badapokharia	Khordha
44	4	Baghadharia	Dhenkanal
45	4	Bala	Karanjia
46	4	Barihapur	Dhenkanal
47	4	Batisahi	Karanjia
48	4	Botanda	Khordha
49	4	Brahmapur	Dhenkanal
50	4	Damol	Dhenkanal
51	4	Dhobapal	Angul
52	4	Gadasantri	Angul
53	4	Gopalpur	Dhenkanal
54	4	Gurilo	Dhenkanal
55	4	Guruda	Keonjhar
56	4	Jhadabandha	Dhenkanal
57	4	Kandarsingha	Dhenkanal
58	4	Karanda	Dhenkanal
59	4	Makundapur	Dhenkanal
60	4	Markata	Dhenkanal
61	4	Nimidha	Dhenkanal
62	4	O C L Its	Rourkela
63	4	Palasapithia	Dhenkanal
64	4	Panchupada	Dhenkanal
65	4	Patuabeda	Sundargarh
66	4	Purunakot	Satkosia WL

67	4	Raurkela M	Rourkela
68	4	Sadangi	Dhenkanal
69	4	Sanghaposi	Deogarh
70	4	Sarabhadi	Karanjia
71	4	Sundargarh M	Sundargarh
72	4	Tainsar	Rourkela
73	4	Talagarh	Angul
74	4	Uparadiha	Keonjhar
75	3	Akhupal	Dhenkanal
76	3	Aranga	Khordha
77	3	Argalbindha	Rairangpur
78	3	Balikiari	Dhenkanal
79	3	Bamandiadihi	Sundargarh
80	3	Baniapanka	Keonjhar WL
81	3	Baripada M	Baripada
82	3	Belagan	Ghumsur South
83	3	Bhaliadal	Keonjhar
84	3	Bhalupatra	Jharsuguda
85	3	Bhejia	Athagarh
86	3	Brahmaniapal	Dhenkanal
87	3	Brundabanbiharipur	Khordha
88	3	Budhaamb	Rourkela
89	3	Buromal	Bolangir
90	3	Chandiramachandrapur	Ghumsur South
91	3	Charpali	Bargarh
92	3	Chhatam	Rourkela
93	3	Cuttack M Corp	Chandaka WL
94	3	Dhunkchhali	Redhakhol
95	3	Dinabandhupur	Dhenkanal
96	3	Dobuna	Keonjhar
97	3	Dudurokot	Dhenkanal
98	3	Gadagovindpur	Dhenkanal
99	3	Gariamunda	Rourkela
100	3	Godloisingh	Sambalpur
101	3	Golagadia	Dhenkanal
102	3	Gopinathapur	Khordha
103	3	Haladibahali	Dhenkanal

104	3	Kalikaprasad	Khordha
105	3	Karlakhaman	Rourkela
106	3	Kendudihi	Keonjhar
107	3	Kharagprasad	Dhenkanal
108	3	Khariabahal	Rourkela
109	3	Kharidali	Dhenkanal
110	3	Khatiabhangoni	Bonai
111	3	Khuntakata	Keonjhar
112	3	Kotam	Dhenkanal
113	3	Kumurusinga	Dhenkanal
114	3	Lathikata CT	Rourkela
115	3	Madhapur	Dhenkanal
116	3	Madhupur	Bonai
117	3	Mangalpur	Dhenkanal
118	3	Naibuga	Keonjhar
119	3	Nandapur	Dhenkanal
120	3	Nuara	Dhenkanal
121	3	Palasbani	Rairangpur
122	3	Panchupali	Keonjhar WL
123	3	Parichhal	Khordha
124	3	Pasasinga	Dhenkanal
125	3	Pateli	Angul
126	3	Pechamundi	Deogarh
127	3	Raikakachhar	Rourkela
128	3	Ranaspur	Jeypore
129	3	Saldihi	Bargarh
130	3	Sanahindol	Dhenkanal
131	3	Sankari	Keonjhar
132	3	Santarapur	Keonjhar
133	3	Sogarapasi	Dhenkanal
134	3	Sridihi	Dhenkanal
135	3	Swarupvilla	Baripada
136	3	Tikilipada	Sundargarh
137	3	Totapada	Khordha
138	2	Achalkote	Athagarh
139	2	Akula	Keonjhar
140	2	Ambajhara	Balasore WL

141	2	Ambapalas	Dhenkanal
142	2	Ambilijhari	Cuttack
143	2	Ambithi	Dhenkanal
144	2	Amlipani	Sambalpur
145	2	Angarbandha	Angul
146	2	Arda	Jharsuguda
147	2	Arnnapurnapur Kha	Dhenkanal
148	2	Badabill	Karanjia
149	2	Badakantakul	Angul
150	2	Badamunda	Dhenkanal
151	2	Badkuda	Redhakhol
152	2	Baghuabol	Angul
153	2	Baghuapat	Angul
154	2	Bailo	Dhenkanal
155	2	Baishnabkhol	Deogarh
156	2	Baliamba	Athamallik
157	2	Bam	Dhenkanal
158	2	Bandal	Bonai
159	2	Bandhapali	Sundargarh
160	2	Baneikala	Keonjhar
161	2	Banki	Rairangpur
162	2	Bankibahal	Sundargarh
163	2	Barada	Dhenkanal
164	2	Basala	Angul
165	2	Basantapada	Dhenkanal
166	2	Batisuan	Deogarh
167	2	Baula	Athagarh
168	2	Belpalsamilpurunapani	Baripada
169	2	Beruanpal	Dhenkanal
170	2	Bhanjapali	Bonai
171	2	Bhatli CT	Bargarh
172	2	Bhaunra	Jharsuguda
173	2	Bhumijtola	Rourkela
174	2	Bijuli Khaman	Sundargarh
175	2	Biringajhar	Rourkela
176	2	Biswalpali	Bamra WL

