Farmer-Wildlife Conflict Mitigation

Towards Solutions for Peaceful Co-Existence

A Compendium

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Cover Image Soumik Banerjee

(Left) Machan for Elephants, Wild Pigs
(Right top) Rat traps made from Wild Brinjal Fruits: *Solanum xanthoocarpum*

(Right bottom) Mouse trap in Rajmahal hill, Jharkhand

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1. Introduction

Across India's countryside, an unspoken war plays out each night a war not of hatred, but of hunger, where farmers and wild animals alike scrape for the same vanishing resources, farmers defending their crops, wildlife searching for food in a landscape too small for all.

Every single day in India, 2–3 people die in wildlife conflict. - And these are just the reported numbers.

Even the Government of India now recognises the scale. In March 2025, the Prime Minister noted that **"we must use remote sensing, geospatial mapping, Artificial Intelligence and Machine Learning to combat human–animal conflict"**, underscoring that the crisis has outgrown local firefighting and requires a national-level strategy.

The statistical evidence regarding human-wildlife encounters across India indicates a significant and escalating crisis:

- 628 people killed by elephants in 2023–24
- 8,000–9,000 injuries from wildlife every year
- Crop loss across 1 million hectares annually due to elephants alone
- Wild boar raids rising across nearly every state
- Nilgai, macaques, and peafowl wiping out crops in 40–60% of farms in some belts
- Leopard and hyena livestock killings increasing in peri-urban zones

For most people sitting far from the forest edge—in cities, towns, and office blocks—human–wildlife conflict arrives only as a flash on a screen. A viral video of elephants storming a field, a leopard leaping over a compound wall, a monkey snatching fruit from a street vendor. It is dramatic, shareable, and often framed as a battle between "them" and "us." Social media dutifully divides itself into camps: those who grieve for the farmer who has lost a year's income in one night, and those who feel for the injured animal stumbling through a human maze.

But for those who actually live inside this conflict—the women guarding fields at dusk, the children who scan paths for fresh dung before walking to school, the men who sleep with one ear open every night—this is not a clash of good and bad. It is a struggle for survival on both sides. A silent, daily negotiation over land, food, water, and safety. There are no villains here. Only beings—human and wild—trying to endure a landscape that has shrunk or changed faster than either of them can adapt.

And the numbers now make one thing impossible to deny: **the conflict is rising.** Not in isolated pockets, not by a few percentage points, but at a scale that is reshaping rural life across India.

The **scale of that equation** is not small anymore. National data now suggests that more than **500 people die and around 9,000 are injured every year** in India due to encounters with elephants, tigers, and leopards alone, according to recent MoEFCC compilations.

Crop damage linked to wildlife is estimated at roughly ₹500–700 crore a year nationwide, with cultivated fields near forest edges becoming recurrent targets for raiding species such as elephants, wild boar, nilgai, and monkeys causing substantial seasonal losses for affected households. in forest-edge farms is lost to raiding species like elephants, wild boar, nilgai, and monkeys. Elephant conflict alone may affect **0.8–1 million hectares of cropland annually** and touch nearly **a million rural families** each year.

In Kerala, one recent summary estimated **344 human deaths** from human–wildlife conflict between 2021 and 2025, with thousands more incidents of crop loss and property damage. This is not a marginal problem at the edge of the forest; it is one of the central pressures shaping rural life.

WHAT CONSTITUTES FARMER–WILDLIFE CONFLICT?

Farmer–wildlife conflict begins long before an elephant steps into a field. It begins in the everyday overlap of two lives forced into the same shrinking and changing landscape. Across India, more than 70% of reported human–wildlife conflict cases relate to crop loss and property damage, reflecting the central role of cultivated crops as an easily accessible and high-value food source for wildlife in forest-edge landscapes. (Based on national compensation records analysed across 18 states)

One night of elephant foraging can flatten a season's paddy. Wild boars uproot acres of groundnut in hours. Nilgai and peafowl strip fields repeatedly. For small farmers, this is not just an inconvenience—it is a financial faultline that severely impacts their livelihood.

In national human–wildlife conflict data from 2012–13, livestock predation accounted for roughly 20 % of reported conflict incidents processed for compensation, after crop/property damage. A cow is not an animal; it is a source of income to many families and rural households have deep bonds with their domesticated animals.

Human injuries and deaths sit at the most tragic edge. In states such as Odisha and Assam, a large share of human casualties occur during night-time crop guarding, when farmers stay in fields to protect standing crops from elephants and other wildlife.

Official mitigation guidelines note that unprotected night guarding significantly increases the risk of injury and death during wildlife encounters.

And then there is the emotional toll:

- Sleepless nights.
- Children walking along elephant paths with potential danger lurking all the time.

- The sound of a cracking branch shifting from background noise to panic.
- Broken fences and damaged irrigation pipes that no compensation form bothers to record.

"Imagine guarding your home every night for sixty nights—that is harvest season for millions."

System failures deepen the crisis: slow verification, poor land-use planning, no real-time response systems, and compensation processes that often cost more time than the payout. And importantly, no real mitigation efforts.

India still lacks a **national database of wildlife conflict**—no central system to track where, how often, or which species are responsible. The invisibility of data ensures the conflict remains underestimated and undebated in a nuanced fashion.

Scale of Conflict — Crop & Livestock Damage by Multiple Species

The scale of the conflict can be devastating both to farmers who have lost lives or crops and to the animals involved.

In 2012–13, 18 states reported 78,656 human–wildlife conflict incidents processed for compensation, with cumulative payouts of US$5.33 million (~₹4–5 crore), and average payments of roughly US$47 (~₹4 000) per crop/property damage incident and US$74 (~₹6 000) per livestock depredation case, rising substantially for human injuries and fatalities.

Yet these numbers represent only the visible edge of the crisis. Behind every quantified loss lies the trauma of sleepless nights, children kept home from school during peak conflict months, elders staying awake with torches, women who walk to their fields with quiet fear, and entire communities shaped by the unpredictability of wildlife movement.

Multi-species Crop & Livestock Impact

- In Indian forest-edge agricultural zones, crop damage is consistently the most commonly reported form of human–wildlife conflict. National compensation and survey data show that crop and property damage account for over 70% of reported conflict incidents, with wild boar, deer, macaques, and other herbivores frequently implicated in crop-raiding.

- Livestock depredation forms a smaller but significant share of reported conflict, and is most often associated with carnivores such as the common leopard and, in some regions, the golden jackal.

- Pan-India analyses of compensation records and conflict reviews indicate that elephants, wild boar (and other ungulates), and leopards recur most frequently across reports of crop damage, livestock loss, and property damage, though their relative importance varies by landscape and region. (additional source link)

- Smaller species—including monkeys, peafowl, and squirrels, as well as stray or feral cattle—also contribute substantially to repeated crop damage. In the Himalayan mid-hill regions, field studies have reported that up to 33% of cultivated land is affected by wild or stray animal 'menace,' leading to reduced yields and abandonment of cropped area.

Economic Loss and Scale

In Himachal Pradesh's hill farming zones, a field-based study on wildlife "animal menace" reported an average economic loss of ₹25,358 per affected farm, with wheat, paddy, and maize identified as the most impacted crops. The study also found that farms located in menace-prone zones experienced a measurable contraction in cultivation, with net cropped area declining by approximately 12–17%.

In western India, studies from Maharashtra's Konkan and adjoining regions document substantial losses from herbivore wildlife—including wild boar, macaques/langurs, nilgai, gaur, and stray cattle—at the farm scale. Average losses were estimated at approximately ₹27,000 per hectare of affected farmland per year. The same analyses noted that formal compensation mechanisms covered only about 1–2% of the assessed damage, leaving most losses uncompensated.

WHY CONFLICT IS RISING: THE FORCES SHAPING A FRAGILE LANDSCAPE

The rise in human–wildlife conflict in India cannot be explained by wildlife numbers alone. In many landscapes, **human demography, land use, and infrastructure have changed faster and more deeply than wildlife behaviour**, mostly in the name of "Development", fundamentally altering how people and animals encounter one another.

This is not a sudden crisis. It is the cumulative outcome of **slow, structural shifts** that have compressed humans and wildlife into the same shrinking and rapidly-changing spaces. Across the country, once-continuous habitats have been reduced to narrow, fragmented strips between farms, roads, canals, and settlements. Forests that historically provided seasonal food, water, and cover now exist as isolated patches, often unable to sustain the wildlife populations that depend on them. They are also **administered in a siloed fashion**, with human-created administrative boundaries that are not actually physically present in the landscape - across state governments, district administrations, between different departments and so on, reflecting on **very poor imagination of the institutional architecture** required for governance for co-existence of wild animals and human beings.

At the same time, the human landscape has undergone profound change. Rural populations are ageing, younger generations are migrating out of agriculture, and long-settled families are increasingly replaced by short-term migrant labour. This **demographic churn has eroded generational knowledge** about wildlife movement, seasonal risk, and safe behaviour. More people now live or work alone in landscapes that were once navigated collectively, increasing vulnerability during encounters.

These social changes intersect with ecological pressure. **Climate variability** has intensified stress on both humans and wildlife. Failed or erratic monsoons reduce forest forage, extended summers dry up water sources, and degraded habitats offer fewer buffers during lean periods. Wildlife is pushed outward toward croplands at precisely the moment when fields reach peak nutritional value. A crop ready for harvest becomes the most reliable and energy-rich food source available across the landscape.

Land-use choices have further amplified this overlap. High-calorie crops—such as paddy, maize, groundnut, banana, and vegetables—are now cultivated right up to forest boundaries, drawing species such as elephants, wild boar, nilgai, macaques, and peafowl into repeated contact with people. Some crops like sugarcane provide good cover for the wild animals to start residing, breeding and parenting in these farms.

Infrastructure expansion has compounded these pressures. Roads, canals, pipelines, powerlines, fencing, and extractive activities such as sand mining routinely cut across traditional animal movement routes. These interventions often create **delayed conflict**: disruptions that do not trigger immediate incidents but alter movement patterns in ways that surface months or years later. A new canal can divert an elephant herd toward a village; a highway junction can push nilgai or wild boar into fields that previously experienced little or no damage.

None of these changes are individually intended to cause conflict. Taken together, however, they have multiplied and tightened the edges where humans and wildlife meet, making encounters more frequent, less predictable, and more dangerous. Consequently, human-wildlife conflict should not be viewed as an isolated incident; rather, it is the direct result of intersecting demographic shifts, ecological pressures, and rapid infrastructural development within shared landscapes and is a chronic, ‘wicked problem’ here to stay.

Have Conservation Efforts Led to More Conflict?

One explanation that one often hears —especially in cities—is that “conservation has worked too well” and that increasing wildlife numbers are to blame. There is a sliver of truth here. For some species, especially **elephants and tigers**, national or regional populations have indeed stabilised or grown thanks to decades of protection.

But this explanation is only half the story. The other half is that these same animals are being squeezed into **more broken and busier landscapes**. In Kerala’s Wayanad, for instance, a recent analysis links rising conflict to a familiar list: forest loss since the 1940s, invasive weeds choking fodder, monoculture plantations replacing diverse forest, and roads, canals, and powerlines slicing through old movement routes. Elephants, wild boar, monkeys, and bears are not suddenly misbehaving; they are following food and water through a maze humans have redrawn.

Alternate Narrative:

Some farmers and ecologists are questioning the data about increase in animals due to conservation efforts. They also question the idea that "too many animals" are the main problem, while admitting that in some landscapes there is a "spillage effect". These ideas simply collapse when you look closely at what conflict does to wildlife themselves.

Kerala has experienced notable wildlife losses linked to human–wildlife conflict. Audit and forest department data indicate that elephants and other large mammals continue to suffer unnatural deaths associated with conflict on agricultural frontiers, including from electrocution and retaliatory incidents reported in conflict hotspots.

In Wayanad district, located on the forest border, wild animal attacks and clashes between people and wildlife have been frequent; government data for recent years show thousands of wild animal attacks, including large numbers attributed to elephants, boars, tigers, and leopards, with dozens of livestock also lost.

Wildlife census data suggest significant changes in Kerala's large mammal populations over the last decade: elephant numbers declined substantially between 2017 and 2023, and tiger counts in parts of Wayanad's forests have also shifted over recent censuses, suggesting demographic pressures on these species.

Across India, national guidelines on human–elephant conflict note that over 100 elephants die each year due to conflict-related causes, including electrocution, poisoning, train collisions, and retaliatory actions linked to crop protection. Conflict is therefore not only a farmer's crisis; it is also a significant source of mortality for elephants, with serious local impacts even where national population totals appear stable.

Meanwhile, it is also true that wild animals in several places are acclimatising themselves to novel, 'unnatural' habitats where adapting creatures are not only surviving but breeding and raising their cubs/offspring whose natural habitat then becomes a human-designed landscape.

THE SPECTRUM OF CONFLICT:

Conflict is not one event. It is a **continuum** that repeats across thousands of villages:

- **Minor but daily losses** that grind families down.
- **Seasonal devastation** from elephants, boar, or nilgai.
- **Predation events** that wipe out a household's only asset.
- **Property damage** that rarely makes it into compensation registers.
- **Emotional stress** that shapes sleep, mobility, farming choices, schooling, and community relations.

- **Suffering for wildlife**, too—injuries from fences, traps, trenches, stone-throwing, vehicles, and electrical lines.

The conflict has many forms, but its essence is the same: **both humans and animals are trying to survive in landscapes that no longer have space for both to thrive effortlessly.**

WHY NUMBERS UNDERESTIMATE SUFFERING

Even the most detailed official tables fail to capture the lived experience of human–wildlife conflict, because a substantial share of losses never enter any formal reporting or compensation system.

Across India, studies and field reports consistently note that a large proportion of crop damage caused by species such as wild boar, monkeys, nilgai, and peafowl goes unreported. Farmers often do not file claims—not because losses are minor, but because reporting is time-consuming, uncertain, and frequently yields little or no relief.

Compensation, where it is received, typically covers only a small fraction of actual losses, focusing narrowly on visible damage while excluding indirect costs such as missed wage labour, repeated re-sowing, fence repair, disrupted schooling, and the chronic stress of guarding fields at night.

These systems also fail to account for losses borne by wildlife themselves—injuries from fencing, electrocution, vehicle strikes, displacement from traditional ranges, and the death of calves or dependent young during high-pressure conflict periods.

Numbers measure loss.
They do not measure **fear**, **fatigue**, or **the slow erosion of resilience or trust**.

Sources:

Karanth et al., 2018 (Biological Conservation) – reporting gaps and valuation limits
https://www.sciencedirect.com/science/article/abs/pii/S0006320717318852

CWS / ATREE compensation valuation reviews
https://cwsindia.org/how-are-wildlife-related-losses-valued-in-india/

State-level studies (HP, Maharashtra, Odisha) documenting non-reporting and low compensation uptake

THE STATE'S RESPONSE: PROMISE, PRESSURE, AND THE LONG ROAD AHEAD

Governments across India have long recognized that farmer–wildlife conflict is not a peripheral environmental issue—it is a rural livelihood crisis, a conservation challenge, and a governance test. The urgency is visible at the highest levels. The Prime Minister himself has spoken publicly about the need for **holistic, humane, and science-driven solutions** that protect both farmers and wildlife. His statements highlight a national mood: the country cannot afford a future where rural families live in fear and wildlife wanders in desperation. Conflict management is no longer an administrative task; it is a national priority tied to food security, ecological stability, and social cohesion and equity.

In recent years, the Union Government has articulated a national approach to human–wildlife conflict mitigation through policy frameworks and programme guidelines. These include the National Action Plan for Human–Wildlife Conflict Mitigation, continued expansion of Project Elephant with an emphasis on corridor protection and early-warning measures, financial support for Rapid Response Teams in conflict-prone states, and the introduction of geo-tagged, online compensation systems in several states. Pilot initiatives using drones and technology-enabled early-warning systems have also been supported in select landscapes.

At the state level, a range of institutional and operational responses have emerged. Karnataka has constituted a dedicated Elephant Task Force; Kerala has established district-level conflict management mechanisms; Uttarakhand operates SMS-based early-warning systems in elephant movement zones; Assam maintains specialised elephant response squads; and Tamil Nadu has pursued landscape-scale corridor identification and management through integrated planning processes.

On paper, these moves signal a country trying to get ahead of the crisis. But the ground reality remains uneven.

Compensation schemes exist, but are chronically underfunded. Early-warning systems work, but only in patches. Fencing projects begin, but maintenance budgets disappear. Interdepartmental coordination is promoted, but rarely institutionalised. Forest frontline staff work to exhaustion, but vacancies remain unfilled for years. Many states have policy ambition, but not the administrative muscle to carry it forward over the long term.

India is not alone in this struggle—Kenya, Nepal, Sri Lanka, and parts of Southeast Asia face similar challenges—but India's scale is unmatched. No other country manages conflict involving **over 500 human deaths annually**, tens of thousands of crop-damage claims, millions of hectares of vulnerable farmland, and some of the world's largest populations of elephants, big cats, wild boar, nilgai, macaques, and peafowl living directly alongside human settlements. ***In many ways, India is performing a staggering balancing act: supporting the world's largest agrarian population while protecting some of the world's most charismatic and endangered wildlife—on the same land.***

Yet this very scale exposes the gaps.

Compensation reaches farmers late or not at all. Preventive tools are delivered through pilots that vanish when funding ends. Wildlife corridors remain unnotified or unprotected in several states. Linear infrastructure—roads, canals, powerlines—continues to expand faster than mitigation measures. Many states lack updated conflict data, making planning reactive rather than predictive. District administrations often respond only after a major incident, not before. In some regions, local politics influences who gets compensated or protected, fracturing trust in the system.

Most critically, India's current framework still treats conflict as a **forest department problem**, when the truth is that it is a **whole-of-government problem** involving agriculture, rural development, revenue, environment, disaster management, and even urban planning. Importantly, Panchayats and affected marginalised people are missing from the institutions, processes and procedures that seek to create peaceful co-existence.

Despite these shortcomings, India retains something precious: **an underlying cultural tolerance for wildlife** that has prevented the widespread retaliatory killing seen in many other countries. Farmers continue to express frustration, fear, and anger—but rarely hatred. This tolerance is the foundation on which any long-term coexistence strategy must be built.

WHY THIS COMPENDIUM EXISTS — A PRACTICAL MAP IN A FRACTURED LANDSCAPE

This compendium is written for farmers, policymakers, civil society practitioners, and researchers working in conflict-prone landscapes. It does not propose a single solution. Instead, it brings together **evidence, field experience, and practical lessons** to support better decision-making that leads to solutions being enacted.

The chapters that follow move from this national overview into:

- species-specific conflict patterns,
- a detailed case study,
- practical mitigation tools and decision frameworks,
- governance and policy analysis.

Together, they aim to reduce harm to both people and wildlife in landscapes where coexistence is not a choice, but a necessity.

1.1 Case Study:

Mitigation Story That Mostly Worked and How It Still Breaks- Elephants, People, and Valparai

> This case study is important not because Valparai is typical of human–elephant conflict in India—it is not—but because it demonstrates how conflict outcomes change when the problem is correctly diagnosed and addressed through institutions rather than ad-hoc measures.
>
> Valparai shows that where elephants cannot be excluded, reducing human fatalities depends less on barriers or animal control and more on understanding movement patterns, changing human behaviour at moments of risk, and embedding early warning and response systems within everyday institutions.
>
> While the physical context of plantations is unique, the underlying principles—evidence-based diagnosis, prioritisation of human safety, predictability through information, avoidance of risk-shifting interventions, and sustained coordination between communities, civil society, companies, and the state—are applicable across a wide range of human–wildlife conflict landscapes in India.