177	2	Biswanathpur	Sundargarh
178	2	Brahmapanga A	Balliguda
179	2	Brajaballabhapur	Khordha
180	2	Buchukupadabeat	Rourkela
181	2	Budheisuni	Ghumsur South
182	2	Camp Of Tisco	Keonjhar
183	2	Chandapur	Brahmapur
184	2	Chandapur	Dhenkanal
185	2	Chhatia	Dhenkanal
186	2	Chhatrama	Khordha
187	2	Chheliapada	Angul
188	2	Dantiamuhan	Baripada
189	2	Darjani	Dhenkanal
190	2	Dengula	Bonai
191	2	Deogan	Karanjia
192	2	Digarisol	Baripada
193	2	Dobeipentha	Keonjhar
194	2	Domuhani	Ghumsur North
195	2	Duduka	Sundargarh
196	2	Dullavpur	Keonjhar
197	2	Fuljhara	Rairangpur
198	2	Gadigan	Baripada
199	2	Gaham	Angul
200	2	Gailo	Dhenkanal
201	2	Gargadbahal	Redhakhol
202	2	Gayabandha	Khordha
203	2	Gengutia	Dhenkanal
204	2	Ghanamal	Bargarh
205	2	Gobindapur	Dhenkanal
206	2	Gobindpur Tileimal	Sundargarh
207	2	Gopalapur	Khordha
208	2	Gopalpur	Satkosia WL
209	2	Goudiapada	Khordha
210	2	Gourenmunda	Bargarh
211	2	Guagaria	Dhenkanal
212	2	Gundei	Dhenkanal

213	2	Gundichapada	Dhenkanal
214	2	Gutidarha	Rourkela
215	2	Hadagarh	Keonjhar WL
216	2	Hamamira	Angul
217	2	Hariharajore R F Tuta-munda	Redhakhol
218	2	Hariharpur	Keonjhar
219	2	Hatisila	Keonjhar
220	2	Hatura	Dhenkanal
221	2	Hunda	Keonjhar
222	2	Ichhabatipur R	Dhenkanal
223	2	Itma	Sundargarh
224	2	Jahnapada	Dhenkanal
225	2	Jakeikela	Bonai
226	2	Jambhirdihi	Rourkela
227	2	Jamuchakada	Dhenkanal
228	2	Jamunanaki	Rourkela
229	2	Janiguda	Jeypore
230	2	Jharbeda	Rourkela
231	2	Jhatiali	Karanjia
232	2	Joda M	Keonjhar
233	2	Kadambeda	Karanjia
234	2	Kadomali	Kalahandi South
235	2	Kalada	Dhenkanal
236	2	Kaliapal	Keonjhar
237	2	Kalmanga	Bonai
238	2	Kalusahukateni	Dhenkanal
239	2	Kamarei	Athamallik
240	2	Kamupadar	Rayagada
241	2	Kanja	Angul
242	2	Kanka	Dhenkanal
243	2	Kankadasoda	Dhenkanal
244	2	Kankalunda	Dhenkanal
245	2	Kantamegha	Angul
246	2	Kantimili	Dhenkanal
247	2	Karadadadar	Athamallik
248	2	Karanjia	Keonjhar

249	2	Khalapal	Dhenkanal
250	2	Khaliborei	Dhenkanal
251	2	Khaman	Cuttack
252	2	Kharaba	Keonjhar
253	2	Khatuahata	Dhenkanal
254	2	Khetamundali	Ghumsur North
255	2	Koida CT	Bonai
256	2	Kotaberena	Dhenkanal
257	2	Kukuda	Rourkela
258	2	Kukuta	Dhenkanal
259	2	Kulkuta	Bonai
260	2	Kumbahal	Sundargarh
261	2	Kumusi	Dhenkanal
262	2	Kureichuan	Bamra WL
263	2	Kusakala	Keonjhar
264	2	Laxmipur	Deogarh
265	2	Lendo	Khordha
266	2	Lohadar	Rourkela
267	2	Madhapur	Baripada
268	2	Madhupur	Dhenkanal
269	2	Magurakhala	Angul
270	2	Mahisalanda	Cuttack
271	2	Manchabeda	Bonai
272	2	Manko	Rourkela
273	2	Meramandali	Dhenkanal
274	2	Mohaniganj	Baripada
275	2	Motari	Dhenkanal
276	2	Muktapasi	Dhenkanal
277	2	Nagiapasi	Dhenkanal
278	2	Nahada	Dhenkanal
279	2	Naikanali	Angul
280	2	Nandamaha A	Balliguda
281	2	Naraharipur	Dhenkanal
282	2	Natripal	Deogarh
283	2	Naukiari	Dhenkanal
284	2	Nuabaripal	Keonjhar WL
285	2	Nuagarh	Athamallik

286	2	Nuagarh	Keonjhar
287	2	Nuapada	Dhenkanal
288	2	Nuatoli	Rourkela
289	2	Odapada	Dhenkanal
290	2	Pandadar	Keonjhar
291	2	Pankadihi	Bonai
292	2	Patala	Dhenkanal
293	2	Patala	Keonjhar
294	2	Purusottampur	Baripada
295	2	Putugaon	Keonjhar
296	2	Raigudi	Keonjhar
297	2	Raihari	Rairangpur
298	2	Raipada	Rairangpur
299	2	Rajia	Keonjhar
300	2	Rakala	Dhenkanal
301	2	Ramachandrapur	Athagarh
302	2	Rameikhamar	Dhenkanal
303	2	Ramguda	Jeypore
304	2	Ramimunda	Satkosia WL
305	2	Ranibania	Dhenkanal
306	2	Ranipal	Dhenkanal
307	2	Ranipokhari	Balasore WL
308	2	Rautarapur	Khordha
309	2	Rugudidihi	Keonjhar
310	2	Sadhucharanpur	Athagarh
311	2	Sagadapata	Keonjhar WL
312	2	Salasahi	Baripada
313	2	Sanamunda	Dhenkanal
314	2	Sanda	Dhenkanal
315	2	Sanfakirmunda	Rourkela
316	2	Sanjapada	Dhenkanal
317	2	Sankarpur	Dhenkanal
318	2	Sanputuli	Bonai
319	2	Sanrusiberna	Bonai
320	2	Santarabandha	Angul
321	2	Santhapada	Angul

322	2	Sarda	Sundargarh
323	2	Sariapada	Dhenkanal
324	2	Satahalia	Keonjhar
325	2	Siriabahal	Keonjhar
326	2	Siunapalli	Nabarangpur
327	2	Sulahi	Jharsuguda
328	2	Sunahaja	Baripada
329	2	Sunamara	Rairangpur
330	2	Sunariposi	Karanjia
331	2	Sundara	Keonjhar
332	2	Sunduria	Keonjhar
333	2	Talcher M	Angul
334	2	Tarabha	Satkosia WL
335	2	Terbeda	Redhakhol
336	2	Thenga	Dhenkanal
337	2	Tipirisingha	Deogarh
338	2	Titigaon	Athamallik
339	2	Udusu	Rourkela
340	1	Agrahat	Cuttack
341	1	Ahari	Baripada
342	1	Ainlajharan	Sambalpur
343	1	Ainlapali Jungle	Subarnapur
344	1	Aitapada	Jharsuguda
345	1	Ajatipur	Angul
346	1	Alekhapatana	Dhenkanal
347	1	Alusinga	Dhenkanal
348	1	Amalabeda	Rairangpur
349	1	Ambadali	Keonjhar
350	1	Ambagadia	Baripada
351	1	Ambahal	Bargarh
352	1	Ambapada	Dhenkanal
353	1	Analabereni	Dhenkanal
354	1	Anandapur Alias Pan-chapokharia	Keonjhar
355	1	Ankura	Keonjhar
356	1	Anlabereni	Athamallik
357	1	Anlapal	Dhenkanal

358	1	Anua	Baripada
359	1	Arachua	Dhenkanal
360	1	Arkhapal	Deogarh
361	1	Arla	Rourkela
362	1	Arsala	Keonjhar
363	1	Artasantrakateni	Dhenkanal
364	1	Ashokbandhali Bardid-inga	Sambalpur
365	1	Asurmunda	Subarnapur
366	1	Atinda	Dhenkanal
367	1	Bachhuribanka	Dhenkanal
368	1	Badabamua	Rourkela
369	1	Badadandasahi	Angul
370	1	Badamosingi	Rayagada
371	1	Badaraduan	Keonjhar
372	1	Badasada	Deogarh
373	1	Badbilla	Baripada
374	1	Badgaon	Bonai
375	1	Badgaon	Rourkela
376	1	Badgudiali	Rourkela
377	1	Badikata	Bargarh
378	1	Badkanjari	Bargarh
379	1	Badmal	Sambalpur
380	1	Badposi	Karanjia
381	1	Bagadia	Angul
382	1	Bagheiput	Khordha
383	1	Baghiaberna	Jharsuguda
384	1	Baghlata	Rourkela
385	1	Bagjharan	Bolangir
386	1	Bagpur	Kalahandi North
387	1	Bahadajhola	Nayagarh
388	1	Bahalpadar	Bolangir
389	1	Bahalunda	Dhenkanal
390	1	Bahandei	Dhenkanal
391	1	Baidpali	Bargarh
392	1	Baikunthapur	Keonjhar
393	1	Baisana	Athamallik

394	1	Baisinga	Dhenkanal
395	1	Baisnabajholi	Redhakhol
396	1	Bajarsul	Balasore WL
397	1	Bajinia	Rourkela
398	1	Bajrakot	Angul
399	1	Bakartala	Karanjia
400	1	Balada	Keonjhar
401	1	Balanga	Angul
402	1	Baldihi	Bonai
403	1	Baliadhipa	Baripada
404	1	Balijore	Sundargarh
405	1	Balikudiajungle	Angul
406	1	Balikuma	Dhenkanal
407	1	Balipadara A	Balliguda
408	1	Balipasi	Angul
409	1	Balipokhari	Keonjhar
410	1	Balipur	Athagarh
411	1	Baliputa	Satkosia WL
412	1	Balisinga	Kalahandi North
413	1	Bampa	Dhenkanal
414	1	Banabiharipur	Keonjhar
415	1	Banakati	Baripada
416	1	Banamalipur	Athagarh
417	1	Bandamunda	Bargarh
418	1	Bandania	Dhenkanal
419	1	Bandhagaon	Athamallik
420	1	Bandijharan	Sambalpur
421	1	Bangol	Dhenkanal
422	1	Bangu	Dhenkanal
423	1	Baniabandha	Redhakhol
424	1	Banjipali	Bargarh
425	1	Banktentuli	Subarnapur
426	1	Bankual	Athamallik
427	1	Banpokharia	Rairangpur
428	1	Bantha	Ghumsur North
429	1	Baradapal	Dhenkanal
430	1	Baragounia	Angul

431	1	Barangakachar	Sundargarh
432	1	Barapadar	Athamallik
433	1	Barasingha	Dhenkanal
434	1	Bargada	Rourkela
435	1	Barghat	Bonai
436	1	Bargiput	Rairangpur
437	1	Barkhanda	Keonjhar
438	1	Barkotia	Deogarh
439	1	Basaloi	Redhakhol
440	1	Basantapur	Keonjhar
441	1	Basiapada	Sambalpur
442	1	Basira	Keonjhar
443	1	Basoi	Dhenkanal
444	1	Basudebapur	Keonjhar
445	1	Basudevpur	Keonjhar
446	1	Batasinga	Dhenkanal
447	1	Baudabeda	Angul
448	1	Baunsakana	Dhenkanal
449	1	Baunsjore	Rourkela
450	1	Baunsuli	Keonjhar
451	1	Bayakumutia	Keonjhar
452	1	Beheranibasa	Sambalpur
453	1	Belapada	Dhenkanal
454	1	Belda	Keonjhar
455	1	Belkidihi	Sundargarh
456	1	Belkudar	Bonai
457	1	Belpahar M	Jharsuguda
458	1	Beltikiri	Dhenkanal
459	1	Benipathara	Dhenkanal
460	1	Bhadubeda	Rairangpur
461	1	Bhagatpur	Keonjhar
462	1	Bhagattola	Rourkela
463	1	Bhairangisol	Baripada
464	1	Bhaktabadkudar	Deogarh
465	1	Bhalukchua	Baripada
466	1	Bhalukhaman	Angul
467	1	Bhalukonadi	Nabarangpur

468	1	Bhalupali	Bolangir
469	1	Bhanaranali	Dhenkanal
470	1	Bharatapur	Redhakhol
471	1	Bharatbahal	Bolangir
472	1	Bhatchhatar	Baripada
473	1	Bhedabahal	Sundargarh
474	1	Bhejia	Dhenkanal
475	1	Bhejidihi	Keonjhar
476	1	Bhikampur	Sundargarh
477	1	Bhiruda	Athagarh
478	1	Bhitaramada Hill No 1	Rairangpur
479	1	Bhubanposi	Keonjhar
480	1	Bhuinragadi	Nayagarh
481	1	Bhulukabahal	Deogarh
482	1	Bhurtigarh	Kalahandi North
483	1	Bhurudubani	Baripada
484	1	Bhusunda	Ghumsur South
485	1	Bhutuda	Bonai
486	1	Bhuyanraida	Keonjhar
487	1	Bijatala	Rairangpur
488	1	Bijaylaxmisaranpur	Ghumsur South
489	1	Binida	Keonjhar
490	1	Binodpur	Athamallik
491	1	Birasingpur	Athagarh
492	1	Biribira	Sundargarh
493	1	Birikera	Rourkela
494	1	Biringadihi	Keonjhar
495	1	Birsinghagad	Sambalpur
496	1	Biru	Angul
497	1	Bishnupur	Balasore WL
498	1	Bishwanathapur	Kalahandi South
499	1	Brahmandihi	Bargarh
500	1	Brahmani	Subarnapur
501	1	Brahmani	Redhakhol
502	1	Brahmanidei	Angul
503	1	Brahmanipali	Athamallik
504	1	Bramhanbasa	Dhenkanal