Valparai, in the Anamalai Hills of Tamil Nadu, presents a form of human–elephant conflict that is fundamentally different from much of rural India. It is not a village at the edge of a forest, nor a set of farms abutting a protected area. Valparai is a **plantation landscape embedded within elephant habitat**, created roughly **100–120 years ago** when large tracts of rainforest were converted into tea estates.

Today, approximately **70,000 people** live and work across this mosaic of estates, roads, worker settlements, schools, factories and places of worship. The surrounding forests form part of a larger protected area network, but elephant movement cuts directly through the plantation landscape. From an ecological perspective, this is not unusual: the town is recent; the elephants are not.

This historical and spatial context shaped every aspect of how human–elephant conflict unfolded in Valparai—and why conventional solutions proved inadequate.

A conflict defined by human fatalities, not crop loss

In most parts of India, elephant conflict is driven by crop damage. Elephants raid food crops such as paddy, maize, banana or sugarcane, leading to repeated economic losses for farmers.

Valparai does not fit this pattern. Elephants do not eat tea, and therefore large-scale crop damage was never the primary issue. Instead, conflict took a more dangerous form: **close encounters between elephants and people**, often at night, resulting in human injury or death.

Between the mid-1990s and early 2000s, Valparai recorded dozens of elephant-related human fatalities. By the time systematic work began in the early 2000s, the cumulative toll had reached several dozen deaths over two decades. These incidents were not driven by aggressive elephants attacking settlements en masse. Rather, they were typically the outcome of **sudden encounters**, poor visibility, panic, and attempts by people to chase elephants away.

This distinction was critical. It reframed the problem from one of exclusion—keeping elephants out—to one of **risk reduction and life-saving** in a shared landscape.

Understanding elephants before designing solutions

The Nature Conservation Foundation (NCF) began long-term work in the Valparai landscape around **2002**, focusing first on understanding elephant ecology and behaviour rather than immediately implementing deterrents or perceived solutions.

Over more than two decades of monitoring and research, NCF documented:

- the presence of roughly **80–120 elephants** using the plantation landscape within an area of about **200 square kilometres**
- strong fidelity of herds to specific routes, valleys and forest fragments
- predictable seasonal patterns, with peak elephant movement and most human fatalities occurring between **November and January**
- differences in behaviour between herds and individuals, particularly young male elephants
- heightened stress responses near roads, crowds, and noise

A consistent finding emerged: **elephant movement in Valparai was largely predictable**, and serious conflict often followed when that predictability was disrupted—by people, infrastructure, or attempts to force elephants away.

From research to communication: working with estates and workers

Scientific understanding alone could not reduce fatalities. The next step was translating that knowledge into everyday decision-making by people who lived and worked in the estates.

NCF invested heavily in communication and engagement with:

- tea estate managers and supervisors
- long-term workers and resident families

- forest department staff
- company management

These engagements focused on explaining elephant behaviour in practical terms: why elephants used certain routes, why chasing them increased danger, and why barriers in one location caused elephants to move to other locations.

Particular attention was given to explaining how **human behaviour under stress** contributed to fatalities. Many deaths occurred when people ran out of houses at night, unaware of where elephants were, or when individuals attempted to drive elephants using noise or stones. Importantly, there were no documented cases of elephants entering houses and killing people in Valparai; fatalities occurred outdoors, during sudden encounters.

Changing such deeply ingrained reactions required repetition and trust. Orientation sessions were conducted regularly, especially as new workers joined estates.

Shifting the focus from animals to people

As understanding deepened, it became clear that reducing deaths depended less on controlling elephants and more on **changing how people responded to elephant presence**.

The mitigation strategy therefore focused on:

- reducing surprise encounters
- increasing access to timely, local information
- discouraging chasing or driving away of elephants
- reinforcing simple behavioural rules, such as avoiding shortcuts and staying indoors at night when elephants were nearby

This approach acknowledged a difficult reality: elephants could not be removed from Valparai, but human exposure to risk could be reduced.

Information as a safety tool: early warning systems

To support safer behaviour, NCF helped develop a layered early warning system tailored to Valparai's social context.

The system evolved over time and included:

- alerts through local cable television channels
- SMS alerts as mobile phone use increased
- voice messages to reach workers with varying literacy levels

- red warning lights at key junctions and known elephant crossing points
- community-based reporting, backed by verification
- round-the-clock rapid response teams from the Tamil Nadu Forest Department

By the early 2020s, public reporting indicated that the system had reached several thousand subscribers, delivered thousands of alerts, and operated dozens of warning lights across the landscape. The purpose was not precision tracking, but **predictability**—ensuring people knew when elephants were nearby.

The most important rule: do not try to drive out elephants

Among all measures adopted in Valparai, one principle proved central: **avoid driving out elephants unless absolutely necessary**.

Experience showed that chasing elephants out of one area often forced them onto roads or into neighbouring estates where people were unprepared. This relocation of the risk increased the likelihood of fatal encounters.

Tea companies and forest authorities gradually adopted a "no-drive" approach, intervening only when elephants caused active damage to houses. This required institutional coordination and trust, but it significantly reduced risky encounters.

Evidence of impact, and its limits

According to accounts from NCF and local authorities:

- Valparai recorded **zero elephant-related human deaths** during **2021, 2022 and 2023**
- In **2024**, **three fatalities** occurred, linked to panic-driven behaviour and attempts to chase elephants

These incidents underscored an important lesson: **success is fragile**. A single breakdown in behaviour or coordination can reverse years of progress.

New challenges: infrastructure and demographic change

Valparai's mitigation efforts continue to face new pressures.

Infrastructure interventions in Valparai have, at times, created new risks because they were undertaken without an understanding of elephant movement and physical capabilities. In one documented instance, people excavated land and deposited large, loose mounds of soft mud at a location regularly used by elephants as a crossing point. While the intervention may have appeared harmless to those involved, it fundamentally altered the terrain in a way that made crossing difficult for elephants.

Elephants require stable footing; loose, yielding mud increases the risk of slipping, particularly for calves and older individuals. When confronted with such obstacles, elephants hesitate, bunch up, or attempt repeated crossings, leading to heightened stress and confusion. In a landscape already shared with people, this delay and agitation increases the likelihood that elephants will remain in human-use areas for longer periods, move unpredictably, or divert into roads and settlements—conditions under which the risk of dangerous human–elephant encounters, and potentially fatal incidents, rises significantly. At the same time, the demographic profile of the workforce has changed.

Where estates once housed stable, multi-generational families, many now rely on **short-term migrant workers** who stay for a few months and leave. Each new group arrives without landscape knowledge, requiring repeated orientation and increasing vulnerability, particularly for children.

These shifts have reintroduced risk, even as the core mitigation framework remains in place.

Lessons from Valparai

The Valparai case demonstrates that effective human–elephant conflict mitigation depends on **context-specific understanding**. Solutions designed for crop-raiding landscapes would not have addressed Valparai's primary risk: loss of human life due to sudden encounters.

Key lessons include:

- conflict mitigation must be grounded in local ecology and land use
- saving lives may require prioritising behaviour change over physical barriers
- information and predictability are powerful safety tools
- poorly planned infrastructure can undo ecological understanding
- long-term success requires continuous engagement, not one-time interventions

Valparai does not offer a universal blueprint. It offers something more valuable: a demonstration that when civil society, the state, companies and communities work together—guided by evidence rather than instinct—human lives can be protected even in deeply shared landscapes.

1.2 Beyond Conflict: Power, Voice, and Coexistence

Human–wildlife conflict is most often described through visible events: crops destroyed, livestock killed, people injured or killed, and animals injured/killed/captured or relocated. These incidents are serious and demand urgent response. However, they do not explain why conflict escalates so sharply in some landscapes while tolerance persists in others. To understand this, it is necessary to look beyond animals and damage, and examine how a certain cultural ethos, power, voice, and social inequality shape the experience of conflict.

Across India's conflict-prone landscapes, coexistence has not broken down because rural communities are unwilling to live with wildlife. Nor has it collapsed simply because animal populations have increased. It has weakened because the costs of coexistence are carried unevenly, and because those who bear the greatest burden are rarely involved in deciding how conflict should be addressed.

We consistently find that forest-dependent communities, Dalit farmers, landless households, livestock-grazers, small and marginal cultivators, women, and children suffer the most. For these groups, conflict is not an occasional shock but a continuous condition layered onto existing economic and social vulnerability. Their exposure to risk is higher, their coping options fewer, and their access to state support weaker.

Dalit and landless households often depend on small plots, wage labour, livestock, and access to common lands including forest fringes for minor forest produce and grazing. When mitigation measures such as fences, trenches, or restricted zones are introduced without consultation, it is frequently these households who lose grazing routes or access to resources. This forces people to walk longer distances, enter forests at unsafe hours or locations, or guard crops and animals through the night. What appears as a technical solution on paper often translates into greater danger for those with the least flexibility.

Women experience conflict in ways that are both direct and invisible. They are responsible for daily movement through risky spaces: collecting water and firewood, walking to fields, taking children to school, and managing households when men migrate for work. These activities often take place early in the morning or after dark, when animal movement is highest. As conflict increases, women are the first to restrict their movement. Fear becomes routine. Health care is delayed, schooling is disrupted, and income opportunities shrink. When injury or death occurs, women absorb additional responsibilities, often without land titles, savings, or institutional backing.

Children are also deeply affected. In one account a school-going girl was killed by an elephant while cycling through a coffee estate on her way to school. Her parents did not demand the removal or killing of elephants. Their question was simpler and more troubling: whether it was unreasonable to expect that a child should be able to travel safely between home and school while living outside a forest. This question goes to the heart of the conflict. It is not about hostility toward wildlife, but about the absence of basic assurance of safety.

Official systems rarely capture these realities. Policy frameworks and compensation records measure acres damaged, animals lost, or payments made (and in under-estimated ways). They do not measure fear, fatigue, lost sleep, children withdrawn from school, or the steady erosion of resilience in households living with constant uncertainty. For many families, even years without major crop loss involve heavy costs in time, labour, and stress simply to remain safe.

There also exists a deep gap between policy claims and lived experience. At a large public meeting in Mysuru, senior officials presented rapid response teams and revised compensation rates as evidence of effective action. During the meeting, a farmer received a call from his son, who was trying to drive elephants out of a field. Despite repeated calls, the rapid response team had not arrived. The farmer handed the phone to the official and asked him to explain where the team was. In that moment, the distance between planning and reality became impossible to ignore.

Such gaps undermine trust. Farmers are repeatedly told that systems exist, yet experience abandonment during emergencies. Over time, this disconnect fuels anger not only toward wildlife, but toward institutions that promise protection and fail to deliver it.

Compensation occupies a central place in this tension. During the same farmers meeting, one farmer stood up and carefully listed the compensation amounts paid for different losses: how much for an acre of crop destroyed, how much for injury, how much for permanent disability, and how much for a human death. His figures were precise, reflecting long experience with the system.

He then asked a simple question. If the state assigns a price to crops, limbs, and lives, what price does it assign to an elephant's life? If an elephant dies during conflict, should farmers compensate the government in return? The room fell silent. After a pause, the farmer explained his point. He said his concern was not about harming elephants. It was about the fact that the system had reduced human as well as animal suffering to a set of low and inadequate payments. What he wanted was safety for his family and protection for his livelihood, as well as for the animals to be protected, not repeated compensation after irreversible loss.

This exchange captures a widespread grievance. Compensation is often presented as care, but in practice it frequently feels like devaluation. Payments arrive late, fall far below actual losses, and ignore the preventive costs farmers incur year after year. For poorer households, the process itself involves repeated travel, lost wages, and, in some cases, informal payments. Compensation may soften the blow, but it does not prevent harm, nor does it restore dignity.

A recurring question that arises is who gets to decide how conflict should be managed when wildlife lives in people's backyards. Decisions are often shaped by distant experts, courts, conservation advocates, forest department officials and centralised bureaucracies. Those living with animals daily have limited influence. Farmers questioned whether people living far away, who had never shared food or space with elephants, should determine relocation, capture, or continued exposure to risk. One farmer stated that he had fed elephants through his crops for twenty years and was no longer able to bear that cost alone.

This points to a democratic deficit in conservation governance. Communities possess detailed knowledge of animal movement, seasonal risk, and workable coping strategies. Yet their role is usually confined to compliance rather than co-decision. Coexistence, under such conditions, becomes an obligation imposed from above rather than a shared arrangement shaped through negotiation.

Another issue that is highlighted is that conflict is not understood uniformly even within the same landscape. In one area, settler farmers viewed animals primarily as destroyers of livelihood. In the same area, an Adivasi community described it as "sharing food", as part of living in a shared landscape, where sometimes people eat and sometimes animals do. Neither group was exaggerating. Their responses reflected different histories, relationships to land, and survival strategies. This shows that conflict is not only ecological but cultural, and that a single policy lens cannot accommodate such diversity.

Another key insight is that animals adapt quickly, while policy does not. Elephants, leopards, and other species learn from experience. Cubs raised in agricultural landscapes learn to survive there and often return even after relocation into forests. Removing animals without understanding their learned behaviour frequently fails. Current policy treats all conflict as the same, without distinguishing between animals displaced by habitat loss, animals spilling over from successful conservation areas, and animals permanently residing in human-dominated landscapes. This lack of differentiation leads to blunt responses that satisfy neither conservation goals nor human safety.

Underlying many of these failures is an attempt to govern ecological and cultural diversity through uniform solutions. One department, one set of rules, and one model of intervention are being expected to work across vastly different landscapes. Small, community-led models demonstrate what is possible, but they remain limited because institutions are reluctant to transfer real authority to local levels, preventing positive experiences from being replicated.

When people are excluded from decision-making, resentment grows. In some areas this resentment is channelled into demands for removal or retaliation against animals, often amplified by political actors. Yet what is clear is that many farmers are more nuanced than such narratives suggest. They seek safety, respect, and support, not the destruction of wildlife.

Human–wildlife conflict, therefore, is not only about animals and land. It is about who is taking decisions on whose behalf, whose safety is negotiable, whose labour is invisible, and whose suffering is normalised. Dalit farmers, landless households, women, and children occupy the most exposed positions in this system, yet their experiences are least reflected in policy design.

Protecting coexistence requires more than technology or compensation. It requires recognising inequality, restoring voice, providing equitable spaces in decision-making and sharing responsibility. Until those who bear the greatest costs are treated as central participants in decision-making, coexistence will remain fragile. The challenge is not to ask vulnerable communities to tolerate more loss, but to govern shared landscapes with fairness, dignity, and collective care.

2.1 Human Elephant Conflict

Human–elephant conflict manifests through multiple forms of damage that differ sharply in severity, reversibility, and long-term impact. While crop loss, property damage, and social disruption are widespread and economically destabilising, human death represents an irreversible threshold beyond which coexistence becomes morally, politically, and practically untenable.

This chapter examines the full spectrum of damage caused by human–elephant conflict, distinguishing between outcomes that can be mitigated, compensated, or absorbed over time, and those—particularly loss of human life—that demand fundamentally different prevention strategies.

Understanding these distinctions is essential for designing responses that reduce harm without escalating conflict or undermining long-term coexistence.

Section 1 - Forms of Damage in Human–Elephant Conflict

Human–elephant conflict affects farming and forest-edge communities through multiple, interconnected forms of damage. These impacts are not equal in severity or consequence, but together they shape livelihoods, safety, and long-term tolerance of coexistence.

1.A Human Death and Injury

Human death represents the most severe and irreversible outcome of human–elephant conflict. National guidelines and government records show that elephant-related human fatalities in India have remained persistently high over the last two decades.

Official guidelines of the Ministry of Environment, Forest and Climate Change note that more than 100 elephants die each year due to human–elephant conflict, including electrocution, train collisions, poisoning, and retaliatory actions.
(MoEFCC, 2019) - https://moef.gov.in/uploads/2019/08/01-HEC-guidelines.pdf

Government data compiled through Parliamentary responses and state records indicate that human deaths from elephant encounters number in the several hundreds annually, with a rising trend observed after 2020. Recent years have recorded annual fatalities exceeding 600 in some years, underscoring the persistence and scale of the problem.
(Parliamentary answers; MoEFCC compilations) - https://pib.gov.in/

Fatalities are unevenly distributed across states. Odisha consistently records the highest number of elephant-related human deaths nationally, with repeated hotspots in districts such as Angul, Dhenkanal, Keonjhar, and Mayurbhanj. Assam has reported over a thousand elephant-related human deaths since the early 2000s, while Karnataka records sustained fatalities each year, particularly in

Hassan, Chikkamagaluru, and Kodagu. Kerala reports fewer deaths overall, but a comparatively high burden of non-fatal injuries in districts such as Wayanad and Idukki.

The Role of Panic: Core Finding

The majority of human deaths associated with elephants are not caused by deliberate elephant aggression. They result from panic-driven human actions during surprise encounters.

Evidence from Forest Department investigations and mitigation guidelines shows that a majority of elephant-related human deaths are accidental and occur during panic-driven responses to sudden encounters—particularly at night—rather than from intentional elephant attacks on people.

The Dominant Fatality Pattern

Most fatal incidents follow a consistent sequence: an elephant or herd approaches farms or houses, usually at night; a person hears movement and assumes imminent danger; the person exits abruptly in fear; the elephant is already retreating; and a close-range collision occurs, resulting in trampling or crushing. In many investigated cases, the elephant was leaving the area rather than advancing.

Why Panic Is Lethal

Elephants have limited depth perception at close range and respond strongly to sudden movement or obstruction. Humans in panic lose spatial awareness and choose escape routes that intersect with elephant paths. At night or in poor visibility, this interaction sharply increases fatal risk. Panic negates the protective value of distance, warning time, and even well-designed mitigation systems.

Differential Risk Within Communities

Fatal risk from human–elephant conflict is unevenly distributed within affected communities. Forest Department investigations and field studies consistently show that elderly individuals living alone, women moving outside at night for sanitation or household tasks, migrant workers unfamiliar with elephant behaviour, and children face higher risk during sudden encounters.

In contrast, long-settled and indigenous communities living in the same landscapes often demonstrate lower exposure to fatal encounters, not because risk is absent, but because shared experience, situational awareness, and learned behavioural norms—such as avoiding night movement, not chasing elephants, and responding calmly to warnings—reduce panic-driven interactions.

Correcting a Common Misinterpretation

Elephant aggression, including musth-related behaviour and calf-protective responses, does occur but accounts for a minority of fatal incidents. Overemphasising aggression falsely portrays elephants as inherently violent, frames deaths as unpredictable, and legitimises forceful deterrence or removal. Evidence shows that most fatalities are accidental and triggered by rapid human movement under fear.

Why Fatalities Rise Without More Elephants

In many regions, elephant populations have remained stable or increased modestly while human fatalities have risen sharply. This divergence correlates with changes in human demography rather than elephant behaviour, including ageing rural populations, migration-driven loss of landscape knowledge, and increasing numbers of people living alone. The same elephants now interact with human populations less prepared to interpret and respond safely to their presence.

The Primary Behavioural Rule for Survival

The most effective immediate rule for reducing fatalities is consistent across landscapes: people should not run, chase, surround, or block elephants. Remaining inside secure structures, maintaining distance, and allowing clear exit routes substantially reduce fatal encounters and must be central to all training and awareness efforts.

1.B. Crop Damage and Food Security

Crop loss is the most routine and financially destabilizing form of conflict.

A 2021 multi-landscape household survey across forest-edge regions in India found that roughly half of all surveyed households experienced crop damage from wildlife, with many reporting severe seasonal losses.

A recent field study from Chhattisgarh recorded 363 crop-raiding incidents across 60 villages, damaging more than 12 hectares of cultivated land.

In the Western Ghats, farm-level research from banana and arecanut-growing belts shows that households facing repeated elephant incursions can incur annual losses approaching or exceeding ₹1 lakh in severely affected years.

Which crops are most affected

- Paddy
- Maize
- Sugarcane
- Banana
- Jackfruit
- Coconut & arecanut

- Vegetables on field edges

Reasons crop loss is devastating

- Damage usually occurs just before harvest.
- Compensation rarely matches actual loss.
- Smallholders can lose their entire season from one incident.

Where data conflicts

- Compensation data shows only a fraction of actual losses.
- Our findings through discussions with farmers show that there is far greater monetary loss than state claims.

The persistence of human fatalities and crop damage raises a question that cannot be addressed through mitigation measures alone: who decides what level of risk is acceptable, and for whom. In most conflict landscapes, decisions about elephant management—capture, relocation, fencing, or continued coexistence—are taken by institutions and experts far removed from daily exposure to danger.

Those who live with elephants, and who bear the risk of injury or death and crop loss, have limited influence over these decisions. The result is a system in which life-threatening risk is normalised for certain rural populations without their consent, while the authority to define "tolerable loss" remains concentrated elsewhere. This imbalance lies at the heart of growing resistance to conservation interventions

1.C. Property Damage (Houses, Grain Stores, Water Tanks and Other Infrastructure)

This form of damage is highly disruptive but often underreported.

Typical structures damaged

- Mud huts, kitchens, grain stores
- Pump houses, pipes, water tanks
- Livestock sheds
- Boundary walls

- Shops/outbuildings near forest edges

Observed patterns

- Elephants break into homes to reach stored grain.
- Tin-roof houses in tea gardens (Assam) frequently targeted.
- Plantation belts in Kerala report repeated pump-house destruction.

Effects on households

- Families must relocate temporarily to schools or relatives' homes.
- Repair costs push households into debt.
- Grain loss equals immediate food insecurity.

Data inconsistencies

- Only verified cases enter government records.
- Academic field studies estimate 2–3× more incidents than compensated.

1.D. Long-Term Social, Emotional, and Livelihood Impacts - The "unseen" costs rarely represented in official data

Conflict impacts are also shaped by caste and land ownership in ways that are rarely acknowledged in official assessments. Dalit and landless households are often the first to lose access when mitigation infrastructure such as fences or trenches is installed, as they depend more heavily on common lands, informal grazing routes, and forest-edge resources.

These households are more likely to be forced into longer, riskier movement patterns and night-time exposure. Lacking land titles or formal recognition, they also face greater difficulty accessing compensation and institutional support. As a result, human–elephant conflict reinforces existing social inequalities, concentrating risk among those with the least capacity to absorb it.

Let us look at the different kinds of long term social, emotional and livelihood impacts:

1. Gendered impacts

- When men die, women become de facto heads of household overnight. Even when compensation comes, widows struggle because:
- Land titles may be in the husband's name.

- They lack access to banking systems.
- They cannot secure loans for the next planting season.
- When women die:
- Children, especially girls, drop out of school.
- Boys take on wage work or full responsibility for farming.
- Elderly grandparents take over childcare.

2. Impact on education

- Children miss school when elephants are near the village.
- Night-time raids mean no sleep, affecting learning.
- Families avoid sending children alone even for short walks to school.

3. Psychological trauma

- Chronic fear, especially among elderly and women.
- Anxiety about walking outside after dark.
- Families sleep in groups, community halls, or open fields.

4. Economic chain reactions

- Repeated damage → loans → debt cycles
- Abandonment of farming (especially banana & paddy)
- Migration to towns
- Seasonal wage labour replacing agriculture

5. Community tensions

- Between forest-edge farmers and those farther away
- Between groups favouring strict protection and groups supporting coexistence
- Between villagers and forest staff when compensation is delayed

6. When elephants are harmed, conflict worsens

- Injured elephants become aggressive and unpredictable.

- Calf–mother separation increases risk of night raids.
- Stress leads to erratic movement patterns.

Understanding damage in all its forms — physical, economic, social, psychological — is essential for designing real, humane, and effective solutions.

And unless we acknowledge every part of this chain, our solutions remain incomplete. The following sections, which detail preventive practices and community protocols, are designed to address each link in this damaging chain.

Section 2 Harm to Elephants and Its Role in Escalating Conflict

Human–elephant conflict inflicts severe and often overlooked harm on elephants. Beyond immediate mortality, it causes injury, behavioural stress, social disruption, and long-term instability in elephant populations. These impacts, in turn, increase risk to humans.

2. A Unnatural Elephant Mortality

Electrocution from illegal or poorly designed fencing is one of the leading causes of unnatural elephant mortality in India, with studies and government guidelines noting that adult males are disproportionately affected due to wider ranging behaviour and greater exposure to agricultural boundaries and power infrastructure.
(MoEFCC 2019; Sukumar et al.)

Railway collisions constitute another major source of elephant mortality. In Assam, studies documenting the impacts of rail expansion show a sharp increase in elephant deaths following broad-gauge conversion and higher train speeds. Between 1987 and 2015, at least 206 elephant deaths were attributed to train strikes, concentrated along a small number of high-risk rail corridors.
(Wildlife Institute of India; PIB)

Habitat loss and corridor fragmentation compound these risks. When traditional movement corridors are blocked by infrastructure, elephants are forced into farms, roads, and settlements, increasing the likelihood of fatal encounters and intensifying human–elephant conflict.

2. B Injury, Stress, and Population-Level Effects

Many elephants survive encounters with human infrastructure but sustain serious injuries from electrified wires, trenches, and poorly maintained fences. These injuries cause long-term disability and impair movement.

Chronic disturbance leads to behavioural changes. Elephants increasingly shift to nocturnal movement, become more secretive, and alter long-established routes. The loss of experienced matriarchs disrupts social cohesion and decision-making within herds. In fragmented landscapes, sub-populations face increasing isolation and reduced exchange between groups.

These effects create a cascading pattern: elephant deaths and injuries destabilise herds, destabilised herds move unpredictably, and unpredictable movement increases conflict.

2. C Behaviour, Corridors, and Predictable Movement

Elephant movement is governed by strong behavioural rules. Herds are matriarchal, with the oldest female guiding travel, feeding, and risk avoidance. Typical herds contain 8–12 individuals, while adult males often travel alone. Solitary bulls, especially during musth, take greater risks and enter farms more frequently.

Elephants preferentially move at night to avoid human activity, heat, and disturbance. Consequently, both elephant incursions and human fatalities peak after dusk.

Elephants possess long-term spatial memory. They remember water sources, fruiting trees, and corridors for decades, passing this knowledge across generations. When traditional routes are blocked by settlements, railways, mines, or fencing, elephants do not abandon them. Instead, they detour—most often through cultivated land.

Food density reinforces this pattern. One acre of crops such as paddy or sugarcane can offer nutritional value equivalent to several dozen acres of forest. Habitat fragmentation and disturbance further increase reliance on farmland, especially during seasonal crop availability.

India has approximately 150 government-recognised elephant corridors, concentrated in eastern and southern landscapes. Blocking these corridors forces elephants into new villages, splits herds, prolongs their presence in human-dominated areas, and spreads conflict geographically.

Why This Matters

Elephants are ecosystem engineers, and their stability is central to both conservation and human safety. Interventions that injure or kill elephants increase long-term conflict by destabilising movement and behaviour.

Effective mitigation depends on aligning infrastructure, land use, and community practices with elephant ecology. Fences that cut corridors, trenches that block water access, or vigilance systems misaligned with night-time movement are likely to fail.

Understanding how harm to elephants feeds back into conflict is essential for designing solutions that protect both people and wildlife.

Section 3: Farm- and Community-Level Mitigation

How to Reduce Risk Without Escalating Conflict

Core Principle

No single mitigation method works permanently, and no mitigation method works in isolation. Elephants are intelligent, mobile, and highly responsive to stress and obstruction. Measures that rely solely on physical barriers or enforcement—such as fencing, trenches, or drives—often reduce conflict locally while unintentionally increasing it elsewhere. When implemented without coordination, these interventions fragment elephant movement, deflect animals onto roads or new villages, and shift risk into regions with little prior exposure or preparedness.

Effective mitigation therefore depends not only on the choice of tools, but on **how and where they are deployed**, and **who participates in their design, maintenance, and response**. Community participation, supported by state agencies and civil society organisations, is essential to ensure that mitigation preserves predictable elephant movement, maintains landscape connectivity, and prioritises human safety. Approaches that slow elephants, provide early warning, and create time for calm human response—rather than attempting exclusion or force—have consistently shown better outcomes.

Mitigation that ignores landscape-scale effects, local knowledge, and shared responsibility risks converting manageable conflict into dispersed and more dangerous encounters. Sustainable risk reduction requires coordinated, community-owned systems embedded within broader state planning and supported by long-term institutional commitment.

3.A Methods That Escalate Conflict (To Be Avoided)

Why These Methods Fail (Common Patterns)

All harmful or retaliatory methods share four outcomes:

1. They cause injury or death to elephants
2. They destabilise herd structure and movement
3. They shift conflict to new locations
4. They increase risk to humans and invite legal consequences

3.A.1 Lethal and Injury-Causing Methods (Illegal)

Method	Why Used	Why It Fails
Electrocution (illegal fencing, live wires)	Cheap, immediate	Kills adult bulls disproportionately; destabilises breeding; increases risk-taking by younger males; escalates conflict
Snaring / wire traps	To injure and deter	Causes chronic injury; elephants return; injured animals become unpredictable
Poisoning	Silent removal	Slow, cruel deaths; spreads conflict; non-bailable offence
Explosive bait	Fear-based deterrence	Severe injury, calf deaths, herd aggression, national legal consequences

Conclusion: These methods worsen conflict and are illegal under wildlife law.

3.A.2 Panic-Inducing Deterrence (High Human Risk)

Method	Why Used	Risk
Firecrackers, torch mobs, drums	Immediate reaction	Causes panic charges, calf separation, night-only movement
Aggressive chasing	Emotional response	Leads to human deaths during close encounters
Burning forest edges	Pushback attempt	Destroys forage, causes unpredictable movement

3.B Methods That Work When Designed and Maintained Correctly

3.B.1 Physical Barriers (Delay, Not Absolute Prevention)

Method	Best Use	Failure Risk
Solar electric fences	Continuous community fencing	Poor maintenance, gaps, battery failure
Elephant-proof trenches	Permanent boundaries	Siltation, waterlogging, calf injury

3.B.2 Sensory and Biological Deterrents (Temporary)

Method	Strength	Limitation
Chilli-grease ropes	Low-cost, effective when fresh	Rain wash-off, habituation
Light / sound	Warning support	Habituation if used alone
Buffer crops	Delay & guidance	Fails without community adoption

B.C Community-Level Systems (Highest Impact on Safety)

3.C.1. Shared Vigilance & Early Warning

- Night vigilance groups
- Watchtowers at known routes
- WhatsApp / SMS / siren alerts

Impact:
Reduces surprise encounters, which cause most fatalities.

3.C.2 Spatial Planning (Long-Term Reduction)

- Respect corridors
- Move grain storage inward
- Avoid construction on paths
- Use buffer crops strategically

3.D Technology-Assisted Early Warning (Support Tools)

Tool	Best For	Limitation
Camera traps	Mapping routes	Not real-time

Tool	Best For	Limitation
GPS collars	Advance warning	Covers few elephants
Thermal cameras	Dense vegetation	High cost, maintenance
Drones	Emergencies	Short duration

Rule: Technology buys time; behaviour saves lives.

3.E Decision Guide

Goal	Use	Avoid
Real-time warning	Alerts, towers, collars	Camera traps alone
Entry-point mapping	Camera traps	Noise-only deterrents
Emergency response	Drones + FD	Mobs, firecrackers
Low-cost warning	Patrols + alerts	Tech without maintenance

Section 4 - CSO and Research Interventions

Civil society organisations and research institutions play a critical intermediary role in human–elephant conflict (HEC) landscapes. Their primary contribution lies not in replacing state responsibility, but in **testing, refining, and operationalising mitigation approaches** that bridge scientific knowledge, administrative systems, and local practice.

Across elephant-range states, these actors typically function in four overlapping domains:

1. Landscape-scale planning and data generation
2. Early-warning and response systems
3. Community capacity-building and behavioural change
4. Livelihood and risk-diversification support

Their interventions are most effective when embedded within Forest Department frameworks and when communities retain ownership over daily operation and maintenance.

4.A Landscape and Corridor-Focused Interventions

A major contribution of civil society and research institutions has been in **identifying elephant movement patterns and functional corridors**, often through long-term field surveys, telemetry data, and historical land-use analysis.

Typical activities include:

- Ground validation of elephant movement routes
- Mapping conflict hotspots and seasonal pathways
- Supporting habitat restoration and corridor protection
- Advising on placement of mitigation infrastructure to avoid blocking movement

Where these inputs are integrated into district or state planning, they help reduce repeated displacement of elephants and the geographic spread of conflict. Where ignored, static mitigation structures often fail or shift risk elsewhere.

4.B Early-Warning, Monitoring, and Decision-Support Systems

Civil society actors have played a key role in **piloting early-warning systems** that aim to reduce surprise encounters—the dominant cause of human fatalities.

Common approaches include:

- Acoustic or vibration-based elephant detection
- Camera trap networks used for route mapping
- GPS-based tracking of selected individuals or herds
- SMS, app-based, or siren alerts linked to detection systems

These tools are most effective when treated as **decision-support mechanisms rather than standalone solutions**. Their value lies in buying time for calm human response, not in attempting total exclusion of elephants. Coverage limitations, maintenance costs, and technology failure remain persistent constraints.

4.C Community-Based Vigilance and Response Capacity

Another major area of engagement has been **strengthening community-level preparedness** rather than relying solely on enforcement or emergency response.

Typical interventions include:

- Training night vigilance groups and first responders
- Developing locally appropriate response protocols
- Supporting watchtowers, patrol schedules, and alert chains
- Behavioural training focused on panic avoidance and safe response

Evidence across landscapes shows that **communities with shared vigilance systems experience fewer fatal encounters**, even when elephant presence remains high. The effectiveness of these systems depends on trust, consistency, and clear coordination with Forest Department staff.

4.D Livelihood Diversification and Risk Reduction

In highly exposed forest-edge areas, some interventions focus on **reducing economic vulnerability rather than stopping elephant movement**.

These include:

- Supporting alternative or supplementary livelihoods
- Encouraging buffer crops or land-use changes

- Reducing dependence on highly palatable crops in high-risk zones

While such measures do not eliminate conflict, they can lower the severity of economic shocks and reduce pressure for retaliatory action. Their impact is context-specific and limited where landholdings are small or livelihood options constrained.

4.5 Structural Limits of Civil Society Interventions

Despite their contributions, civil society and research-led interventions face clear limits:

- They **cannot substitute for state authority**, funding, or legal enforcement

- Successful pilots often fail to scale without institutional adoption

- Projects are vulnerable to funding cycles and personnel turnover

- Long-term maintenance frequently collapses once external support ends

Most importantly, civil society interventions succeed only when **state systems absorb and institutionalise them**. Where this does not occur, fragmented pilots coexist with persistent conflict.

Key Insight

Civil society and research institutions are most effective not as parallel problem-solvers, but as **catalysts within state-led and community-owned systems**. Their strongest contribution lies in improving design quality, reducing fatal risk through early warning and behavioural change, and ensuring that mitigation aligns with elephant ecology rather than reacting to crisis.

Over-reliance on isolated pilots, technologies, or short-term projects—without institutional integration—risks reproducing the very fragmentation that drives human–elephant conflict.

Section 5 - Government Responses to Human - Elephant Conflict

Specialized Forest Department Interventions

These are high-cost, high-skill operations used when conflict has escalated or specific “problem elephants” are involved.

5. A Use of Kunkis (Trained Captive Elephants)

What this is:

Captive, trained elephants used by the Forest Department to drive or guide wild herds back into forest areas during organised drive operations.

Primary role:

- To physically and psychologically guide wild elephants away from human settlements.
- Used in large-scale drives in Assam, West Bengal, and occasionally Karnataka.

Effectiveness:

- Useful for short-term dispersal.
- Wild elephants often return if underlying habitat/feed issues are not addressed.
- Expensive to maintain (feed, veterinary care, mahout wages).

5.B Chemical Immobilisation (Tranquilisers)

What this is:

Use of dart-delivered anaesthetics by trained veterinarians to immobilise elephants for:

- treating injuries,
- fitting radio-collars,
- capturing and relocating habitual, highly dangerous individuals.

Protocol:

- Governed by MoEFCC Recommended Operating Procedure.
- Only trained vets and Rapid Response Teams may use it.
- Treated as a last resort, not a routine tool

Section 6 - State-Level Schemes, Compensation Systems, and Ground-Level Reality in Human–Elephant Conflict

This section explains how mitigation infrastructure and compensation systems for Human–Elephant Conflict (HEC) operate in India, how funds and relief are accessed in practice, and why outcomes often fail despite extensive policy frameworks.
The section is structured for **decision-making and diagnosis**, not merely description.

6.A FUNDING FOR PREVENTION: MITIGATION INFRASTRUCTURE

6.A.1. Central Government Support: Project Tiger & Elephant (PT&E)

In 2023–24, the Government of India merged Project Tiger and Project Elephant into a single Centrally Sponsored Scheme (CSS) titled **Project Tiger & Elephant (PT&E)**.

Central Funding Landscape for HEC Mitigation

Item	Details
Total PT&E Allocation	₹330–335 crore per year (Budget Estimates 2023–24) *(Union Budget / MoEFCC Expenditure Budget 2023–24* — https://www.indiabudget.gov.in)
Coverage	53 Tiger Reserves, 33 Elephant Reserves *(Project Elephant* pages — https://projecttiger.nic.in/progress-so-far.html; https://moef.gov.in/en/division/project-elephant/)
Earlier Project Elephant Allocation	₹30–35 crore per year (pre-merger) (See MoEFCC demand for grants (pre-PT&E). *Union Budget Archives* — https://www.indiabudget.gov.in)
Current Status	Elephant funding is discretionary within PT&E Supported by MoEFCC budget presentations. — https://moef.gov.in/wp-content/uploads/2024/02/Wildlife-Budget-Presentation.pdf
Key Constraint	Proposals must compete with tiger-centric priorities noted in independent policy and budget analyses. — https://civilsocietybudgetbriefs.org; https://www.downtoearth.org.in

Critical Insight
Post-merger, elephant-specific funding is **not ring-fenced**. Elephant mitigation projects are approved only if they are strongly justified in the State's Annual Plan of Operation (APO).

6.2 How Mitigation Funds Are Actually Accessed

Central funds are released **only to State Forest Departments**. CSOs, Panchayats, and communities cannot apply directly to the Ministry.

Bottom-Up Process to Access Mitigation Funds

Step	Actor	Action	Common Failure Point
1	Gram Sabha	Pass resolution demanding specific mitigation	No formal resolution
2	Panchayat + Range Forest Officer	Submit proposal with map, cost, maintenance commitment	Weak documentation
3	Divisional Forest Officer → Chief Wildlife Warden	Inclusion in State Annual Plan of Operation	**Most proposals fail here**
4	MoEF&CC (Ministry of Environment, Forest and Climate Change)	Central sanction & release	Delays / partial approval

Key Practical Lever
Written Panchayat commitment for maintenance (e.g., fence vegetation clearing) is often decisive.

6.3 CAMPA Funds: Parallel Route for Mitigation

CAMPA funds originate from forest diversion penalties under the Forest (Conservation) Act, 1980 and are governed by the CAMPA Act, 2016.

What Are CAMPA Funds?

CAMPA Funds refer to the corpus of money managed under the Compensatory Afforestation Fund Management and Planning Authority. These funds are a massive, dedicated financial resource crucial for India's environmental conservation efforts, particularly at the state level.