505	1	Brundabanpur	Athamallik
506	1	Bubra Bubuda	Bargarh
507	1	Budha Khaman	Keonjhar
508	1	Budhakhaman	Deogarh
509	1	Budhipahad	Dhenkanal
510	1	Budna	Sundargarh
511	1	Buduli	Ghumsur North
512	1	Buhalipal	Dhenkanal
513	1	Bungapali	Bargarh
514	1	Buromunda	Bargarh
515	1	Burudihi	Bamra WL
516	1	Chachhupali	Deogarh
517	1	Chadeibhure	Keonjhar
518	1	Chadheimara	Deogarh
519	1	Chainpal	Angul
520	1	Chajangi	Balliguda
521	1	Chakakhalia	Bargarh
522	1	Chandiposh	Bonai
523	1	Chandrasekharpur	Angul
524	1	Chandrasekharpur	Khordha
525	1	Charakhaman	Athamallik
526	1	Charapalli	Khordha
527	1	Chargad	Redhakhol
528	1	Chaulia	Dhenkanal
529	1	Chengjharan	Rourkela
530	1	Chhachinapada	Baripada
531	1	Chhailosimilipatana	Dhenkanal
532	1	Chhamunda	Keonjhar
533	1	Chhatghar Forestbeat	Dhenkanal
534	1	Chhatipur	Khordha
535	1	Chhelachheli	Dhenkanal
536	1	Chhendipadajungle	Angul
537	1	Chhotapadagoan	Cuttack
538	1	Chhotkei Chhotakoi	Satkosia WL
539	1	Chhurichukha	Sundargarh
540	1	Chilataila	Dhenkanal
541	1	Chintapokhari	Dhenkanal

542	1	Chirgunikudar	Deogarh
543	1	Chitalapur	Dhenkanal
544	1	Chitrada	Baripada
545	1	Chitrakut	Khordha
546	1	Chormalda	Keonjhar
547	1	Choudwar M	Cuttack
548	1	Chuanbahal	Rourkela
549	1	Daitaripali	Bamra WL
550	1	Dalakudar	Rourkela
551	1	Dalita	Bonai
552	1	Dalki	Redhakhol
553	1	Dalsingamarthapur	Dhenkanal
554	1	Damajodi	Angul
555	1	Danamal	Bolangir
556	1	Danardanpur	Sundargarh
557	1	Dandargouni	Keonjhar
558	1	Dangapal	Angul
559	1	Dangapathar	Deogarh
560	1	Dangarapada	Khordha
561	1	Dangarbila	Baripada
562	1	Danguapasi	Keonjhar
563	1	Danla	Keonjhar
564	1	Dantari	Sambalpur
565	1	Daragaon	Khariar
566	1	Debhuin	Athagarh
567	1	Deopan	Jharsuguda
568	1	Deopata	Rairangpur
569	1	Deshbhatli	Bargarh
570	1	Deuli	Karanjia
571	1	Deuli	Khordha
572	1	Dhagotha	Keonjhar
573	1	Dhamakpur	Sundargarh
574	1	Dhangurumunda	Angul
575	1	Dhansol	Baripada
576	1	Dhanurjayapur	Keonjhar
577	1	Dhaurakhaman	Angul
578	1	Dhenkikote	Keonjhar

579	1	Dhepapalli	Ghumsur South
580	1	Dhobakundia	Baripada
581	1	Diarapasi	Dhenkanal
582	1	Digapahandi Nac	Brahmapur
583	1	Dimiria	Keonjhar
584	1	Dimiria	Keonjhar
585	1	Dubulabeda	Rairangpur
586	1	Dudhanali	Keonjhar
587	1	Dudurta	Rourkela
588	1	Dugudha	Baripada
589	1	Dumuria	Keonjhar
590	1	Dunguricha dha	Bargarh
591	1	Durgapur	Baripada
592	1	Fakirmohanpur	Dhenkanal
593	1	Fatamunda	Bolangir
594	1	Fulajhar	Cuttack
595	1	Fulbari	Sundargarh
596	1	Fuljhar	Keonjhar
597	1	Gadakhol	Redhakhol
598	1	Gadatarasa	Angul
599	1	Gaganaposh	Bonai
601	1	Galapada	Dhenkanal
602	1	Gambharia	Keonjhar
603	1	Gamhapali	Jharsuguda
604	1	Gandabarei	Keonjhar
605	1	Ganeshganja	Deogarh
606	1	Ganua	Bonai
607	1	Garamian	Cuttack
608	1	Gargadbahal	Sundargarh
609	1	Gariapasi	Deogarh
610	1	Gatarei	Dhenkanal
611	1	Gaudiniposh	Rourkela
612	1	Gaunighasa	Angul
613	1	Gayala Banka	Chandaka WL
614	1	Ghess	Bargarh
615	1	Ghodadian	Dhenkanal

616	1	Ghoghia	Rourkela
617	1	Ghosar	Athamallik
618	1	Ghunesh	Bolangir
619	1	Ghuntapasi	Keonjhar
620	1	Giranga Part	Angul
621	1	Giridharprasad	Dhenkanal
622	1	Gobardhan	Keonjhar
623	1	Gobardhanpur	Dhenkanal
624	1	Gobindaprasad	Dhenkanal
625	1	Gobindapur	Dhenkanal
626	1	Gobindpur	Baripada
627	1	Gobindpur	Athagarh
628	1	Gochhangi	Boudh
629	1	Goda	Khordha
630	1	Godaribili	Dhenkanal
631	1	Godipokhari	Dhenkanal
632	1	Golabandha	Keonjhar WL
633	1	Gopa	Khordha
634	1	Gopapur	Cuttack
635	1	Gopigangadharpur	Angul
636	1	Gopinathapur	Angul
637	1	Gopinathapur	Keonjhar
638	1	Gopinathapur Nuagaon	Keonjhar
639	1	Gugudari	Keonjhar
640	1	Guhalachatua	Keonjhar
641	1	Gujapal	Bonai
642	1	Gundiadihi	Sundargarh
643	1	Gunduribadi	Ghumsur North
644	1	Gunduriposi	Keonjhar
645	1	Gurandia	Similipal North
646	1	Gurudacamp	Keonjhar
647	1	Gurujanga	Dhenkanal
648	1	Gurutuan	Keonjhar
649	1	Haldi	Khariar
650	1	Hamirpur	Sundargarh
651	1	Handatupa	Jharsuguda