If Project Elephant funds are exhausted (common), ask the DFO to help get assistance under CAMPA This is a dedicated, massive pool of money held by states specifically to mitigate environmental impacts, and represents a highly viable route for funding significant mitigation infrastructure (like trenches and walls) when standard Forest Department budgets are constrained.

Important Qualification
CAMPA is procedurally flexible but **administratively controlled**. Proposals still require CWLW approval and active follow-up.

6.4 COMPENSATION AFTER DAMAGE: EX-GRATIA & INSURANCE

1. Federal Compensation Framework

The Central Government sets minimum standards for **human death and grievous injury**. All other compensation is state-determined.

Central Ex-Gratia Minimum Norms

Damage Caused by Wild Animals	Central Government Ex-Gratia Amount (Minimum)	Policy Access and Claim Process (Typical Steps)
Human Death or Permanent Incapacitation	₹10 lakh	1. Report the incident to local authorities and file an FIR. 2. Notify the Range Forest Officer / State Forest Department. 3. Submit claim with post-mortem/disability certificate and spot report.
Grievous Injury	₹2 lakh	1. File incident report with RFO. 2. Attach medical certificate and treatment records. 3. Submit claim following state procedures.
Minor Injury	Cost of treatment up to ₹25,000	1. Report to RFO. 2. Submit medical bills and treatment certificate.
Loss of Livestock, Crop, or Property	Varies by State/UT norms	Compensation for crops/livestock/property is governed by state or UT compensation norms and rates.

Union Ministry of Environment, Forest and Climate Change (MoEFCC) official ex-gratia rates under Centrally Sponsored Schemes “Integrated Development of Wildlife Habitats”, Project Tiger & Project Elephant:

- Death or permanent incapacitation: ₹10 lakh
- Grievous injury: ₹2 lakh
- Minor injury: treatment up to ₹25,000
- Loss of property/crops/livestock: per State/UT norms

[Source: Press release on ex-gratia rates from the Union Environment Ministry, 5 Feb 2024]

Key Gap
There is **no national floor** for crop or property damage—the largest source of grievance.

6.5. Crop Insurance: PMFBY and Wild-Animal Damage

From **Kharif 2026**, PMFBY includes wild-animal damage as an **add-on under "localised risks"**, subject to state notification.

PMFBY Premiums and Coverage (2025–26)

Crop Category	Farmer Premium	Govt Subsidy
Kharif food grains & oilseeds	2%	Remainder
Rabi food grains & oilseeds	1.5%	Remainder
Cash / horticultural crops	5%	Remainder

Mandatory Clarification
Wild-animal damage coverage applies **only where notified by the state and accepted by insurers**. It is not uniform nationwide.

Section7 - Gaps in Policy and Implementation

The gaps in policy and implementation regarding Human-Elephant Conflict (HEC) in India are widespread, primarily stemming from decentralized execution, inadequate financing, and a focus on short-term deterrents over long-term habitat management.

Academic studies and government reports consistently highlight major deficiencies in compensation schemes and the efficacy of physical mitigation measures.

7.A Compensation Gaps: Delay, Inadequacy, and Hidden Costs

A central structural weakness underlying compensation gaps is the attempt to govern ecological and cultural diversity through uniform institutional responses. India's human–elephant conflict is managed largely through a single legal framework and a single administrative system, despite vast differences in landscape, livelihood, history, and social organisation.

This monoculture of governance assumes that one set of tools and procedures can address fundamentally different forms of coexistence and conflict. The transcripts repeatedly point to the limits of this approach, noting that local institutions, cultural norms, and community knowledge are sidelined even where formal decentralised structures exist. Without adapting governance to diversity, policy interventions remain blunt and often counterproductive.

While the Central Government sets the compensation floor (e.g., ₹10 Lakh for human death, enhanced in December 2023), the State-level implementation is plagued by systemic failures that undermine community tolerance for elephants.

7.B Bureaucratic Delays and Pendency

- Compensation systems across Karnataka exhibit significant delays and administrative hurdles, reinforcing farmer claims of bureaucratic bottlenecks in human–elephant conflict management**.**
- While mass totals of reported HEC cases run into the thousands in some forest circles, compensation processing remains slow and encumbered by documentation and procedural requirements. Karnataka Forest Department responses in the state Assembly admit that many eligible claims are delayed or not paid due to incomplete paperwork and procedural bottlenecks, forcing affected households to make repeated visits and wait long periods for relief.

7.C Inadequate Valuation (Crop Loss)

Low Payouts: Compensation for crop damage is often significantly lower than the actual market value of losses, particularly for smallholders. In Odisha, conflict assessments have found that average compensation payments per crop-damage incident are far below what farmers claim as loss, making the system appear inequitable and weak in covering real costs. *(Guru & Das 2017 — Odisha human–elephant conflict study)*

Under-reporting due to low valuation: In states such as Kerala, farmers and activists have noted that relatively low compensation payouts for crop damage disincentivise reporting, as the effort and cost of filing claims often outweigh the expected relief. *(Times of India reporting on compensation challenges)*

7.D Ignoring Hidden and Transaction Costs

- Transaction Costs: Discussions with farmers show that the process of obtaining compensation involves significant "transaction costs." These include travel fees for repeated visits to the forest office, loss of paid work, and in some documented cases, pressure to pay bribes to officials for necessary documentation.

- Hidden Costs: Policies rarely account for non-monetary losses, such as:

- Opportunity Cost: Time spent guarding fields at night, leading to lack of sleep and fatigue.

- Social Cost: Low school attendance for children who are deployed to guard fields during the day.

- Psychological Cost: Increased debt burden, anxiety, and fear in communities living on the conflict periphery.

7.E Mitigation Gaps: Efficacy, Monitoring, and Policy Focus

Implementation of physical deterrents is widespread, but a lack of scientific assessment and poor maintenance often leads to high failure rates.

Failure of Physical Barriers

- Lack of Scientific Basis: Academic literature points out that many physical barriers, such as solar fences and Elephant Proof Trenches (EPTs), are installed without a prior scientific assessment of site specificity or elephant movement patterns. This often leads to failure in their intended goal.

- In Golaghat district, Assam—one of the state's persistent human–elephant conflict hotspots—physical mitigation measures such as solar fencing and trenches were installed to reduce elephant incursions. However, field assessments and government reviews show that conflict incidents continued to rise through the 2010s despite these interventions.

- Studies attribute this failure not to the absence of infrastructure, but to weak long-term monitoring, inconsistent maintenance, and a reliance on static barriers in a highly dynamic elephant landscape. Over time, elephants breached, bypassed, or exploited degraded fencing and trenches, demonstrating how poorly maintained barriers can lose effectiveness rapidly and even displace risk to adjacent areas.

7.F Policy Failure on Habitat Management

- Research from Assam and other elephant landscapes indicates that human–elephant conflict intensifies sharply once habitat loss and fragmentation cross a critical functional threshold. When forest cover becomes severely reduced and disconnected, elephants are forced to move through farms, roads, and settlements to access food, water, and movement routes. Studies emphasise that

it is this underlying land-use change—rather than the absence of deterrents—that drives sustained conflict, a factor that policy responses often fail to address directly.
(Assam conflict studies; ATREE; Choudhury 2004)

- A central policy response has been the identification of elephant movement corridors. The Wildlife Institute of India has ground-validated 150 elephant corridors across 15 states. However, implementation has lagged, with many corridors remaining vulnerable to encroachment, mining, road expansion, and other unplanned infrastructure—precisely the pressures that restrict elephant movement and intensify conflict.
(WII, Right of Passage)

7.G Retaliatory Strategies

- Elephant Drives Conducted by the State: In several states, the traditional practice of "elephant drives" (chasing elephant herds into unfamiliar territory) has repeatedly proven to be ineffective. Elephants have a strong memory and tend to return to their home ranges. The drives simply cause the elephants to become more stressed and aggressive, increasing conflict along their displacement route

Section 8 - Suggested Actions by Level: What Can Realistically Reduce Risk

8.A. Farm-Level Actions (Immediate, Low-Cost, Behaviour-Critical)

8.A.1. Reduce night-time surprise encounters at the household scale

- Shift grain storage, fodder, and water sources away from house edges facing elephant routes.

- Install simple fixed lighting at entry points and courtyards (not roaming torches).

Addresses: Panic-driven fatalities, house break-ins.

8.A.2. Follow a single non-negotiable safety rule during encounters

- Do not chase, run, surround, or attempt to block elephants; remain inside secure structures and allow exit routes.

- This rule should be reinforced repeatedly through village-level drills and signage.

Addresses: The dominant cause of human deaths.

8.A.3. Use deterrents only as delay tools, not exclusion tools

- Chilli rope, light, or sound should be used to slow entry and trigger alerts—not to confront or drive elephants.

Addresses: Escalation caused by panic and aggressive deterrence.

8. B. Community-Level Actions (Highest Impact on Fatality Reduction)

8.B.1. Establish shared night vigilance and alert systems

- Fixed watch points on known routes, rotating night duty, and a single alert channel (siren/phone/WhatsApp).

- Focus on early warning, not pursuit.

Addresses: Surprise encounters; uneven individual risk.

8.B.2. Collective maintenance responsibility for mitigation infrastructure

- Panchayat-level maintenance rosters for fences, trenches, and vegetation clearance.

- Infrastructure without maintenance should not be expanded.

Addresses: High failure rates of physical barriers.

8.B.3. Protect elephant movement paths through village planning

- Avoid new construction, grain storage, or water points on known routes.

- Use buffer crops collectively, not farm-by-farm.

Addresses: Route blocking that displaces conflict.

8.C. Civil Society / Research-Level Actions (Catalytic, Not Substitutive)

8.C.1. Shift from pilots to adoption-ready designs

- Prioritise interventions that Forest Departments and Panchayats can operate with existing staff and budgets.

- Avoid technology that requires continuous external support.

Addresses: Collapse of pilots after project exit.

8.C.2. Standardise training on human behaviour, not just technology

- Focus training on panic avoidance, safe response, and coordinated vigilance.

- Behavioural change should be treated as core mitigation, not "awareness".

Addresses: The primary cause of fatalities.

8.C.3. Support local governance processes, not parallel systems

- Assist Gram Sabhas and Panchayats in drafting resolutions, maps, and maintenance plans needed to access state funds.

Addresses: Failure to translate community demand into sanctioned action.

8.D. Government-Level Actions (Structural, Scalable, Necessary)

8.D.1. Ring-fence funding for elephant mitigation within PT&E

- Create a clearly identifiable elephant-specific budget line, including maintenance costs.

Addresses: Chronic underfunding and competition with tiger priorities.

8.D.2. Make maintenance a funded obligation, not a local afterthought

- Sanction mitigation projects only with approved long-term maintenance plans and budgets.

Addresses: Infrastructure decay and repeat failure.

8.D.3. Treat corridors as safety infrastructure, not conservation add-ons

- Prevent new barriers, roads, or construction on validated elephant movement paths.

- Integrate corridor protection into district planning approvals.

Addresses: Root cause of geographic spread and intensification of conflict.

Core Takeaway

Fatal risk and crop loss damage from human–elephant conflict is **not inevitable**. It persists because responsibility is fragmented, maintenance is unfunded, behaviour is under-addressed, and landscape planning is reactive. Reducing deaths and chronic loss requires **small, enforceable actions at each level**, aligned with elephant ecology and human safety—not larger, more complex projects.

2.2 Tiger Human Conflict

Introduction:

Section 1 - Tiger–Farmer Conflict and Types of Damage

Human–tiger conflict is a **spatially clustered but recurrent** feature of rural landscapes bordering tiger habitats across India. As tiger conservation succeeds and human populations continue to live, farm, and graze livestock along forest edges, the overlap between people, domestic animals, and tigers has increased. This overlap generates measurable economic, social, and safety impacts on farming communities.

Tiger-related conflict is **low-frequency but high-impact**, characterised by sharp geographic clustering rather than uniform presence across all tiger landscapes. In a limited number of corridors and buffer zones, tigers exert disproportionate influence on livelihoods, safety perceptions, and land-use decisions, while in many other tiger-range areas conflict remains minimal or episodic.

The damage associated with tiger–farmer conflict occurs in three primary forms: **livestock predation**, **human injury or death**, and **indirect agricultural and livelihood losses**. The scale and patterns of each type have been quantified across multiple long-term ecological studies and government datasets.

1.A Livestock Predation

A Livestock depredation is the largest quantifiable component of tiger–farmer conflict. Multiple long-term and landscape-wide datasets show that:

● Around **Corbett Tiger Reserve**, tigers caused an average of **573 kills per year (2006-2015)** — nearly double the ~263 attributed to leopards. Leopards dominated only in the reserve's north zone.. In these depredations, **cattle made up ~75% of all livestock killed**, followed by buffaloes and other domestic animals.
Source: Ghosal et al., *PLOS One* 2018.

● **Kanha Tiger Reserve (2001-2009)** compensation records show **400–600 livestock loss claims per year**, with most cases attributed to tigers, then leopards.

● Spatial risk analyses consistently show that **predation risk spikes when livestock graze inside forest patches**, especially where villages abut core and buffer areas. These are typically within ~2 km of forest edges with dense understory and water sources.

● Importantly, **most losses arise from modifiable husbandry practices** — free-range or unsupervised grazing, forest-edge grazing, lack of predator-proof night enclosures, and delayed carcass handling — rather than unavoidable tiger behaviour.

1.A.1 Household and Economic Impacts

- For smallholder households, each livestock loss represents a **direct economic shock**, reducing milk income, draught power, breeding potential, and asset value. Evidence from government household income surveys and livestock valuation schedules shows that the market value of a milch cow, combined with foregone milk income, commonly exceeds **several weeks to months of average household earnings** for marginal and small farmers. As a result, livestock depredation is financially destabilising in the absence of timely compensation or effective preventive support.

Sources: National Statistical Office (2019). *Situation Assessment of Agricultural Households in India*. Government of India. | Department of Animal Husbandry & Dairying (various years). *Basic Animal Husbandry Statistics*. Government of India.

- Losses are **unevenly distributed**: a smaller subset of households and villages experience repeated depredations, creating chronic loss cycles that amplify vulnerability and grievance.

- Across central Indian tiger landscapes, household surveys show that livestock loss is consistently among the most frequently claimed and highest compensation categories where tigers and leopards co-occur — highlighting its pervasive economic burden.
Source: Combined conflict and compensation analyses in Kanha and other reserves.

- **Compensation schemes**, whether state-level or central, **usually cover only a fraction of true market value and ancillary losses**. Without investment in preventive measures (predator-proof corrals, herders, deterrents), affected households remain at risk of recurring losses rather than reduced future conflict.

1.A.2. Indirect and Secondary Economic Effects

Indirect effects often **exceed the impact of single events**:

- Farmers avoid high-risk grazing areas, forcing cattle to stay near villages, **reducing pasture access and increasing fodder costs**.

- Households near high-conflict zones report changing crop choices or abandoning crops requiring dawn/dusk field work — times coinciding with peak tiger movement.

- In extreme cases, **persistent conflict leads to farm abandonment or migration**, as documented in multi-species conflict zones in South Asia.

- Women often bear disproportionate indirect burdens through increased fodder collection time, fuelwood gathering constraints, and reduced mobility due to fear of tiger encounters.

1.B Human Injuries and Fatalities

Although far rarer than livestock losses, **human injuries and fatalities from tiger attacks carry disproportionate social and political impact**. Tiger attacks are **spatially clustered and behaviourally patterned**, rather than random.

Central India: Tadoba–Andhari landscape - A detailed study of human–tiger conflict in the Tadoba–Andhari Tiger Reserve landscape documented **34 human deaths from tiger attacks between 2005 and 2011**, with incidents concentrated in **buffer zones and village–forest interfaces**, rather than inside village cores.
Victims were predominantly **adult men**, most often **grazers, firewood collectors, or agricultural workers**, engaged in **solitary activities during early morning or dusk**, when tiger movement is highest.
Source: Dhanwatey et al. (2013), *PLOS ONE*

The study further shows that Tadoba functions as a **source landscape**, exporting dispersing tigers into surrounding multi-use areas. These dispersal movements create **predictable clusters of encounters** where tiger movement corridors intersect with routine human activity in agricultural and forest-fringe villages.

Sundarbans: a distinct conflict system - The **Sundarbans** represents an exceptional human–tiger conflict landscape. Unlike mainland reserves, fatalities here arise from **daily livelihood dependence inside tiger habitat**, rather than forest-edge interaction. Peer-reviewed analyses document **dozens of human fatalities over multi-year periods**, largely affecting honey collectors, fishers, and woodcutters entering mangrove forests as part of routine livelihood activities.
Source: Das & Jana (2010), *Human Dimensions of Wildlife*, Sundarbans conflict analysis.

Cross-cutting patterns

Across these landscapes, fatal attacks consistently show:

- Concentration among **forest-dependent occupational groups**
- Occurrence during **forest entry or use**, not within village centres
- Strong clustering at **village–forest interfaces and dispersal corridors**

Even **isolated fatal incidents** can generate powerful "fear landscapes", reducing access to forests, increasing grazing and labour costs, and provoking strong political and administrative responses—especially when **compensation, communication, or rapid response mechanisms are delayed**.

1. C Temporal Patterns

Seasonality

Tiger–farmer conflict shows **clear and repeatable seasonal variation**, shaped by both ecological conditions and predictable human land-use patterns.

- **Dry seasons** often see peaks in livestock attacks as wild prey concentrates near shrinking water sources and cattle grazing expands deeper into forested areas. Reduced forage outside forests pushes both prey and livestock into overlapping spaces, increasing encounter risk.

- **Monsoon and post-monsoon periods** show a secondary rise in conflict. During this time, dense vegetation reduces visibility and increases the likelihood of surprise encounters between tigers, livestock, and people.

- In agricultural landscapes, conflict risk rises sharply when **tall, dense crops such as sugarcane, banana, or mature plantation crops** are at peak height. These crops provide **excellent ambush cover**, allowing tigers and leopards to move, rest, and hunt close to villages with minimal detection.

- As a result, seasonal conflict patterns reflect not only wildlife ecology, but also **crop calendars, grazing decisions, and periods of reduced human visibility**.

1. D Multi-year Variability and Habitat Spillover

Conflict intensity also varies substantially from year to year, driven by population dynamics and landscape structure.

- **Years of increased tiger dispersal**, particularly when young males leave core reserves, often show sharp spikes in conflict. In some landscapes, livestock depredation and encounter rates rise dramatically relative to average years.

- New conflict hotspots frequently emerge along **dispersal corridors and forest–agriculture interfaces**, especially where movement routes intersect with irrigated farmland and plantations.

- Over time, many tigers and leopards have begun to **use plantation edges and agricultural mosaics as semi-permanent habitat**, rather than treating them as temporary spillover zones. Dense crops, irrigation canals, and abundant livestock create conditions that resemble forest edge habitat in structure and prey availability.

In such landscapes, conflict is no longer driven only by animals "straying" out of forests. Instead, it reflects a **reconfigured habitat system**, where forest edges, plantations, and farmlands function as an extended hunting and movement environment. This shifts conflict from episodic intrusion to **persistent, landscape-level interaction**, especially in areas with continuous crop cover and weak separation between forest and agriculture.

These temporal fluctuations demonstrate that tiger–farmer conflict is shaped by **ecological dynamics, crop structure, and population age composition**, rather than static averages or random events. Many spikes are predictable based on **dispersal cycles, crop stages, and known movement routes**, underscoring the importance of anticipatory mitigation rather than reactive response.