652	1	Handibhanga	Keonjhar
653	1	Handigoda	Angul
654	1	Haribereni	Angul
655	1	Haridajodi	Keonjhar
656	1	Haridapasi	Athagarh
657	1	Hariharpur Rayati	Angul
658	1	Harinasul	Baripada
659	1	Haripur	Baripada
660	1	Haripur	Khordha
661	1	Haripur	Cuttack
662	1	Harischandrapur	Bonai
663	1	Hatibahal	Bonai
664	1	Hatibari	Sambalpur
665	1	Hatikholia	Balasore WL
666	1	Hatipahul	Subarnapur
667	1	Haturipal	Dhenkanal
668	1	Hill No 1	Rairangpur
669	1	Hinsaloi	Angul
670	1	Hinsrida	Angul
671	1	Hirapasi	Keonjhar
672	1	Hunjaposi	Keonjhar
673	1	Ichhapur	Athamallik
674	1	Illirisingha	Dhenkanal
675	1	Indraprastha	Keonjhar
676	1	Industrial and Education-al Area OG Ward 18	Rayagada
677	1	Inkarabandha	Angul
678	1	Iswarapal	Dhenkanal
679	1	Itapokhari	Keonjhar
680	1	Jada	Bonai
681	1	Jadabanka	Keonjhar WL
682	1	Jadaloi	Bonai
683	1	Jadida	Baripada
684	1	Jagadispur	Rourkela
685	1	Jaganathpur	Parlakhemundi
686	1	Jaladihi	Keonjhar
687	1	Jalda CT	Rourkela

688	1	Jalibahal	Bamra WL
689	1	Jamadapal	Baripada
690	1	Jamardiha Panchunaika	Deogarh
691	1	Jamartala	Bargarh
692	1	Jamjori	Sambalpur
693	1	Jamudalak	Keonjhar
694	1	Jamudihi	Bonai
695	1	Jamujharia	Sundargarh
696	1	Jamuna	Balasore WL
697	1	Jamunda	Angul
698	1	Jamurla	Sundargarh
699	1	Janisahi	Athagarh
700	1	Jariput	Khordha
701	1	Jariput	Khordha
702	1	Jayapanga	Dhenkanal
703	1	Jayapur	Bargarh
704	1	Jemabantadei	Khordha
705	1	Jhaduberani	Dhenkanal
706	1	Jharada	Dhenkanal
707	1	Jharbeda	Keonjhar
708	1	Jharmunda	Bolangir
709	1	Jhatimunda	Athamallik
710	1	Jhirpani	Bonai
711	1	Jhumukaposi	Keonjhar
712	1	Jiral	Dhenkanal
713	1	Jodabandha	Rourkela
714	1	Jubakhol	Bargarh
715	1	Jugudidara	Keonjhar
716	1	Junagarh Nac	Kalahandi South
717	1	Junani	Bamra WL
718	1	Junga	Keonjhar
719	1	Jurabandh	Bolangir
720	1	Jyotipur	Keonjhar
721	1	K Handabandha	Karanjia
722	1	Kadakala	Keonjhar
723	1	Kadala	Dhenkanal
724	1	Kadamdihi	Bonai

725	1	Kadodiha	Bonai
726	1	Kadokotha	Baripada
727	1	Kadopani	Rourkela
728	1	Kainthasasan	Baripada
729	1	Kakarpani	Baripada
730	1	Kakatapanga	Boudh
731	1	Kakhadi	Athagarh
732	1	Kakudibhag	Dhenkanal
733	1	Kalakada	Karanjia
734	1	Kalakatha	Deogarh
735	1	Kalama	Ghumsur South
736	1	Kalama	Balasore WL
737	1	Kalanda	Dhenkanal
738	1	Kalanda Kha	Keonjhar
739	1	Kalanga	Dhenkanal
740	1	Kalankipur	Athagarh
741	1	Kalapangi	Nayagarh
742	1	Kalarajhar	Khordha
743	1	Kalia	Nayagarh
744	1	Kalikaprasad	Keonjhar
745	1	Kalima	Keonjhar
746	1	Kalimati	Keonjhar
747	1	Kalodih	Rourkela
748	1	Kamagaon	Keonjhar
749	1	Kamalapur	Athamallik
750	1	Kamanda	Bonai
751	1	Kanaka	Dhenkanal
752	1	Kanakpur	Kalahandi North
753	1	Kanaloi	Angul
754	1	Kandaraposi	Keonjhar
755	1	Kandesahi	Keonjhar
756	1	Kandhakoili	Angul
757	1	Kandhara	Dhenkanal
758	1	Kandhumunda	Bargarh
759	1	Kanhupur Kanapur	Keonjhar WL
760	1	Kanjiamba	Deogarh
761	1	Kankadapat	Keonjhar

762	1	Kankili	Dhenkanal
763	1	Kankini	Baripada
764	1	Kansar	Sambalpur
765	1	Kansara	Dhenkanal
766	1	Kansingha	Bargarh
767	1	Kantabahal	Bonai
768	1	Kantagam	Nabarangpur
769	1	Kantapada	Keonjhar
770	1	Kanthi	Baripada
771	1	Kantiamura	Sundargarh
772	1	Kantioputasahi	Dhenkanal
773	1	Kantipur	Cuttack
774	1	Kapatdiha	Keonjhar
775	1	Kapisahi	Dhenkanal
776	1	Karadabandha	Rayagada
777	1	Karadabani	Dhenkanal
778	1	Karamulpatana	Dhenkanal
779	1	Karanjia	Baripada
780	1	Karatpata	Angul
781	1	Karhimunda	Bolangir
782	1	Karuadarha	Bonai
783	1	Kashipur	Khordha
784	1	Kasipada	Dhenkanal
785	1	Kasira	Bonai
786	1	Kasira	Keonjhar
787	1	Katabahal	Dhenkanal
788	1	Katada	Angul
789	1	Katarapada	Dhenkanal
790	1	Kathakaranjia	Karanjia
791	1	Kathkaranjia	Rourkela
792	1	Kathsirisi	Baripada
793	1	Katulikana Ka	Keonjhar
794	1	Katupali	Keonjhar
795	1	Katupali	Bamra WL
796	1	Kaunriapal	Dhenkanal
797	1	Kendeipasi	Keonjhar
798	1	Kendubadijholomalo	Brahmapur

799	1	Kendughati	Keonjhar
800	1	Kendujhar M	Keonjhar
801	1	Kendupada	Dhenkanal
802	1	Keranda	Khordha
803	1	Kerendatangi	Khordha
804	1	Khairbani	Rourkela
805	1	Khairgura	Bolangir
806	1	Khairpanga	Athagarh
807	1	Khairtola	Rourkela
808	1	Khajuribani	Keonjhar
809	1	Khaliapali	Bolangir
810	1	Khamarnuagan	Athagarh
811	1	Khandadhuan	Deogarh
812	1	Khanditiri	Dhenkanal
813	1	Khandualmunda	Dhenkanal
814	1	Kharachuli	Dhenkanal
815	1	Kharijore	Rourkela
816	1	Kharod	Athagarh
817	1	Kharsali	Redhakhol
818	1	Khatakhura	Dhenkanal
819	1	Khejuria	Baripada
820	1	Kheriakani	Sundargarh
821	1	Khilei	Deogarh
822	1	Khirabereni	Angul
823	1	Khireitangiri	Keonjhar
824	1	Khuntagaon	Sundargarh
825	1	Khuntapada	Keonjhar
826	1	Khuntapur	Baripada
827	1	Khuribhanga	Dhenkanal
828	1	Kiakata	Athamallik
829	1	Kiapalla	Khordha
830	1	Kinjirikella	Sundargarh
831	1	Kodagadia	Keonjhar
832	1	Kodipasa	Keonjhar
833	1	Kokerama	Rourkela
834	1	Kolabira	Jharsuguda

835	1	Kolharodkala	Keonjhar
836	1	Kosala	Angul
837	1	Kosala R F	Angul
838	1	Kotagara	Dhenkanal
839	1	Krushnakumarpur	Dhenkanal
840	1	Kuajharan	Keonjhar
841	1	Kudaloi	Jharsuguda
842	1	Kudhrenpali	Bargarh
843	1	Kula	Bonai
844	1	Kuladera	Bamra WL
845	1	Kulanga	Keonjhar
846	1	Kulasara	Angul
847	1	Kulgaon	Sundargarh
848	1	Kulhiamal	Jharsuguda
849	1	Kulunga Industrial Estate and Other Colony Area OG	Rourkela
850	1	Kumbharamunda	Balliguda
851	1	Kumbharunibati	Dhenkanal
852	1	Kumundi Kha	Keonjhar
853	1	Kundali	Athamallik
854	1	Kundapitha	Deogarh
855	1	Kundapur	Athamallik
856	1	Kundei	Keonjhar
857	1	Kundheidiha	Bonai
858	1	Kundheigola	Deogarh
859	1	Kundheihata	Keonjhar
860	1	Kundrughutu	Rourkela
861	1	Kunua	Dhenkanal
862	1	Kupatangar	Sundargarh
863	1	Kuremal	Jharsuguda
864	1	Kurulia	Karanjia
865	1	Kurum	Khordha
866	1	Kusanpuri	Bamra WL
867	1	Kusatikiri	Keonjhar WL
868	1	Kushamura	Sambalpur
869	1	Kuspangi	Athagarh

870	1	Kustuna	Sundargarh
871	1	Kusumdihi	Bonai
872	1	Kusumtoli	Rourkela
873	1	Kutasingha	Bolangir
874	1	Kuturuma	Sundargarh
875	1	Lachhadakindar	Bonai
876	1	Lahanda	Keonjhar
877	1	Laija	Redhakhol
878	1	Laimura	Deogarh
879	1	Langalakanti	Keonjhar
880	1	Languliabeda	Angul
881	1	Lariapali	Jharsuguda
882	1	Laribadi	Balliguda
883	1	Latadeipur	Dhenkanal
884	1	Lemlema	Sundargarh
885	1	Lendra	Rourkela
886	1	Lether	Bargarh
887	1	Lochapali	Dhenkanal
888	1	Lokanathpur	Keonjhar
889	1	Luburi	Redhakhol
890	1	Machhapangi	Cuttack
891	1	Machhapur	Athagarh
892	1	Madarangapalli	Ghumsur South
893	1	Madhapur	Dhenkanal
894	1	Madhuria	Baripada
895	1	Mahabirod	Dhenkanal
896	1	Mahaguda	Ghumsur North
897	1	Mahalinga San	Redhakhol
898	1	Mahantipada	Bhadrak WL
899	1	Mahapada	Dhenkanal
900	1	Mahatapala	Khordha
901	1	Mahuldiha	Bonai
902	1	Mahulpali	Bargarh
903	1	Maidanikela	Keonjhar
904	1	Maidharapada	Angul
905	1	Majhichakundapal	Deogarh

906	1	Makadchuan	Bolangir
907	1	Makarapalli	Ghumsur North
908	1	Makarkenda	Redhakhol
909	1	Malada	Keonjhar
910	1	Malanda	Keonjhar
911	1	Malansuga	Phulbani
912	1	Malapura	Dhenkanal
913	1	Malda	Bonai
914	1	Malibido	Dhenkanal
915	1	Malipada	Khordha
916	1	Malitola	Koraput
917	1	Manapur	Khordha
918	1	Manastara	Kalahandi South
919	1	Manbir	Rairangpur
920	1	Mandua	Angul
921	1	Maneidoli	Dhenkanal
922	1	Mangalpur	Keonjhar
923	1	Manikajori	Angul
924	1	Manipur	Balasore WL
925	1	Mankadmunda	Deogarh
926	1	Maranda	Angul
927	1	Marudhipa	Angul
928	1	Marusuan	Keonjhar
929	1	Masurikudar	Rourkela
930	1	Mathatentulia	Dhenkanal
931	1	Matiali	Balasore WL
932	1	Mayurjhalia	Khordha
933	1	Medinipur	Keonjhar
934	1	Meghatalabahali	Dhenkanal
935	1	Merda	Keonjhar
936	1	Mohanpur	Deogarh
937	1	Muchikucha	Rourkela
938	1	Mulijhar	Khordha
939	1	Murdangapali	Dhenkanal
940	1	Murgapahadi	Keonjhar
941	1	Musapali	Rourkela