Section 2 - Harm Caused to Tigers in Human–Tiger Conflict Landscapes

Category of Harm	Mechanism / Pathway	How It Occurs in Conflict Landscapes	Why It Matters (Conservation Consequence)
Direct Human-Caused Mortality	Poisoning	Tigers feed on livestock carcasses deliberately laced with pesticides or organophosphates	Rapid, undetected deaths; highly underreported; removes breeding adults
	Electrocution	Illegal live electric fencing; exposed or poorly insulated wires near fields	One of the leading non-natural mortality

			causes; often kills dispersing males
	Shooting (“accidental” or retaliatory)	Panic or anger during village entry; firearm access	Rare but symbolically powerful; escalates public pressure for removal
	Capture-related mortality	Chase stress, darting errors, hyperthermia, transport collapse	Risk increases when capture is rushed or politically driven
Injury and Death During Crowd-Driven Events	Physical assault	Tigers attacked with stones, metal rods, fire, or improvised weapons	Non-lethal injury increases stress and future conflict risk
	Firecracker misuse	Crackers used at close range or in confined spaces	Causes burns, eye injuries, shock; can be fatal
	Vehicle collisions	Tigers fleeing mobs or firelines cross roads	Collision mortality rises in conflict zones near highways
	Core failure point	Loss of crowd control	Incident management breakdown escalates risk for humans and tigers

Forced Displacement	Repeated chasing and disturbance	Tigers pushed out of established territories	Entry into suboptimal habitat; increased livestock dependence
	Capture pressure	Pre-emptive or repeated capture attempts	Territorial destabilisation; repeat conflict elsewhere
Habitat Fragmentation	Corridor obstruction	Fencing, highways, railways, urban expansion	Restricts movement; increases stress and encounter probability
	Habitat compression	Tigers confined to smaller fragments	Nutritional stress; higher intraspecific conflict
Ecological Traps	Livestock-rich villages	Poor carcass disposal; free-ranging cattle	Attracts tigers repeatedly into high-risk zones
	Human practices	Predictable grazing and waste patterns	Not all villages become traps—governance matters
Psychological & Physiological Stress	Chronic disturbance	Exposure to crowds, vehicles, sirens, drones, harassment	Elevated stress hormones; weakened immunity
	Behavioural effects	Stress-induced risk-taking and nocturnality	Increases probability of conflict encounters

Capture & Long-Term Captivity	Permanent removal from wild	Old, injured, or labelled “dangerous” tigers confined	Welfare decline; captivity functions as slow elimination
	Captive stress indicators	Pacing, muscle atrophy, cage-biting, inactivity	Loss of reproductive and ecological function
Population-Level Impacts	Loss of breeding adults	Prime-age males and breeding females removed	Disproportionate impact on recovery potential
	Behavioural skew	Selection for bolder, risk-prone individuals	Populations become more conflict-prone over time
	Genetic bottlenecks	Removal of dispersing subadult males	Reduced gene flow; hidden isolation despite stable counts
Narrative-Driven Harm	“Man-eater” labelling	Public and media pressure after fatalities	Removal without behavioural evidence
	Policy overreaction	Mass drives, blanket captures, emergency barriers	Long-term fragmentation locked in by crisis decisions

Section 3 - Why Tigers Behave the Way They Do in Human–Tiger Conflict Landscapes

Tiger behaviour in conflict landscapes is largely predictable and adaptive rather than random or malicious. Most encounters arise from a consistent interaction between tiger ecology and human-modified environments. A small set of recurring drivers explains the majority of conflict behaviour.

3.A Energy Economics and Risk Minimisation

Tigers are solitary apex predators with high energetic demands. When wild prey becomes unevenly distributed or temporarily inaccessible due to habitat degradation, livestock presents a high-calorie, low-effort alternative. Tigers follow a basic optimisation rule—maximising energy gain while minimising risk—making livestock depredation an adaptive foraging response rather than behavioural abnormality.

3.B Avoidance of Humans and Its Limits

Tigers are innately wary of humans and prefer dense cover, low-light conditions, and undisturbed movement routes. Increasingly, however, human land use overlaps with these preferences. Farm edges, canals, plantations, and forest margins align closely with tiger travel routes and hunting cover. Tigers move through human-dominated areas not because they seek people, but because people now occupy the spaces required for tiger movement and hunting.

3.C Dispersal Pressure and Conflict

Productive tiger populations generate more subadult males than available territories can absorb. These dispersing individuals are typically inexperienced, lack established territories, and are actively excluded by dominant males. As they move through landscapes in search of vacant habitat, they often follow low-resistance linear features such as canals, railways, plantation belts, and village edges. This makes dispersing subadult males disproportionately involved in livestock depredation and accidental encounters with people.

3.D Human-Created Ecological Traps

Several features of human-dominated landscapes unintentionally attract tigers while increasing encounter risk. These include unburied livestock carcasses, garbage that concentrates wild prey, dense crops such as sugarcane that provide ambush cover, artificial water sources, and plantations that structurally resemble forest. Such features function as ecological traps by rewarding tiger use while sharply increasing proximity to people.

3.E Vulnerability, Injury, and Displacement

Tigers that are old, injured, nutritionally stressed, or displaced by competitors often shift toward low-effort prey strategies, which may include livestock. In rare circumstances, slow-moving humans in dense cover may become targets. Most animals labelled as “problem tigers” are therefore responding to constraint or desperation rather than exhibiting aberrant behaviour.

3.F Learning from Human Predictability

Tigers are capable of learning from repeated outcomes. Predictable human behaviour can unintentionally reinforce conflict, for example when kills are left unguarded, when chasing is noisy but ineffective, or when garbage dumps consistently signal prey availability. Regular human movement patterns at dawn and dusk further increase encounter probability. Conflict behaviour is often co-produced by human predictability as much as by tiger behaviour.

3.G Stress and Defensive Encounters

Conflict landscapes impose chronic stress through crowding, vehicles, noise, harassment, and habitat fragmentation. Stressed tigers tend to become more nocturnal, exhibit rapid flight responses, and may occasionally charge defensively when escape routes are blocked. Many attacks classified as “aggressive” are better understood as defensive responses by cornered animals rather than predatory intent.

3.H Escalation Through Human Behaviour

Tigers rely on basic thresholds during encounters, including access to cover, clear escape routes, and avoidance of direct confrontation. Conflict escalates when humans surround animals, block exits, run, throw objects, or approach closely to observe or film, effectively removing the conditions that allow safe withdrawal.

Conclusion

Tigers behave the way they do in conflict landscapes because human-modified environments reward certain behaviours while constraining alternatives. Their actions reflect survival, optimisation, and learned adaptation within altered ecological conditions. Effective conflict mitigation therefore depends less on changing tiger behaviour than on reshaping landscapes and human practices that structure risk.

Section 4 - Mitigation Strategies for Tiger–Farmer Conflict

Mitigation of tiger–farmer conflict requires interventions that are matched to the scale at which risk occurs and the actors capable of implementing them. No single method is sufficient on its own. Measures that reduce livestock exposure, prevent surprise encounters, and ensure coordinated response are consistently more effective than reactive or force-based interventions.

For clarity and operational relevance, mitigation measures are classified below into farm and household-level strategies and community and landscape-level strategies. A third category addresses direct tiger management, which is applied selectively and only under defined conditions.

4. A Farm and Household-Level Mitigation Measures

Measure	**Primary Objective**	**Evidence Strength**	**Key Benefits**	**Key Limitations**
Predator-proof night enclosures	Prevent livestock depredation at night	Strong	Substantially reduces losses where consistently used	Ineffective if livestock continue to graze in forest interiors
Supervised or grouped grazing	Reduce daytime encounters	Moderate	Lowers probability of surprise encounters	Labour-intensive; difficult to sustain
Carcass removal or burial	Prevent repeated tiger visits	Moderate	Disrupts learning of villages as food sources	Requires uniform compliance
Household reinforcement	Improve human safety	Moderate	Reduces risk during night-time encounters	Does not reduce livestock exposure
Use of lights and torches	Short-term deterrence	Weak to moderate	Provides immediate warning	Rapid habituation; ineffective alone

4.B Community and Village-Level Mitigation Measures

Measure	Primary Objective	Evidence Strength	Key Benefits	Key Limitations
Physical barriers at entry points	Prevent tiger entry into villages	Moderate to strong in specific landscapes	Effective when strategically placed and maintained	High cost; risk of fragmentation if overused
Rapid response teams	De-escalate conflict events	Moderate	Reduces injury risk to people and tigers	Requires training and crowd control
Community vigilance systems	Early detection of tiger presence	Moderate	Reduces surprise encounters	Fatigue and uneven participation
Early warning alerts	Improve preparedness	Moderate	Provides time for safe response	Dependent on communication and follow-up
Coordinated grazing rules	Reduce exposure	Moderate	Aligns individual behaviour with collective safety	Difficult to enforce

4.C Technology-Supported Mitigation Tools

Tool	Intended Use	Evidence Strength	Operational Value	Constraints
Camera traps	Mapping tiger movement	Moderate	Improves understanding of routes	Not real-time
Automated alert systems	Village-level warning	Moderate	Reduces surprise encounters	Requires maintenance
GPS collars	Monitoring specific individuals	Mixed	Useful in limited cases	High cost; limited coverage
Aerial surveillance	Emergency assessment	Weak to moderate	Situational awareness	Short operational window

4.D Direct Management of Tigers

Intervention	Intended Use	Evidence Strength	Risks
Drive-back operations	Immediate risk reduction	Moderate	Risk of escalation if poorly managed
Capture and translocation	Repeated high-risk individuals	Mixed	Often displaces conflict
Permanent captivity	Confirmed dangerous individuals	Moderate	Long-term welfare concerns
Lethal control	Exceptional circumstances	Strong short-term effect	Ecological and social consequences

4.F Governance and Social Measures

Measure	Primary Role	Evidence Strength	Constraints
Timely compensation	Reduce retaliatory killing	Strong	Does not prevent future incidents
Livelihood diversification	Reduce forest dependence	Moderate	Long time horizon
Insurance mechanisms	Risk sharing	Moderate	Requires institutional support
Corridor protection	Long-term conflict reduction	Strong	Politically and administratively challenging
Community institutions	Coordination and compliance	Moderate	Dependent on trust and continuity

Conclusion

Evidence across tiger landscapes shows that preventive measures at the farm and community level are more effective and less harmful than reactive interventions focused on individual animals. Livestock husbandry, early warning, coordinated response, and predictable compensation systems form the core of effective mitigation. Direct management of tigers should remain limited, carefully regulated, and guided by clear behavioural criteria. Sustainable coexistence depends on aligning mitigation with tiger ecology, human land use, and long-term landscape planning rather than relying on short-term deterrence or removal.

SECTION 5 - CSO Interventions for Tiger-Farmer Conflict

Civil society actors contribute most effectively in tiger–farmer conflict landscapes by **stabilising situations immediately after loss, reducing long-term exposure to risk, and supporting physical separation where necessary**. Their role is complementary to Forest Department authority and is strongest where interventions are embedded in local institutions and response protocols.

5.A. Quick Response and Interim Relief (Immediate Measures)

These interventions aim to **de-escalate conflict situations immediately after an incident**, when the risk of retaliatory killing is highest due to anger, fear, and delayed compensation.

Intervention Focus	Key Activities / Mechanisms	Primary Purpose
Rapid response support	Deployment of trained field teams to assist Forest Department staff during tiger presence in villages; support crowd control, safe animal movement, and emergency coordination	Prevent mob formation, panic escalation, and injury
Interim relief for livestock loss	Provision of immediate, short-term financial or material assistance following livestock depredation	Reduce anger during compensation delays; lower retaliation risk
On-ground conflict management	Veterinary care for injured livestock; assistance during high-risk periods; village meetings during active conflict phases	Stabilise communities and maintain cooperation with authorities
Community-based monitoring	Training local residents to observe tiger movement and relay alerts to villages and forest staff	Improve early warning and speed of response

Key constraint: These measures reduce immediate risk but **do not prevent recurrence** unless paired with long-term exposure reduction.

5.B Sustainable Livelihoods and Community Coexistence (Long-Term Risk Reduction)

Long-term interventions focus on **reducing dependence on forest entry and livestock exposure**, thereby lowering the frequency of tiger encounters.

Intervention Focus	Key Activities / Mechanisms	Conflict Pathway Addressed
Alternative livelihoods	Support for non-forest-dependent income activities (e.g., small enterprises, skill training)	Reduces daily forest entry and grazing pressure
Energy substitution	Distribution of fuel-efficient or smokeless cooking systems	Lowers fuelwood collection from tiger habitat
Economic rehabilitation	Education, skill development, and employment transition for high-risk or formerly forest-dependent groups	Reduces long-term exposure and resentment
Community development services	Basic healthcare, education support, and social services in forest-edge villages	Builds trust and reduces hostility toward conservation

Key constraint: These interventions require **time, continuity, and targeting**; generic livelihood schemes show weak conflict impact.

5.C Technology and Infrastructure Support (Physical Mitigation)

These interventions attempt to **reduce physical overlap between people and tigers** in persistently high-risk locations.

Intervention Focus	Key Activities / Mechanisms	Operational Role
Intrusion detection systems	Sensor- or camera-based monitoring linked to alarms or lights	Early warning to villages; delay entry rather than exclusion
Low-cost deterrents	Simple aids (e.g., wearable alerts, whistles, visual deterrents) for field workers	Reduce surprise encounters during routine activities
Physical barriers	Maintenance or installation of fencing at strategic village edges	Prevent repeated straying in specific landscapes

Key constraint: Technology and barriers **shift or delay risk but do not eliminate it**; poor placement or maintenance can worsen fragmentation.

Core Insight

Civil society interventions are most effective when they:

- **Buy time** during crisis moments,
- **Reduce exposure** rather than attempt exclusion, and
- **Strengthen coordination** between communities and Forest Departments.

They fail when treated as substitutes for state responsibility, when pilots are not institutionalised, or when physical solutions are deployed without behavioural and landscape alignment.

Section 6 - Government Systems for Managing Tiger–Human Conflict in India

India's tiger–human conflict management framework operates across field, state, and national levels through a combination of emergency response, compensation, infrastructure, and legal protection. While the system is relatively strong in incident response and legal safeguards, it is less effective in timely compensation delivery and weakest in long-term prevention and incentive alignment. As a result, conflict is managed reactively after incidents occur, rather than systematically reduced over time.

6.A Rapid Response and Field-Level Action

All tiger-range states maintain Rapid Response Teams under National Tiger Conservation Authority protocols. These teams respond to tiger presence in villages, manage crowds, and attempt to guide animals back toward forested areas using coordinated drives, vehicles, and deterrents. They also assist with rescue and capture operations when required. While these teams are essential for preventing panic and reducing immediate human injury risk, they are often understaffed relative to the areas they cover and function primarily as reactive units rather than preventive mechanisms.

6.B Compensation for Human and Livestock Loss

India operates an ex-gratia compensation framework covering human death, injury, and livestock loss, with the central government setting minimum norms for human casualties and states determining livestock and crop compensation rates. Current central standards provide up to ₹10 lakh for human death or permanent incapacitation, ₹2 lakh for grievous injury, and treatment costs for minor injuries, with livestock and crop losses compensated under state-specific norms. Funding is drawn from Forest Department allocations, centrally sponsored schemes, and, in some states, the State Disaster Response Fund.

Claims are processed either through digital portals or offline submission at Range Forest Offices and require prompt reporting, spot verification, and documentation. Compensation plays an important role in reducing immediate retaliation risk, and digital systems have improved traceability where implemented effectively. However, delays in verification and payment remain common, compensation is rarely linked to preventive behaviour, and crop damage is often inadequately covered, limiting the system's ability to reduce future conflict.

6.C Physical Infrastructure and Barriers

States invest in physical measures such as solar fencing, trenches, stone walls, and, in some landscapes, large-scale village fencing to prevent tiger entry. When strategically placed and properly maintained, these structures can reduce repeated village incursions. However, they are costly to install and maintain, can displace conflict to neighbouring areas, and risk fragmenting habitat if poorly planned. Along highways and railways, mitigation measures such as underpasses, fencing, speed limits, and signage reduce collision mortality and panic sightings, but implementation is often slow and enforcement uneven.

6.D Capture, Rescue, and Long-Term Holding

Several states maintain facilities for treating injured tigers, housing confirmed high-risk individuals, and temporarily holding animals prior to release or transfer. Such facilities are necessary for rare, high-risk cases, but overcrowding is common and capture decisions are frequently driven by political pressure rather than behavioural assessment. Although national protocols define conditions for capture, release, permanent captivity, and lethal control, these procedures are often overridden following fatalities, weakening consistency and accountability.

6.E Preventive Community Measures

Governments conduct awareness meetings, distribute safety materials, run school programmes, and maintain alert groups to communicate safe behaviour during tiger presence. These efforts can reduce risky behaviour when sustained, but their effectiveness depends heavily on continuity and local follow-through. Livelihood and household support measures—such as alternative energy sources, improved housing, and cattle sheds—are implemented in some states, but are often generic and insufficiently targeted to specific conflict drivers.

6.F Habitat, Monitoring, and Governance

Government programmes addressing prey augmentation, grazing control, patrolling, and voluntary relocation from critical habitats can reduce livestock depredation risk within reserves, but habitat outside protected areas remains fragmented and poorly regulated. Tiger reserves operate camera-trap networks, digital patrol systems, and, increasingly, drones for surveillance and emergency assessment; however, monitoring data is rarely integrated into real-time community warning systems.

Tigers receive full legal protection under wildlife law, with the National Tiger Conservation Authority issuing guidelines, coordinating funding, and monitoring compliance. Buffer zones are intended to absorb pressure between core habitats and settlements, yet many remain heavily populated and under-managed, limiting their effectiveness as conflict-mitigation spaces.

Section 7 - .Compensation Access: Procedural Summary

The compensation available from the Government of India for human-wildlife conflict, including attacks by tigers, has recently been revised and is structured based on the nature of the damage.

The Ministry of Environment, Forest and Climate Change has enhanced the maximum ex-gratia relief payable under Centrally Sponsored Schemes like 'Development of Wildlife Habitats' and 'Project Tiger' (as of December 2023) with the following norms:

7. A Central Government Ex-Gratia Relief (Maximum)

- **Source of Funds:** The compensation is often a combination of funds from the Forest Department (Centrally Sponsored Schemes) and the State Disaster Response Fund (SDRF), especially in states that have classified human-wildlife conflict as a "state-specific disaster."

Compensation Details

Damage Caused by Wild Animals	**Central Government Ex-Gratia Amount (Minimum)**	**Policy Access and Claim Process (Typical Steps)**
Human Death or Permanent Incapacitation	₹10 lakh	1. Report the incident to local authorities and file an FIR. 2. Notify the Range Forest Officer / State Forest Department. 3. Submit claim with post-mortem/disability certificate and spot report.
Grievous Injury	₹2 lakh	1. File incident report with RFO. 2. Attach medical certificate and treatment records. 3. Submit claim following state procedures.

Minor Injury	Cost of treatment up to ₹25,000	1. Report to RFO. 2. Submit medical bills and treatment certificate.
Loss of Livestock, Crop, or Property	Varies by State/UT norms	Compensation for crops/livestock/property is governed by state or UT compensation norms and rates.

Union Ministry of Environment, Forest and Climate Change (MoEFCC) official ex-gratia rates under Centrally Sponsored Schemes "Integrated Development of Wildlife Habitats", Project Tiger & Project Elephant:

- Death or permanent incapacitation: ₹10 lakh
- Grievous injury: ₹2 lakh
- Minor injury: treatment up to ₹25,000
- Loss of property/crops/livestock: per State/UT norms

Source: Press release on ex-gratia rates from the Union Environment Ministry, 5 Feb 2024

7.B The Gaps in Policy Implementation

India has one of the most extensive compensation systems for human–wildlife conflict in the world. On paper, the framework is strong: multiple schemes cover human death, injury, livestock loss, and property damage. But in practice, serious gaps in delivery, governance, and incentives reduce their effectiveness and actually **prolong conflict rather than resolve it**.

7.B.1 Delays in Payment — the single biggest frustration

Even with digital systems, field realities include:

- Verification teams taking weeks or months
- Confusion over required documents
- Disputes over carcass inspection timing

- Payouts delayed by treasury procedures

Impact:
Delayed compensation = rising anger = increased risk of retaliation (poisoning, electrocution, mobbing a tiger).

7.B.2 Under-Compensation Relative to Actual Loss

Government rates are often:

- Far below market value of cattle (especially indigenous breeds, pregnant animals, or milch cattle)
- Far below the actual economic burden of losing a draught animal
- Not adjusted for inflation or regional livestock prices

Impact:
Farmers absorb a huge unpaid shock → makes retaliation or illegal self-protection more likely.

7.B. 3 Damage to Crops by Wildlife Is Mostly ***Uncovered***

- Wild boar, deer, nilgai, elephants destroy crops in tiger landscapes.
- **PMFBY does not insure wildlife damage**, and most states have tiny, symbolic payments for crop loss (if any).

Impact:
Crop damage pushes farmers to take more risks in forest edges and to arm themselves illegally.

7.B.4 Verification Process Is Often Adversarial

- Forest staff are overworked, sceptical, and sometimes defensive.
- Communities feel the department "looks for reasons to reject claims."
- Carcass inspection windows (e.g., 24 hours) clash with real-world logistics.

Impact:
Breakdown of trust → reduced reporting → increased chances of covert retaliation.

7.B. 5 Compensation Covers ***Symptoms*****, Not *****Causes***

The system pays for loss but rarely invests seriously in:

- Predator-proof cattle sheds
- Fodder support
- Carcass disposal systems
- Early-warning tools
- Better grazing management

Impact:
Conflict continues indefinitely; payouts become a recurring cost instead of preventing loss in the first place.

7.B. 6 Fragmented Responsibility & Weak Coordination

- Forest Department handles compensation.
- Revenue Department handles land/livelihood packages.
- Rural Development handles trenches & fodder plots.
- Panchayats/Gaon Sabhas rarely have formal conflict portfolios.

Impact:
No single accountable authority → delays, duplication, gaps.

7.B. 7 Lack of Monitoring & Transparency on Outcomes

- States rarely publish real-time conflict dashboards.
- No public database of compensation claims vs payouts.
- No evaluation of which villages receive repeat losses and why.
- No ranking of high-risk hotspots by conflict intensity + vulnerability.

Impact:
Policy remains reactive; resources not deployed where needed most.

7.B. 8 Systemic Weakness: Compensation Without a Strategy

The biggest gap is this:

India uses compensation as a bandage, not as part of a prevention strategy.

A modern conflict system requires:

- Insurance or risk-pool mechanisms
- Behaviour-linked incentives
- Prevention-first funding
- Monitoring and accountability
- Risk/tolerance-based zoning

India does compensation well *relative to the region*, but it does not integrate it into a **coherent coexistence framework**.

Section 8 - Suggested Solutions by Level: Tiger–Farmer Conflict (Implementable, Gap-Targeted)

8. A. Farm and Household Level

1. **Predator-proof night housing + zero free-range nights**
    - Keep cattle/buffalo inside a strong enclosure from dusk to dawn (door, roof/overhang, strong posts, tight gaps).
    - This is the single most controllable lever because most livestock kills happen when animals are unattended at night.

2. **Carcass management: remove/bury fast, every time**
    - If a kill happens, do not leave the carcass exposed; coordinate with forest/vet for rapid removal/burial.
    - This breaks the "reward loop" that teaches tigers villages are reliable food sources.

3. **Lower exposure grazing rules for households in hotspots**

    - Avoid grazing inside forest patches / dense cover, especially near water and within ~2 km of forest edges (highest risk zone).
    - If grazing is unavoidable, do it in groups with supervision (not solitary herding).

8. B. Community and Village Level

1. **One village protocol for tiger sightings (anti-mob + safe perimeter)**
    - Pre-agree: who calls whom, who keeps people back, where children gather, and who talks to media/outsiders.
    - The goal is preventing crowd escalation—because crowd-driven events cause injuries to both people and tigers and trigger panic actions.

2. **Community grazing & stall-feeding windows in peak-risk months/areas**
    - For hotspot hamlets, set seasonal rules: no grazing in forest patches, fixed grazing routes/times, and temporary stall-feeding when dispersal movement spikes.
    - This targets exposure (the driver), not just compensation (the bandage).

3. **Village carcass disposal point + duty roster**
    - Create one designated burial/disposal site and a rotating "carcass response" roster so the rule is feasible for everyone, not only well-off households.
    - This prevents repeat attraction and reduces "ecological trap" dynamics.

8. C. CSO / Research Level

1. **Scale "adoption-ready" husbandry support, not shiny pilots**
    - Focus budgets on: enclosure retrofits (materials + design), carcass disposal systems, and training villagers to implement them.
    - These are scalable, low-tech, and directly reduce depredation—unlike many short-lived tech pilots.
2. **Incident-management training (crowd control + communication) with Forest Dept**

    - Run joint drills with local volunteers + forest staff: cordons, safe viewing distances, do-not-chase rules, and de-escalation scripts.
    - This directly fixes the recurring failure point: loss of incident control during sightings.

3. **Hotspot mapping that leads to action, not reports**

   - Maintain a simple "repeat-loss household" list + village risk map (edge, routes, water points) and use it to target enclosures, grazing rules, and response teams first.

8. D. Government Level

1. **Compensation reform: fast-track + market-linked payouts for livestock**

   - Implement a strict service standard (e.g., verification within 48–72 hours, payout within 15–30 days) and update livestock rates to realistic local values.

   - Delays and under-valuation are a major driver of anger and covert retaliation; speed and fairness are prevention tools, not charity.

2. **Prevention-first funding: pay for enclosures and carcass disposal upfront**

   - Shift a defined share of conflict budgets from "post-loss payout" to "pre-loss reduction": enclosure subsidies, community fodder support for stall-feeding windows, and carcass removal logistics.
     Dispersal-corridor governance: keep movement routes functional and visible

   - Integrate corridor/risk zoning into local land-use decisions (roads, fencing, new settlements) and deploy targeted warning/response capacity along known dispersal pathways.

2.3 Wild Boar: A Chronic, Under-Recognised Driver of Agricultural Loss

Across large parts of India, wild boar constitute one of the most persistent and economically damaging sources of human–wildlife conflict. When farmers are asked which animal causes the greatest routine harm to their crops, the answer is often neither elephant nor large carnivore, but wild boar. Despite this, wild boar conflict remains under-represented in policy discourse, media coverage, and institutional response.

Unlike episodic conflicts involving individual animals or rare incursions, wild boar damage is chronic, repetitive, and embedded within everyday agricultural practice. Raids typically occur at night, target crops close to the ground, and leave behind damage that extends beyond consumption to soil disturbance and field degradation. The cumulative effect is not only yield loss in a given season, but long-term erosion of farm viability, particularly for small and marginal cultivators.

This chapter examines the nature of wild boar damage, the mechanisms through which it affects agricultural systems, and the scale of losses reported across different states. It situates wild boar conflict as a livelihood issue rather than a wildlife emergency, and as a structural challenge rather than a series of isolated incidents.

Section 1 - Types of Damage: Rooting, Trampling, and Direct Crop Loss

Wild boar damage cannot be understood simply as crop consumption. Field evidence consistently shows that losses arise through three interrelated mechanisms, each of which contributes to both immediate and long-term agricultural impact.

1 A. Rooting and Digging

Rooting and digging constitute the most destructive and least visible form of wild boar damage. Using their snouts, boars overturn soil in search of roots, tubers, seeds, and invertebrates. This behaviour uproots seedlings, exposes root systems, and disrupts soil structure, often across entire patches of a field in a single night.

In tuber crops, groundnut, and newly sown fields, rooting can erase weeks of growth within hours. Because damage occurs below ground, early impacts are frequently not detected until plants wilt, fail to establish, or show uneven growth, at which point resowing is no longer viable. For small and marginal farmers, this form of damage is particularly severe, as it combines crop loss with wasted inputs and delayed detection.

There are reports of substantial losses attributable to rooting, with especially high impacts in forest-adjacent and hilly landscapes. Reported losses vary widely by crop, stage, and location, but consistently indicate that rooting is a primary driver of early-stage crop failure in wild boar–affected areas.

Source: **Chauhan, N. P. S., et al. (2010).** *Human–Wild Pig Conflict in India: A Review.* **Current Science**, 98(10): 1279–1286.

1. B. Trampling and Path Creation

Even where direct feeding is limited, the movement of wild boar groups through fields causes extensive secondary damage. Trampling across wet, newly sown, or standing crops compacts soil, breaks stems, damages bunds, and creates channels that increase erosion and pest infestation.

Over time, repeated movement establishes permanent paths through agricultural land. These routes are reused by the same groups and, in some cases, by other wildlife, effectively embedding wildlife movement corridors within farmland. Once established, such paths concentrate future damage along predictable lines, increasing the likelihood of repeated incursions in the same fields across seasons.

Field accounts from extensive discussion with farmers across diffrent regions describe fields that appear flattened or stamped rather than selectively grazed, underscoring that trampling often exceeds feeding as a source of damage. In terraced and hill agriculture, repeated trampling of edges and bunds further destabilises soil and increases long-term land degradation.

1.C. Direct Crop Loss

Wild boars preferentially target high-calorie, easily accessible crops, including maize, cereals, groundnut, tuber crops, sugar beet, and paddy, particularly at vulnerable growth stages. Field data show that damage is often spatially uneven, concentrated in high-nutrient patches rather than uniformly across fields, but intensity within those patches can render cultivation economically unviable over time. Wild boar crop damage hotspots frequently coincide with areas of maize and other calorie-rich crops, reflecting crop preference and seasonal availability.

Empirical studies document repeated night-time raids and cumulative partial losses within a season. Damage from rooting and trampling reduces establishment and yields, and because damage accrues incrementally over successive raids, it is often under-reported and inadequately compensated. Reviews of wild pig impacts in agriculture confirm that rooting behaviour and crop raiding result in substantial economic loss and rural livelihood stress.

Evidence from Indian field assessments further indicates rising levels of wild boar damage to cereals, tubers, and associated crops in hilly and forest-fringe landscapes, underscoring the persistent nature of the problem for smallholder farmers.

Sources for above section:

- Patterns of Agricultural Crop Damage by Wild Boar
- Identifying Wild Boar Crop Damage Hotspots
- Impact of Wild Pigs in Agriculture and Their Management
- Crop Protection Measures Against Wild Boar Damage
- Trends of Crop Damage in Darjeeling Hills

1. **D. Scale of Reported Damage**

Available evidence on wild boar damage in India is drawn from a combination of peer-reviewed studies, ICAR and AICRP fact sheets, state agriculture assessments, and institutional reporting. While study designs, crops assessed, and estimation methods vary widely, the overall pattern is consistent across regions: wild boar represent one of the most significant sources of routine crop loss in forest-fringe, rainfed, and hill-farming systems.

Field studies from multiple states document substantial losses in cereals, millets, pulses, tubers, sugarcane, and groundnut, particularly when damage occurs at early establishment, flowering, pod-setting, or milky grain stages. Reported impacts range from repeated partial losses requiring re-sowing to severe localised damage capable of eliminating the economic viability of cultivation in affected plots. Importantly, losses are typically cumulative over a season rather than arising from a single catastrophic event, and are therefore frequently under-reported in official records.

Although individual studies report quantitative estimates of yield loss at local or crop-specific scales, differences in methodology, sampling, and reporting standards make it inappropriate to aggregate these figures into a single comparable state-wise dataset. As a result, no consolidated national or state-level estimates exist that reliably quantify wild boar–related crop loss across India. The absence of standardised monitoring systems means that available figures should be interpreted as indicative of scale and pattern rather than as directly comparable measurements.

Sources:

- Chauhan, N. P. S. et al. (multiple papers, 2002–2012), Current Science
- ICAR–AICRP on Vertebrate Pest Management (state fact sheets)
- Gokhale Institute / CSD wildlife–agriculture conflict studies
- State agriculture department assessments (Kerala, Telangana, Maharashtra)

1.E Crop selection

Crop selection reflects a hierarchy based on energy content, ease of access, and compatibility with rooting behaviour. Preferences vary by region, cropping system, and availability, but consistent patterns are reported across states.

Relative Crop Preference in Wild Boar Conflict

Preference Tier	Crops	Characteristics
High Preference	Maize, groundnut, tapioca, sugarcane, paddy	High energy value, soft soil, accessible growth stages
Moderate Preference	Sweet potato, yam, banana, millets, vegetables	Consumed when readily available
Low Preference / Deterrent Crops	Castor, chilli, lemongrass, turmeric, ginger	Often used as buffer crops

1. F Timing of Increased Crop Raiding

Crop raiding intensity is linked to crop stage, water availability, and reproductive demand rather than seasonal migration.

Conditions Associated with Increased Raiding

Condition	Mechanism
Pre-harvest crop stages	Maximum caloric payoff from mature crops
Monsoon and post-monsoon periods	Softened soils facilitate rooting
Dry season	Forest forage scarcity; irrigated crops remain available
Breeding and piglet-rearing periods	Sustained food demand by family groups
Low-light nights	Reduced perceived risk during foraging

Reports of increased activity during low-light nights are common among farmers and field observers, though quantitative evidence remains limited.

Section 2 - Harm Caused to Wild Boar in Farmer–Boar Conflict Landscapes

Farmer–boar conflict results in substantial harm to wild boar populations, extending beyond crop protection outcomes to include direct mortality, injury, chronic stress, and population-level effects. These impacts are diffuse, poorly documented, and largely absent from formal wildlife conflict statistics, which tend to focus on agricultural loss rather than animal outcomes.

Forms of Harm to Wild Boar in Agricultural Conflict Landscapes

Category of Harm	Mechanisms	Documented Evidence	Key Characteristics	Governance Visibility
Direct Killing through Authorised Culling	Shooting of designated "problem boars" under state permission	Large-scale culling reported in states such as Kerala and Tamil Nadu	High adult mortality; politically driven escalation after incidents	Partial; numbers reported but impacts not evaluated
Retaliatory Killing	Tracking and killing of boars following crop damage or human injury	Media and field reports of post-incident retaliation	Event-driven, often unregulated	Low
Poisoning	Use of toxic bait in crop fields or along boar routes	Reviews documenting use of warfarin and other toxicants	Slow deaths; high suffering; non-target mortality	Very low
Trapping and Snares	Wire snares, crude traps, pit traps	Indian and international reviews of wild pig control	Severe injury; prolonged restraint; escape with wounds	Very low
Injuries from Physical Deterrents	Thorn hedges, chemical barriers, improvised obstacles	Field trials and agricultural studies	Lacerations, stress responses, distress behaviour	Absent
Electric Fencing Exposure	Repeated shocks during fence testing or breaches	Promotion and deployment records across states	Behavioural stress; injury risk; illegal high-voltage use in some areas	Partial

Category of Harm	Mechanisms	Documented Evidence	Key Characteristics	Governance Visibility
Chronic Disturbance and Harassment	Night patrols, dogs, firecrackers, drive hunts	Behavioural ecology studies	Temporary displacement; altered movement patterns; stress	Absent
Population-Level Effects	Cumulative hunting and habitat loss	Field studies noting local declines despite Least Concern status	Uneven population pressure across regions	Absent

Summary

Wild boar in conflict landscapes are subjected to a continuum of harm ranging from regulated culling to unregulated lethal methods and chronic disturbance. A significant proportion of adult mortality in agricultural areas is human-caused, driven by crop damage, retaliatory responses, and policy-sanctioned control measures. Sub-lethal impacts, including injury, stress, and repeated displacement, further degrade welfare and alter movement patterns without producing lasting conflict reduction.

These impacts are largely invisible in official records, as monitoring systems prioritise crop loss and compensation rather than animal outcomes. The result is a paradoxical pattern in which wild boar are simultaneously designated as vermin in some regions and experience localised population decline in others, without systematic assessment of ecological or conflict-related consequences.

Section 3 - Why Wild Boars Behave the Way They Do in Agricultural Landscapes

Wild boar behaviour in agricultural landscapes reflects predictable ecological and behavioural responses to food availability, risk, and reproduction. Crop raiding is not aberrant or aggressive behaviour, but an outcome of land-use patterns that concentrate high-energy food in environments with comparatively low predation risk. Understanding this logic is essential for designing mitigation measures that alter incentives rather than merely reacting to damage.

3.A. Opportunistic Foraging and Energy Maximisation

Wild boars are dietary generalists with a foraging strategy optimised for locating and extracting energy-dense food with minimal effort. Their omnivorous diet includes roots, tubers, shoots, invertebrates, fruits, and cultivated crops. Agricultural fields offer concentrated calories, soft soils that facilitate digging, and predictable access, making them energetically efficient foraging sites compared to fragmented or degraded natural habitats.

In landscapes where natural forage has declined or become patchy, cultivated fields function as reliable substitutes. Repeated successful foraging reinforces use of agricultural areas across seasons.

3.B Selection of Low-Risk, High-Reward Environments

Crop fields combine high nutritional payoff with relatively low perceived risk. Compared to forested habitats, agricultural interiors typically support fewer large predators and offer clear visibility and escape routes. Irrigation further stabilises food availability across seasons, reducing natural constraints that would otherwise limit boar presence.

As a result, wild boars preferentially use cultivated landscapes where the balance between energy gain and risk exposure is favourable.

3.C Temporal Adjustment and Nocturnal Activity

Wild boars are naturally crepuscular and nocturnal, but repeated human disturbance reinforces this pattern. In conflict landscapes, boars shift activity to later hours of the night to reduce encounters with people while continuing to exploit crops. This temporal adjustment reflects learning and habituation rather than innate aggressiveness.

Boars also learn patterns of human activity, including guard timings, fence weaknesses, and low-cost deterrents. Deterrence measures that do not impose consistent costs are rapidly tested and bypassed.

3.D Reproductive Pressure and Group Foraging

Wild boars have high reproductive potential, with sows producing multiple piglets per litter under favourable conditions. When food is abundant, family groups expand and require sustained access to high-quality forage. This increases movement frequency and the likelihood of entering agricultural areas, particularly during periods when crops are mature and energy-rich.

Larger group size also increases the scale of damage through trampling and soil disturbance, even when feeding duration is limited.

3.E Habitat Change and Displacement Toward Farms

Deforestation, removal of undergrowth, monoculture plantations, and loss of forest-floor forage have reduced the availability of diverse natural food sources. In response, wild boars expand their foraging range into cultivated areas. This outward movement reflects compensation for declining habitat quality rather than population expansion alone.

Where farms provide stable access to water and crops, displacement becomes persistent rather than seasonal.

Section 4 - Deterrents Used Against Wild Boars: Farm-Level and Community-Level Strategies

Across India, farmers deploy a wide range of deterrents against wild boars, from improvised household measures to coordinated village-scale interventions. These measures differ markedly in effectiveness, cost, durability, and welfare impact. A structured assessment of deterrents helps explain why conflict persists despite sustained effort and investment.

The key pattern is consistent: **isolated farm-level deterrents provide short-term suppression**, while **coordinated community-level measures perform better but are institutionally fragile**.

4. A. Farm-Level Deterrents

Farm-level measures are implemented by individual households. They are widely used because they are locally controllable, but they are prone to rapid habituation, high labour demand, and displacement of damage to neighbouring fields.