942	1	Nabakisorepur	Dhenkanal
943	1	Nadambansdiha	Keonjhar
944	1	Nadeilo	Dhenkanal
945	1	Nageswar	Dhenkanal
946	1	Nagpada	Khariar
947	1	Nakichua	Baripada
948	1	Naksapali	Jharsuguda
949	1	Nalpanga	Keonjhar
950	1	Naraganga	Khordha
951	1	Naranapur	Keonjhar
952	1	Nariamba	Nayagarh
953	1	Nathua	Dhenkanal
954	1	Natima	Dhenkanal
955	1	Nayabandha	Keonjhar
956	1	Nayagarh	Keonjhar
957	1	Nayapurusottampur	Baripada
958	1	Niladriprasad	Khordha
959	1	Nilagiri Nac	Balasore WL
960	1	Nimina	Ghumsur North
961	1	Nischintapur	Keonjhar
962	1	Nitigotha	Keonjhar
963	1	Nua	Dhenkanal
964	1	Nuabaga	Dhenkanal
965	1	Nuabarangamal	Sambalpur
966	1	Nuagam	Rayagada
967	1	Nuagan	Baripada
968	1	Nuagaon	Baripada
969	1	Nuagaon	Keonjhar
970	1	Nuagaon	Keonjhar
971	1	Nuagarh	Athagarh
972	1	Nuakholaregeda	Athamallik
973	1	Nuakot	Dhenkanal
974	1	Nuanagar	Baripada
975	1	Nuapada	Khordha
976	1	Nuapada	Dhenkanal
977	1	Nuasahi	Rairangpur
978	1	Nunajharan	Keonjhar

979	1	Odapala	Khordha
980	1	Ogalpur	Khordha
981	1	Olanda	Angul
982	1	Olasingha	Khordha
983	1	Ostapanga	Keonjhar
984	1	Padagadajhatipadar	Brahmapur
985	1	Padhanpali	Sambalpur
986	1	Padmapokhari	Baripada
987	1	Padmapur	Rourkela
988	1	Padmapur	Keonjhar
989	1	Paduliposi	Keonjhar
990	1	Paikpurunakot	Dhenkanal
991	1	Pakhanmunda	Bolangir
992	1	Palasa Kha	Keonjhar
993	1	Palasahi	Dhenkanal
994	1	Palasmunduli	Baripada
995	1	Palaspal	Keonjhar WL
996	1	Palsani	Bargarh
997	1	Panabaraj	Khordha
998	1	Panasuan	Keonjhar
999	1	Panchara	Sundargarh
1000	1	Panigengutia	Dhenkanal
1001	1	Panisul	Baripada
1002	1	Parajungle	Angul
1003	1	Parasailo	Cuttack
1004	1	Pariasul	Baripada
1005	1	Parmanpur	Jharsuguda
1006	1	Pasasinga	Dhenkanal
1007	1	Patab	Rourkela
1008	1	Patabari	Keonjhar
1009	1	Pataka	Athamallik
1010	1	Patakhaman	Redhakhol
1011	1	Patalu	Dhenkanal
1012	1	Patapur	Baripada
1013	1	Patharchatia	Baripada
1014	1	Pathartanga	Athamallik
1015	1	Patmunda	Bonai

1016	1	Patpur	Baripada
1017	1	Patrapada	Athamallik
1018	1	Patrapali	Redhakhol
1019	1	Patrapur	Brahmapur
1020	1	Patumura	Deogarh
1021	1	Paunsia	Deogarh
1022	1	Phaljhari	Baripada
1023	1	Phiringibahal Bad	Bamra WL
1024	1	Phul Muthi	Subarnapur
1025	1	Pidhapokhari	Keonjhar
1026	1	Pikol	Jharsuguda
1027	1	Pindapathar	Bamra WL
1028	1	Pipalbahal	Angul
1029	1	Pitanau R F	Keonjhar WL
1030	1	Pithabhuin	Sundargarh
1031	1	Podajalanga	Sundargarh
1032	1	Podapadar	Athamallik
1033	1	Pokharia	Karanjia
1034	1	Pokharia	Baripada
1035	1	Praharajpur	Baripada
1036	1	Prasanapur	Athagarh
1037	1	Pratappur	Athamallik
1038	1	Pukhrasale	Jharsuguda
1039	1	Punjiama	Khordha
1040	1	Purastampur	Keonjhar
1041	1	Purnachandrapur I	Baripada
1042	1	Purunapani	Baripada
1043	1	Purunia	Baripada
1044	1	Purusottampur	Dhenkanal
1045	1	Radhadeipur	Dhenkanal
1046	1	Radhapriyapur	Athagarh
1047	1	Ragadiapada	Angul
1048	1	Raibol	Dhenkanal
1049	1	Raidihi	Sundargarh
1050	1	Raijharan	Angul
1051	1	Raikia	Phulbani
1052	1	Raikudar	Keonjhar

1053	1	Raisuan	Keonjhar
1054	1	Raitala	Dhenkanal
1055	1	Rajabasa	Keonjhar
1056	1	Rajamohanpur	Dhenkanal
1057	1	Rajapur	Sundargarh
1058	1	Rajatei	Puri (WL)
1059	1	Rajpalma	Koraput
1060	1	Ramabahal	Rourkela
1061	1	Ramachandrapur	Brahmapur
1062	1	Ramachandrapur	Keonjhar
1063	1	Ramachandrapur	Keonjhar
1064	1	Rambhasindhol	Subarnapur
1065	1	Ramchandrapur	Angul
1066	1	Ramchipidihi	Jharsuguda
1067	1	Rampur	Bolangir
1068	1	Randa	Khordha
1069	1	Ranibandha	Baripada
1070	1	Raniberna	Rourkela
1071	1	Ransingpur	Athagarh
1072	1	Rasasinga	Dhenkanal
1073	1	Rasmunda	Bargarh
1074	1	Rasol	Dhenkanal
1075	1	Ratamati	Khordha
1076	1	Ratnapravapodapada	Dhenkanal
1077	1	Rekuti	Keonjhar
1078	1	Rengalbeda	Rourkela
1079	1	Ria	Dhenkanal
1080	1	Rugudi	Keonjhar
1081	1	Rupakund	Keonjhar
1082	1	Saanta	Khordha
1083	1	Sabra	Bonai
1084	1	Sadangabahali	Keonjhar
1085	1	Sagjore	Rourkela
1086	1	Sahajabahal	Athamallik
1087	1	Sahajbahal	Sundargarh
1088	1	Sajanagarh	Balasore WL
1089	1	Sakharpoibanjar	Brahmapur