Farm-Level Deterrents Against Wild Boars

Category	**Common Methods**	**Typical Effectiveness**	**Key Limitations**
Physical Barriers	Barbed wire, chain-link, mesh fencing, bunds	Low–Medium	Boars dig under gaps; high maintenance; monsoon damage; high cost for small farmers
Electric / Solar Fencing	Low-voltage electric fences	Medium–High when well maintained	Expensive; battery failure; illegal lethal voltage use; boars learn to short or bypass
Vegetative Barriers	Thorn hedges, agave, bamboo	Low–Medium	Slow to establish; easily breached by adults; maintenance-heavy
Acoustic Deterrents	Firecrackers, drums, alarms	Low	Habituation within days; labour-intensive; safety risks
Visual Deterrents	Lights, blinkers, lasers, reflectors	Low–Medium initially	Ineffective during late-night low-light periods; rapid habituation

Category	Common Methods	Typical Effectiveness	Key Limitations
Olfactory / Chemical	Kerosene ropes, sulphur smears, hair, urine	Low–Medium, short-lived	Weather-dependent; frequent reapplication
Commercial Repellents	Spray or granular repellents	Medium in early crop stages	High cost; mixed results; repeated application
Farm Management Tactics	Night guarding, buffer crops, crop switching	Medium–High if sustained	Exhausting; unsafe; income trade-offs; not scalable
Harmful / Illegal Methods	Snares, pit traps, poison, lethal fencing	High lethality, not deterrence	Illegal; severe welfare impacts; non-target casualties; social risk

Interpretation at Farm Level:
Farm-level deterrents can reduce damage temporarily but rarely change long-term boar behaviour. Measures that are predictable, weakly enforced, or applied in isolation are rapidly tested and bypassed. Harmful methods persist largely because legal and affordable alternatives are ineffective at this scale.

4.B . Community-Level Deterrents

Community-level strategies operate at a scale closer to wild boar movement and foraging patterns. These interventions are fewer but consistently more effective when collective maintenance and coordination are sustained.

Community-Level Deterrents Against Wild Boars

Category	Common Methods	Typical Effectiveness	Key Limitations
Landscape-Scale Barriers	Village-ring electric fencing, trenches, walls	Medium–High to High	High upfront cost; collective maintenance failure; single breach undermines system
Coordinated Guarding	Rotational patrols, watch huts, sirens	Medium–High	Participation fatigue; requires trust and leadership
Digital Coordination	Alert networks, radios	Medium	Depends on motivation; boars adapt routes

Category	Common Methods	Typical Effectiveness	Key Limitations
Cooperative Cropping	Synchronized sowing/harvest, zoning	High where enforced	Requires consensus; limits individual choice
Buffer Zoning	Village-level deterrent crop belts	Medium	Land sacrifice; damage may shift inward
Non-Lethal Technology	Motion sensors, light grids, drones	Medium, context-dependent	Costly; maintenance burden; experimental
Regulated Lethal Control	Department-approved culling	High short-term reduction	Rapid population rebound; no outcome monitoring
Habitat Management	Clearing invasives, forest food/water restoration	Medium–High long-term	Slow results; inter-departmental dependence

Interpretation at Community Level:
Community-level measures reduce displacement effects and better match the spatial logic of boar movement. Their failure is rarely technical; it is institutional, driven by breakdowns in maintenance, cost-sharing, and long-term coordination.

4.C Cross-Scale Pattern and Failure Modes

Why Deterrents Commonly Fail

Failure Mode	Description
Habituation	Boars rapidly learn predictable deterrents
Displacement	Damage shifts to adjacent fields or villages
Scale Mismatch	Individual measures applied to landscape-scale problem
Maintenance Breakdown	One weak point collapses entire system
Labour Fatigue	Continuous guarding becomes unsustainable
Incentive Misalignment	No linkage between compensation and prevention

Summary

The persistence of wild boar conflict does not reflect lack of effort or ingenuity by farmers. It reflects a structural mismatch between the scale of boar behaviour and the scale at which most deterrents are applied. Farm-level measures suppress damage briefly but collapse under labour and habituation. Community-level measures are demonstrably more effective but depend on institutions capable of sustaining collective action. Where coordination fails, wild boars rapidly reclaim access to crops, and conflict resumes.

Effective mitigation therefore requires prioritising **scale-appropriate, collectively maintained interventions**, supported by governance mechanisms that reduce the burden on individual households and address displacement rather than merely deflecting damage.

Section 5 - CSO and Community-Based Interventions in Wild Boar Conflict

Unlike conflict involving elephants or large carnivores, **wild boar conflict has received very limited focused engagement from non-governmental organisations**. Discussions with farmers across multiple regions consistently indicate that day-to-day management of wild boar damage is handled largely by individual households or informal community arrangements, with little sustained CSO presence or programme-level support.

Where CSOs are involved, wild boar is rarely addressed as a standalone issue. Instead, it appears **incidentally within broader human–wildlife conflict initiatives**, often alongside elephants, deer, monkeys, or other crop-raiding species. Existing documentation suggests that CSO engagement is typically confined to **assessment, awareness, or pilot-level demonstrations**, rather than long-term, on-ground intervention aimed specifically at wild boar.

Most CSO-linked activity related to wild boar falls into three limited categories:

5. A Limited Preventive Support and Demonstrations

Some CSOs and donor-supported programmes have promoted **non-lethal, low-cost deterrence measures**—such as fencing concepts, sensory repellents, or crop protection techniques—as part of general conflict mitigation guidance. These efforts are usually implemented as **short-term pilots or demonstrations**, often in collaboration with forest or agriculture departments. There is little evidence that such interventions are maintained at scale or embedded into routine farming practice beyond the project period.

5. B Guidance and Knowledge Products

At the national and donor level, a small number of **technical guidance documents and conflict assessments** include wild boar as a problem species. These documents synthesise existing research, outline potential mitigation options, and recommend community participation. However, they largely remain **advisory in nature**, with no clear mechanism linking guidance to systematic field implementation or long-term monitoring in affected villages.

5. C Absence of Sustained Community Programmes

Crucially, there is **no evidence of widespread, sustained CSO programmes** focused specifically on wild boar conflict comparable to those seen for elephants or large carnivores. Farmers frequently report that they have **not encountered CSOs working directly on wild boar damage**, and that support—where available—comes primarily from ad hoc government measures, local experimentation, or informal sharing of practices among farmers.

As a result, most mitigation efforts in wild boar–affected areas remain **individualised, reactive, and resource-constrained**. Community-level coordination, where it exists, is typically farmer-driven rather than CSO-facilitated. Compensation support, legal literacy, and systematic documentation of damage—areas where CSOs often play a role in other wildlife conflicts—are largely absent in the context of wild boar.

Overall Assessment

The relative absence of CSO engagement in wild boar conflict reflects a broader governance gap. Wild boar damage is widespread, chronic, and economically significant, yet it is often treated as a **routine agricultural nuisance rather than a structured human–wildlife conflict issue**. This framing has limited the entry of conservation CSOs, reduced donor interest, and left farmers to manage escalating losses with minimal external support.

In the absence of dedicated CSO programmes, wild boar conflict management in India remains fragmented and uneven, driven primarily by farmer coping strategies and state-level responses rather than coordinated community-based intervention. Addressing this gap will require recognising wild boar conflict as a legitimate and persistent livelihood issue, warranting the same institutional attention and support mechanisms extended to other forms of human–wildlife conflict.

Section 6 - State Responses to Wild Boar–Farmer Conflict in India

State responses to wild boar conflict have largely evolved through **state-specific orders and schemes**, rather than a consistent national framework. The dominant pattern is **reactive action**—legal permissions for killing in hotspots, ex-gratia compensation for damage, and subsidies/pilots for deterrent infrastructure—implemented unevenly across districts and rarely evaluated for long-term reduction in crop loss.

6. A - Legal permissions for lethal control

Under the Wildlife (Protection) Act, states typically rely on **targeted permissions** (e.g., Section 11 for animals dangerous to human life or property) or **time-bound "vermin" notifications** issued by the Centre under Section 62 (where applicable). Government responses and RTI-based reporting also note that the Centre has **not adopted a blanket "vermin" notification for wild pigs nationally**, and states are expected to use existing provisions.

Kerala: In May 2022, the Kerala Cabinet decided to permit local bodies to kill wild boar causing damage, while explicitly banning methods like poisoning and electrocution. Kerala's forest department also documents a history of **conditional shooting orders** for crop-raiding wild boar in its rules/orders listings.

Uttarakhand: The Union environment ministry has issued official notifications permitting wild boar culling in specified areas/tehsils of Uttarakhand; the notification itself is available as a ministry-hosted PDF.

Bihar: The Centre has, in the past, allowed time-bound vermin declarations enabling culling of wild pigs in specified districts; this is widely reported and appears in RTI-based reporting.

Goa: Reporting indicates the state has considered/announced moves to declare wild boar as "vermin/nuisance" due to crop damage, but public documentation is primarily through news reporting rather than a single stable government PDF order.

What cannot be claimed safely: Across states, **there is no consistent, publicly available system** publishing (i) baseline wild boar population estimates, (ii) scientifically defined off-take targets, and (iii) post-culling impact evaluation on crop loss. Where commentary exists, it frequently notes absence of scientific population assessment as a limitation in decision-making.

6.B State-sponsored culling operations and licensed shooters

Some states operationalise lethal control through **authorised shooters** coordinated by forest departments and/or local bodies. In Kerala, media reporting based on departmental information describes the use of licensed shooters and repeated extensions of the local-body authorisation framework.

What cannot be quantified reliably (and should not be): Comparable, verified cross-state figures on (a) number of boars removed, (b) where removals occurred, and (c) whether removals reduced seasonal crop damage are **not available in a standardised, linkable format**. Most public reporting is event- or state-specific.

6.C Compensation for crop damage

Most states provide **ex-gratia compensation** for crop damage by wild animals, administered through forest/revenue processes. However, schemes differ on eligibility, rates, caps, and process timelines.

Maharashtra: Maharashtra has enacted a dedicated law for compensation for loss/injury/damage caused by wild animals, explicitly covering crop/fruit plant damage.
Rules under this framework describe application procedure (including a requirement to apply within a specified time window for crop/fruit plant damage).

Kerala: Kerala provides an application channel and describes compensation under its rules for victims of wild animal attacks and crop/property damage; public-facing portals outline the service and the existence of the rules framework.

Karnataka: The Karnataka Forest Department provides public guidance on eligibility and procedures for ex-gratia relief for crop damage by wild animals.

Key constraints : Across states, compensation is widely reported to be **partial and process-heavy**, and it does not by itself prevent repeated seasonal damage. However, **comparative performance data** (average time-to-pay, claim acceptance rates, proportion of loss covered) are not published consistently across states.

6.D Infrastructure support and deterrent subsidies

Many states promote or subsidise **non-lethal barriers**, particularly fencing, through agriculture/forest/rural development channels. The operational challenge most frequently observed in field practice is not initial installation but **maintenance, coverage gaps, and governance of shared assets**—problems that are routinely noted in local implementation discussions but are rarely evaluated through published outcome studies.

6.E Training, awareness, and low-cost deterrents

Departments periodically conduct outreach and issue advisories on non-lethal mitigation (lights, guarding, repellents, coordinated watch). Evidence of these efforts is usually found in departmental circulars and local reports rather than centralised evaluation documents. The key limitation is that these activities are **episodic** and rarely embedded into sustained extension systems with measurable adoption and outcomes.

6.F Monitoring and emerging systems

Some states have begun experimenting with conflict cells, hotspot mapping, or structured reporting, but public documentation is uneven and often not accessible as stable reports. Where official responses exist, they often emphasise that data are fragmented and that there is no national benchmark population/damage system for wild pigs—hence reliance on local orders and permissions.

Section 7 - Gaps in Policy and Implementation

Despite a wide range of state-level interventions—culling permissions, fencing subsidies, compensation schemes, and awareness efforts—India’s approach to wild boar conflict remains structurally weak. The persistence of conflict reflects not a lack of action, but fundamental gaps in policy design, scientific grounding, and institutional coordination.

7.A. Absence of a National Framework or Long-Term Strategy

India does not have a unified national framework for wild boar management. Conflict governance is left entirely to states, which respond independently to local pressure, electoral considerations, and episodic crises.

As a result:

- Approaches vary widely across states with no common standards.
- There are no nationally agreed norms for fencing quality, deterrent design, or compensation valuation.
- Policy direction fluctuates with political cycles rather than evidence.

Wild boar conflict is treated as a state-level administrative issue rather than a national agricultural and ecological challenge.

7.B. Lack of Scientific Population Data

Most states lack even basic population data for wild boar. There are no systematic camera-trap grids, no annual surveys, and no modelling of birth rates, mortality, or movement between landscapes.

This absence of data means that:

- Culling decisions are not evidence-based.
- States cannot distinguish between population growth, habitat degradation, or cropping patterns as drivers of conflict.
- The effectiveness of any intervention cannot be evaluated.

A population-level problem is being managed without population-level information.

7.C. Reliance on Culling Without Outcome Evaluation

Several states increasingly rely on culling authorisations as a visible response to farmer pressure. However, there is little differentiation between targeted removal of problem individuals and broad population reduction.

Key gaps include:

- No monitoring of whether culling reduces crop damage over time.
- No assessment of population rebound, which is rapid given high fertility.
- No spatial targeting based on movement or density data.

In practice, culling functions as a short-term political response rather than a durable management tool.

7.D Compensation Systems That Do Not Reduce Future Risk

Compensation remains the primary state response to crop loss, but it is reactive and weakly linked to prevention.

Common shortcomings include:

- Delays in verification and payment.
- Compensation rates that rarely reflect actual market loss.
- No linkage between compensation and adoption of preventive or collective measures.

The system alleviates immediate distress but does not alter the conditions that generate repeated damage.

7.E Underperforming Prevention Measures

States increasingly subsidise fencing and other deterrents, but implementation is inconsistent.

Persistent issues include:

- Variable quality of materials and installation.
- Lack of clear responsibility for maintenance.
- Absence of enforceable technical standards for fencing design and community upkeep.

When preventive infrastructure fails, farmer confidence in non-lethal measures declines, increasing reliance on harmful and illegal practices.

7.E. No Investment in Fertility Control or Applied Research

While several countries are testing or deploying fertility control for wild pigs, India has made no comparable investment.

There are:

- No pilot trials.
- No dedicated research funding.
- No institutional collaboration between wildlife and veterinary systems.

India relies almost entirely on removal-based strategies, despite global evidence that such approaches are ineffective for high-fertility species when used in isolation.

7.F Lack of Landscape-Level Planning

Most state interventions operate at the level of individual farms or villages, without addressing broader land-use drivers.

There is little evidence of:

- Crop zoning along forest edges.
- Incentives to shift high-risk crops.
- Village-scale buffer belts.
- Habitat restoration to improve natural forage availability.

Without these measures, agricultural landscapes continue to attract wild boar predictably and repeatedly.

7.G Weak Enforcement Against Illegal Lethal Methods

Although illegal methods such as snares, poison baiting, and high-voltage electric lines are officially prohibited, enforcement is limited.

In practice:

- Violations are rarely penalised unless human injury occurs.
- Forest staff face political pressure to avoid enforcement.
- Harmful methods persist with tacit acceptance.

This undermines animal welfare, increases human safety risks, and erodes trust in forest institutions.

7.H Poor Inter-Departmental Coordination

Wild boar conflict spans multiple sectors—agriculture, forestry, revenue, rural development—but coordination between these departments is minimal.

Most states lack:

- Joint field teams.
- Shared databases.

- Integrated early-warning or planning mechanisms.

As responsibility is diffused across departments, accountability for prevention remains unclear.

7.I Data Collection Without Strategic Use

Some states have begun recording incidents, mapping hotspots, or conducting conflict audits. However, this data is rarely analysed or used to guide planning.

Current systems focus on documentation rather than decision-making, limiting their value for prevention.

7.J Absence of Formal Community-Level Conflict Institutions

Unlike international models where local wildlife committees or trained hunting associations play defined roles, India lacks formal community-based conflict management units.

Panchayats receive little technical guidance, and farmers rely on improvised deterrents. This leads to fatigue, frustration, and escalating conflict rather than organised mitigation.

Core Problem

India addresses wild boar conflict through symptoms—crop damage, compensation claims, public anger, and culling—rather than through systems that manage populations, landscapes, and incentives.

Section 8 - Suggested solutions by level: Wild Boar

8.A Farm level

1. **Protect the "first 30–45 days" of the crop with a real barrier, not noise**
    - Early-stage rooting wipes out sowing invisibly and resowing becomes impossible later.

    - Implementable options: tight mesh/chain-link at ground level with a buried skirt (to stop digging under), or well-maintained low-voltage solar fencing where feasible. (Key is closing ground gaps—boars dig.)

2. **Reduce attractants at the field edge (simple crop layout changes)**

  - Concentrate the most preferred/high-calorie crops (maize/groundnut/tubers/paddy) away from the forest-facing edge and use a buffer strip with low-preference crops where agronomically viable.
  - This is not perfect, but it measurably reduces “easy entry + high reward,” especially when combined with barriers.

3. **Stop wasting labour on predictable deterrents that boars learn in days**

  - Standalone lights/sounds/firecrackers habituate fast and simply shift damage within the same season.
    Use sound/light only as an alert add-on to a barrier or patrol—never as the main protection.

8.B Community level

1. **Village-ring barrier at the right scale + maintenance rota**

  - Community barriers outperform isolated farm fixes because boar movement is landscape-scale and individual measures just displace damage to neighbours.
  - Implementable model: one ring-fence/trench section at a time (priority hotspots first), with a written rota for clearing vegetation, checking voltage, and repairing breaches—because “one weak point collapses the whole system.”

2. **Synchronized sowing/harvest or “crop zoning” in the highest-risk belt**

  - Cooperative cropping is one of the few high-impact measures because it removes the patchy buffet that keeps boars returning nightly.
  - Implementable version: only the forest-edge belt agrees on timing/crops; the entire village need not comply.

3. **Rotational patrol only during peak risk windows (not all season)**

    ○ Boar raids intensify at specific crop stages and in low-light nights; guarding all season causes fatigue and collapse.

    ○ Patrol just the vulnerable windows (establishment + pre-harvest), backed by a common alert channel.

8.C CSO / research level

1. **Standardize "minimum viable barrier designs" and train local maintenance**

    ○ The big failure is not installation; it's maintenance and weak specs.

    ○ CSOs can publish and train on 2–3 designs that are locally buildable: (a) dig-proof mesh skirt barrier, (b) solar fence specs + grounding, (c) trench/bund reinforcement for monsoon.

2. **Create simple hotspot maps + repeat-loss household lists that drive targeting**

    ○ Wild boar damage is cumulative and under-reported; without targeting, resources get spread thin and fail.

    ○ Implementable: seasonal map updated with farmers + panchayat; target barriers and patrol windows to the top hotspots first.

3. **Pilot what India is not investing in: fertility control and monitoring design**

    ○ The chapter flags a major gap: no serious investment in fertility control/applied research despite global movement.

- CSOs/research can run tightly designed pilots (even small) *with* monitoring, so governments have something actionable beyond culling.

8. D Government level

1. **Set enforceable technical standards + fund maintenance, not just subsidies**
    - Current prevention fails due to variable quality, unclear maintenance responsibility, and no standards.
    - Implementable: a state "approved designs" list + AMC-style maintenance budgets through panchayats/FD/agri dept.

2. **Stop treating culling as the main strategy: require outcome monitoring**
    - Chapter gap: culling decisions lack population baselines and post-cull evaluation; rebound is rapid.
    - Implementable: any authorised culling must include (a) hotspot justification, (b) simple off-take reporting, and (c) next-season crop-loss tracking in the same villages.

3. **Create an inter-department "boar conflict cell" with one accountable lead**
    - The problem spans agriculture–forest–revenue–rural development, but coordination is weak.
    - Implementable: a district cell that combines (i) barrier funds, (ii) compensation verification, (iii) hotspot mapping, and (iv) enforcement against illegal methods.