1090	1	Salangabudi	Sundargarh
1091	1	Salapada	Dhenkanal
1092	1	Salbira	Sundargarh
1093	1	Salei	Deogarh
1094	1	Salejharan	Sambalpur
1095	1	Salepali	Sundargarh
1096	1	Salijanga	Athagarh
1097	1	Salohi	Deogarh
1098	1	Samnagar	Balasore WL
1099	1	Sanabarabeda	Keonjhar
1100	1	Sanakesari	Karanjia
1101	1	Sananeuli	Keonjhar
1102	1	Sanasuanlo	Dhenkanal
1103	1	Sandalki	Bonai
1104	1	Sangadi	Baripada
1105	1	Sangudiali	Rourkela
1106	1	Sanhatnabeda	Rairangpur
1107	1	Sanindipur	Bonai
1108	1	Sankarapasi	Keonjhar
1109	1	Sankarei	Keonjhar
1110	1	Sankarpratappur	Dhenkanal
1111	1	Sankhamur	Deogarh
1112	1	Sankhiripada	Baripada
1113	1	Sankhua	Keonjhar
1114	1	Sanmanpur	Deogarh
1115	1	Sanramloi	Rourkela
1116	1	Sansunaparbat	Rourkela
1117	1	Sapalahar	Bargarh
1118	1	Sarabeda	Deogarh
1119	1	Saradhapur	Angul
1120	1	Saralia	Balasore WL
1121	1	Saramsil	Bargarh
1122	1	Saranda Bisoi Hill	Rairangpur
1123	1	Saranda Bisoihill	Rairangpur
1124	1	Saranga CT	Dhenkanal
1125	1	Sarangapur	Bargarh
1126	1	Sarasole	Baripada

1127	1	Sarathimunda	Bolangir
1128	1	Sarei	Keonjhar
1129	1	Saria	Keonjhar
1130	1	Sarian	Dhenkanal
1131	1	Sariaposi	Keonjhar
1132	1	Sarkoli	Athagarh
1133	1	Saruali	Keonjhar
1134	1	Sarumala	Baripada
1135	1	Sarupatala	Keonjhar
1136	1	Satapardia	Athamallik
1137	1	Satatira	Keonjhar WL
1138	1	Saurada	Rayagada
1139	1	Serenabeda	Angul
1140	1	Siarimalia	Deogarh
1141	1	Sidimba	Bonai
1142	1	Silipada	Keonjhar
1143	1	Silphodi	Baripada
1144	1	Similipal	Deogarh
1145	1	Similisahi	Angul
1146	1	Singari	Rayagada
1147	1	Singhjuri	Subarnapur
1148	1	Siramanipur	Karanjia
1149	1	Sirigida	Keonjhar
1150	1	Sirisbani	Baripada
1151	1	Sisuparna	Redhakhol
1152	1	Sole	Bonai
1153	1	Sonbarcha	Sundargarh
1154	1	Sorna	Bargarh
1155	1	Srichandanpur	Baripada
1156	1	Srikathapur	Khordha
1157	1	Srimal	Boudh
1158	1	Sripalli	Kalahandi North
1159	1	Subalaya	Sundargarh
1160	1	Sudarsanpur	Athagarh
1161	1	Sudhadihikateni	Dhenkanal
1162	1	Suidihi	Rourkela
1163	1	Suleipal	Angul

1164	1	Suliamal	Bolangir
1165	1	Sunadhara	Brahmapur
1166	1	Sunakhandi	Rourkela
1167	1	Sundarpur	Khordha
1168	1	Sundhikateni	Dhenkanal
1169	1	Surapratap Rajkishorpur	Dhenkanal
1170	1	Surapratappur	Dhenkanal
1171	1	Suravi	Dhenkanal
1172	1	Surjyamanipur	Bargarh
1173	1	Susabnali	Deogarh
1174	1	Tabada	Angul
1175	1	Tabada	Bargarh
1176	1	Takarsinga	Satkosia WL
1177	1	Talabadhi	Khordha
1178	1	Talabahal	Deogarh
1179	1	Taladardbang	Kalahandi South
1180	1	Talagarh	Khordha
1181	1	Talamaliha	Athamallik
1182	1	Talapada	Keonjhar
1183	1	Talapada	Keonjhar
1184	1	Talapati	Rairangpur
1185	1	Talisara	Angul
1186	1	Talkudar	Rourkela
1187	1	Talpadar	Kalahandi South
1188	1	Tamanda	Dhenkanal
1189	1	Tambiri	Ghumsur South
1190	1	Tampargarh	Sambalpur
1191	1	Tandara	Cuttack
1192	1	Tangiapada	Khordha
1193	1	Tangiri	Keonjhar
1194	1	Tangisal	Dhenkanal
1195	1	Tangurupadar	Bargarh
1196	1	Tantra	Bonai
1197	1	Tarabadi	Balliguda
1198	1	Tarana	Rairangpur
1199	1	Telendihi	Sundargarh

1200	1	Telengapali	Sundargarh
1201	1	Telkoi	Keonjhar
1202	1	Tentoposi	Rairangpur
1203	1	Tentuliapada	Dhenkanal
1204	1	Tentulidihi	Bonai
1205	1	Tersa	Rourkela
1206	1	Thakurjharmunda	Bamra WL
1207	1	Thokar	Dhenkanal
1208	1	Tholludi	Ghumsur North
1209	1	Thutipipal	Sundargarh
1210	1	Tileimal	Redhakhol
1211	1	Tinkbir	Deogarh
1212	1	Tipilei	Dhenkanal
1213	1	Titheitangar	Sundargarh
1214	1	Tomka Forest Block	Cuttack
1215	1	Tukpalasia	Baripada
1216	1	Tulasipal	Angul
1217	1	Tuluka	Satkosia WL
1218	1	Tumuni	Angul
1219	1	Tundura	Parlakhemundi
1220	1	Tungurabahal	Keonjhar
1221	1	Tunmura	Rourkela
1222	1	Tuntuna	Karanjia
1223	1	Tunutuna	Keonjhar
1224	1	Turla	Bargarh
1225	1	Uania	Baripada
1226	1	Udayagiri	Keonjhar
1227	1	Udiapali	Jharsuguda
1228	1	Ukasol	Baripada
1229	1	Unapura	Baripada
1230	1	Unchabali	Keonjhar
1231	1	Uparbaghalunda	Dhenkanal
1232	1	Upargincia	Bonai
1233	1	Utunia	Deogarh
1234	1	Vaduasul	Baripada

** This appendix presents human casualties recorded within village areas. Incidents occurring inside forests, reserve forests and protected areas are excluded.*

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