2.4 Farmer - Nilgai Conflict

Section 1. Nilgai–Farmer Conflict: Types of Damage, Extent, and Evidence

Nilgai are among the most economically damaging wildlife species for farmers across large parts of north and central India.

Unlike conflicts involving large carnivores or elephants, nilgai-related conflict is characterised by chronic crop damage, spatial spread across agricultural interiors, and cumulative livelihood erosion rather than discrete or episodic loss events.

Available evidence on nilgai conflict is extensive but fragmented. **There is no consolidated national dataset, no landscape-scale field assessment in major hotspot states such as Bihar, and no standardised methodology for estimating economic loss**. Most existing knowledge is inferred from a combination of state agriculture records, compensation claims, court affidavits, farmer surveys, and media reporting. These sources consistently indicate large-scale damage, but they do not permit precise quantification or reliable trend analysis.

Despite these limitations, nilgai conflict is widely recognised by state governments and courts as a significant contributor to agrarian distress, reflected in repeated policy interventions, farmer agitations, and legal proceedings.

Damage caused by nilgai can be classified into five primary categories:
(1) direct crop depredation,
(2) spatially extensive field destruction,
(3) indirect labour and income losses,
(4) infrastructure and property damage, and
(5) human safety risks - particularly through road accidents and injuries during night guarding.

1.A Direct Crop Damage

Crop depredation is the single largest and most consistently reported component of nilgai–farmer conflict.

Key findings from state- and region-level evidence:

Nilgai–farmer conflict is not confined to forest edges and differs fundamentally from conflicts involving forest-dependent species.

Damage extends well beyond forest boundaries, commonly reported at distances of 5 to 10 kilometres or more into agricultural interiors. In several states, including Rajasthan and Uttar Pradesh, crop damage attributed to nilgai is reported across entire districts rather than isolated fringe villages.

Conventional mitigation concepts such as buffer zones or forest-edge fencing are poorly suited to nilgai conflict. In many regions, agricultural land functions as permanent habitat rather than as a seasonal foraging extension of forest or scrub.

Across Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, Haryana, and parts of Maharashtra, nilgai are repeatedly identified among the most damaging wildlife species affecting agriculture. This assessment is based on state agriculture department loss records, submissions by state governments to High Courts, and district-level farmer surveys rather than systematic field experiments.

A wide range of crops are affected, including wheat, mustard, gram, lentils, maize, soybean, vegetables, fodder crops, and sugarcane. Nilgai do not exhibit strong crop specificity; instead, damage reflects crop availability and accessibility. Observed patterns include higher reporting during the rabi season, particularly during wheat, mustard, and pulse cultivation.

Field-level reports, farmer compensation claims, and affidavits submitted by state governments to High Courts in affected regions commonly report crop losses ranging from one-third to more than two-thirds of the standing crop in affected fields, with near-total crop failure described in small holdings subjected to repeated incursions. These figures represent self-reported or administratively recorded loss estimates used for legal and compensation purposes, and should not be interpreted as statistically representative agronomic averages.

Sources:Patna High Court proceedings and affidavits on nilgai crop damage (Bihar) | Rajasthan High Court committee reports on nilgai conflict

Nilgai typically move in groups of approximately 7 to 15 individuals. Group movement results in rapid, high-intensity damage over short time periods, with trampling often causing losses that exceed direct consumption.

Damage occurs across multiple crop stages. At sowing, seeds and germinating plants are consumed or trampled. During vegetative growth, grazing and stem breakage reduce plant density and yield potential. The most severe economic losses occur during late vegetative and pre-harvest stages, when trampling of mature crops eliminates the full seasonal investment after input costs have already been incurred.

Because damage often occurs late in the cropping cycle, farmers frequently face total loss with no scope for re-sowing or recovery.

Stage-wise crop damage:

- **Sowing stage:** Seed consumption and trampling of germinating crops.
- **Vegetative stage:** Grazing and stem breakage, especially damaging for mustard and pulses.
- **Pre-harvest stage:** Lodging and trampling of mature crops, causing maximum economic loss after full input costs are incurred.

Source: ICAR agronomy impact assessments.

Multi Year Damage: Fields affected in one season show a high likelihood of repeated damage in subsequent cropping cycles. In regions with expanding irrigation and declining commons, reported conflict intensity has increased over time rather than stabilised. Farmers frequently respond by withdrawing from vulnerable crops after two to three consecutive seasons of loss.

These trends indicate that nilgai conflict is driven primarily by long-term land-use transformation and stable access to cultivated forage, not by short-term ecological variation.

Impact:
During discussions with farmers they have reported that because the damage often occurs late in the season, nilgai raids have occasionally wiped out **100% of the farmer's seasonal investment**, leaving no scope for re-sowing or recovery.

Sources:

- Understanding Human–Nilgai Negative Interactions in India
- Agricultural crop depredation by nilgai
- Perception and field surveys – Rajasthan

1.B Indirect and Secondary Economic Costs

Indirect costs associated with nilgai conflict often exceed visible crop loss but are rarely captured in compensation systems or official statistics.

Farmers in high-conflict areas consistently report **substantial additional labour demands** associated with night guarding, deterrence, and field surveillance throughout the cropping season. Studies and field surveys document that these efforts are **continuous rather than episodic**, often requiring repeated night-time presence over extended periods, and disproportionately burden households with limited working members, elderly farmers, or seasonal out-migration. While precise labour-day equivalents are not systematically measured, available evidence indicates that guarding imposes significant opportunity costs by diverting labour from farming, wage work, and rest

Repeated crop damage also drives changes in cropping patterns. Farmers frequently abandon high-value or palatable crops in favour of low-risk, low-return alternatives. Over time, this results in sustained income suppression rather than one-time loss.

The cumulative effect of labour diversion, reduced cropping choices, and repeated losses contributes to long-term livelihood erosion, particularly among small and marginal farmers who lack financial buffers.

Indirect costs often exceed visible crop loss but are rarely quantified in compensation systems.

Impact:
These indirect costs produce **long-term income suppression**, not just episodic loss, and disproportionately affect small and marginal farmers with limited labour reserves.

1.C Infrastructure and Property Damage

Nilgai cause significant physical damage to farm assets, which is rarely recognised as wildlife loss.

Commonly reported damages:

- Trampling and breakage of **irrigation pipes, drip lines, and sprinklers**
- Damage to **field bunds and embankments**
- Repeated destruction of **wire and solar fencing**
- Damage to **young orchards and saplings**

Source: State agriculture department field reports; farmer compensation claims (non-approved categories).

Impact:
These losses are **almost never compensated**, forcing farmers to absorb cumulative repair costs across seasons.

1.D Human Safety Risks and Road Accidents

Although less frequent than crop loss, human safety impacts are real and under-reported.

Evidence from administrative and media records:

- Adult nilgai (200–240 kg) may charge when startled or cornered during night guarding, leading to **injuries to farmers**, especially elderly individuals.
Source: State forest department incident logs; district police records.

- Nilgai are increasingly involved in **road accidents on rural and peri-urban highways**, causing serious injury and fatalities to motorists.
Source: State police accident statistics; compiled media reports.

Gap:
These incidents are rarely classified under "human–wildlife conflict" and are therefore excluded from formal assessments.

Section 2 . Harm to Nilgai in Human–Nilgai Conflict Landscapes

Human–nilgai conflict is typically assessed only through the lens of agricultural loss and farmer distress. However, conflict landscapes also generate substantial and cumulative harm to nilgai populations themselves. These impacts are diffuse, inconsistently recorded, and largely absent from formal wildlife mortality and monitoring systems. As a result, harm to nilgai remains institutionally invisible despite being widespread.

Types of Harm to Nilgai in Conflict Landscapes

Category of Harm	Mechanism in Conflict Landscapes	Nature of Evidence	Visibility in Official Records	Key Implication
Direct Mortality: Poisoning	Deliberate lacing of crop residues, fodder, or water sources with pesticides as retaliatory or preventive action	Forest department seizure records, media investigations, court affidavits	Very low	Mortality substantially underestimated; deaths rarely attributed to conflict
Direct Mortality: Electrocution	Use of illegal live electric fencing and exposed power lines around fields and canals	Electricity department incident reports, forest offence records	Low	Often recorded as electrical accidents rather than wildlife deaths

Category of Harm	**Mechanism in Conflict Landscapes**	**Nature of Evidence**	**Visibility in Official Records**	**Key Implication**
Direct Mortality: Vehicular Collisions	Frequent crossing of rural and peri-urban roads, particularly at night, amplified by group movement and road expansion	Police accident records, transport data, media reporting	Moderate	Treated as traffic incidents, not wildlife conflict
Injury from Chasing and Beating	Active deterrence using sticks, stones, vehicles, and improvised weapons	Rescue notes, veterinary post-mortems, CSO observations	Very low	Many injured animals die later without detection
Injury from Fencing and Barriers	Entanglement, lacerations, and limb injuries from wire, barbed, and solar fencing	Forest rescue records, veterinary treatment logs	Low	Injuries recorded only when animals are immobilised or dead
Displacement from Traditional Ranges	Expansion of agriculture, fencing, and settlement reducing access to grazing areas	Land-use change studies, landscape ecology analyses	Absent	Increased exposure to conflict, starvation, and road mortality
Fragmentation of Movement	Continuous fencing, highways, canals, and irrigation infrastructure	Irrigation maps, movement studies	Absent	Elevated risk during barrier crossings
Chronic Physiological Stress	Repeated disturbance from chasing, noise, lights, and night-time activity	Veterinary field observations, comparative ungulate literature	Absent	Reduced body condition, reproduction, and disease resistance
Capture and Translocation Stress	Exhaustion during chase, darting injuries, transport stress	Forest capture reports, veterinary case studies	Low	High risk of post-release mortality or renewed conflict

Category of Harm	Mechanism in Conflict Landscapes	Nature of Evidence	Visibility in Official Records	Key Implication
Population-Level Effects	Disproportionate loss of reproductive adults and behavioural shifts toward nocturnality	Mortality records, behavioural ecology studies	Absent	Long-term population instability and conflict reinforcement
Policy-Induced Harm	Legal protection without effective mitigation and episodic vermin declarations	Policy reviews, court judgments, government orders	Structural	Encourages illegal killing and prevents outcome evaluation

Summary

Nilgai in conflict landscapes experience a continuous spectrum of harm ranging from direct mortality to chronic physiological stress and displacement. Most of these impacts are either weakly documented or entirely absent from official records because they fall between agricultural, wildlife, and infrastructure governance domains. Policy responses that focus narrowly on crop loss or episodic population control fail to account for this cumulative attrition. As a result, harm to nilgai persists alongside farmer losses, reinforcing conflict dynamics rather than resolving them.

Section 3. Why Nilgai Behave the Way They Do in Human–Nilgai Conflict Landscapes

Nilgai behaviour in agricultural landscapes is not aberrant, aggressive, or anomalous. It represents a predictable response of a large, adaptable herbivore to human-dominated land-use systems that offer high nutritional rewards, reduced predation risk, and stable access to water. The behaviours that generate conflict with farmers emerge from the interaction between Nilgai ecology and structural features of modern agricultural landscapes.

3. A Efficient foragers: Nilgai are efficient foragers that optimise energy intake while minimising risk. Cultivated crops such as wheat, mustard, pulses, and fodder provide substantially higher caloric and nutritional returns than degraded natural grasslands or scrub. Agricultural fields allow rapid intake with lower foraging effort, particularly in landscapes where natural forage has declined. In most cultivated regions, large predators are absent, further reducing perceived risk. Regular use of croplands therefore represents an energetically rational strategy rather than a deviation from normal behaviour.

3.B Long-term land-use change has reinforced this pattern. Historically associated with open scrub, grasslands, and forest edges, Nilgai now inhabit landscapes where these habitats have been extensively converted or fragmented. Expansion of agriculture, loss of commons, and the spread of irrigation have transformed farmland into a reliable substitute habitat, offering year-round forage and water. As a result, Nilgai increasingly treat agricultural areas as permanent ranges rather than as seasonal extensions of natural habitat.

3.C Legal protection under the Wildlife Protection Act, combined with low predation pressure in agricultural interiors, enables high adult survival even in conflict-prone landscapes. Where population control is limited or episodic, Nilgai persist and reproduce successfully within human-dominated areas. This persistence increases encounter frequency with crops and people without requiring any change in intrinsic behaviour.

3.D Irrigated cropping systems further intensify this dynamic. Canal networks, water tanks, and irrigated fields remove seasonal constraints that would otherwise limit Nilgai presence. Tall crops and dense planting provide cover from disturbance, particularly during late vegetative and pre-harvest stages. Nilgai therefore remain within agricultural landscapes throughout the year, with damage becoming most visible when crops are present and economically valuable.

3.E Group living amplifies both damage and risk tolerance. Nilgai commonly move in herds, and collective vigilance reduces individual exposure to disturbance. Group movement results in extensive trampling beyond feeding areas, causing damage that increases non-linearly with group size. High-impact losses can occur within short time periods even without prolonged feeding.

3.F Repeated human responses shape learned behaviour over time. Nilgai adjust activity patterns to avoid disturbance, showing increased nocturnality in high-conflict areas. They become familiar with deterrents that do not impose consistent cost, such as noise, lights, or uncoordinated chasing. Fields that offer repeated successful foraging without consequence are revisited, reinforcing spatial and temporal patterns of crop use.

3.G Attempts at exclusion often result in displacement rather than deterrence. Physical barriers and partial fencing redirect Nilgai movement along edges into adjacent fields or toward unfenced plots. Fragmented protection increases road crossings and canal encounters, shifting conflict spatially without reducing its overall incidence. These outcomes reflect landscape-level design rather than individual animal choice.

3.H Human land-use and farm management practices further reinforce conflict. Accessible post-harvest residues, fallow plots adjacent to cropped land, predictable gaps in fencing, and isolated night guarding create low-risk foraging opportunities. In such settings, conflict behaviour is shaped less by animal intent than by the structure and management of agricultural landscapes.

In summary, Nilgai behaviour in conflict landscapes is an adaptive response to predictable incentives created by land-use transformation, irrigation, legal protection, and partial deterrence. These behaviours are not the result of increased aggression or loss of fear, but of consistent rewards and manageable risk. Effective mitigation therefore requires addressing the structural conditions that favour crop use, rather than relying on animal removal, episodic control, or short-term deterrents alone.

Section 4: Vermin Notification

Policy responses such as vermin notifications, culling permissions, and infrastructure investments have often been implemented without baseline data on nilgai populations or systematic outcome evaluation, making it impossible to assess their effectiveness in reducing crop loss or enhancing farmer livelihoods. The absence of systematic evidence does not indicate low impact; rather, it reflects a structural failure to measure one of the most widespread forms of human–wildlife conflict in India.

However, policy signals confirm the scale of the issue: multiple states have sought or obtained permission under Section 62 of the Wildlife (Protection) Act, 1972 to declare nilgai (blue bull) as "vermin" in specific districts, enabling their regulated culling. This approach was formalised through a Central notification for parts of Bihar in 2015, after state proposals highlighted extensive crop loss attributed to nilgai and wild boar. Another notification allowing culling of nilgai and wild boar was the subject of Supreme Court consideration in 2016, reflecting legal engagement with these permissions. Repeated farmer agitations and legislative attention also underscore nilgai as a primary cause of crop loss in affected regions, with farmer bodies in Madhya Pradesh in 2024 publicly calling for state permission to cull nilgai to protect rabi crops.

Section 5 - Deterrent and Mitigation Methods for Nilgai–Farmer Conflict

Mitigation of Nilgai–farmer conflict is primarily preventive and depends on altering farm practices and local landscape conditions that enable repeated crop use by Nilgai. Evidence from field studies, agricultural extension systems, and pilot interventions shows that outcomes depend less on the type of deterrent used and more on scale, coordination, and maintenance. Measures implemented by individual farmers tend to provide short-term relief, while coordinated community-level actions show greater potential for sustained impact.

5.A Farm-Level Mitigation Measures

Farm-level interventions are the most commonly adopted responses, as they can be implemented independently by individual households. These measures primarily aim to delay, deflect, or temporarily deter Nilgai entry into specific fields.

Farm-Level Deterrent Measures for Nilgai Conflict

Measure Category	**Typical Applications**	**Observed Effect**	**Key Limitations**	**Overall Assessment**
Field-Scale Fencing (wire, barbed, solar)	Individual plots, high-value crops	Reduces entry when continuous and well maintained	High cost, frequent breaches, displacement to neighbouring fields, injury risk	Short-term protection, low scalability
Night Guarding and Vigilance	Peak crop stages, rabi season	Can reduce damage during active guarding	Labour-intensive, injury risk, declining effectiveness over time	Unsustainable for small households
Lights, Noise, Scare Devices	Torches, alarms, firecrackers	Temporary avoidance response	Rapid habituation, ineffective in isolation	Very short-lived benefit
Crop Choice Modification	Shifting to less palatable crops	Reduced damage in specific plots	Lower profitability, market constraints, conflict displacement	Risk avoidance, not conflict reduction
Sowing and Harvest Synchronisation	Neighbouring fields	Shortens vulnerable window	Requires coordination, difficult with fragmented holdings	Limited feasibility
Chemical and Sensory Repellents	Chilli sprays, odour repellents	Minor deterrence in controlled conditions	Wash-off, frequent reapplication, low efficacy under pressure	Experimental only

Summary -Farm Level:
Farm-level measures can suppress damage temporarily but rarely reduce conflict at scale. Most are costly in labour or capital, vulnerable to habituation, and prone to shifting damage spatially rather than preventing it.

5.B Community-Level Mitigation Measures

Community-level measures address Nilgai movement and foraging at a scale closer to the animal's spatial behaviour. These interventions require collective action, shared maintenance, and local governance arrangements but offer greater potential for sustained impact.

Community-Level Mitigation Measures for Nilgai Conflict

Measure Category	Typical Applications	Observed Effect	Key Limitations	Overall Assessment
Community or Block-Level Fencing	Village perimeters, crop clusters	Reduces displacement between adjacent fields	Governance failures, maintenance dependence, single-point failure	Effective if collectively managed
Coordinated Night Vigilance	Rotational guarding across households	Reduces individual labour burden, improves detection	Requires trust, leadership, sustained participation	Moderately effective
Habitat and Attractant Management	Managing fallows, residues, scrub	Reduces staging and resting near fields	Slow benefits, multi-owner coordination needed	Structurally important but gradual
Shared Surveillance and Early Warning	Informal alerts, group monitoring	Improves response timing	Limited without physical barriers	Supportive, not standalone
Informal Cost-Sharing Mechanisms	Shared fencing, maintenance funds	Improves durability of interventions	Social inequities, free-rider risk	Critical enabling condition

Summary - Community Level:
Community-scale interventions reduce displacement effects and better align with Nilgai movement patterns. Their effectiveness depends on local institutions, maintenance arrangements, and equitable cost-sharing. Where these conditions are absent, even technically sound measures fail.

5.C Evidence Synthesis Across Scales

Available evidence indicates consistent patterns:

- Farm-level measures provide immediate but temporary relief and are prone to habituation and displacement.
- Community-level measures perform better when governance and maintenance are sustained.
- No deterrent method has demonstrated durable effectiveness in isolation.
- Mitigation outcomes are shaped more by coordination and continuity than by technology choice.

Section Summary

Nilgai–farmer conflict mitigation at the farm and community level remains dominated by short-term deterrence rather than structural prevention. Individual farm-level actions suppress damage locally but rarely reduce conflict intensity across landscapes. Community-level measures offer greater potential but remain under-implemented due to coordination, financing, and governance constraints. Sustainable mitigation requires shifting emphasis from isolated household responses to collective strategies that align with Nilgai movement patterns and address displacement effects rather than merely deflecting damage.

Section 6 - CSO Interventions for Nilgai–Farmer Conflict

CSO engagement in Nilgai–farmer conflict is limited in scale, fragmented in design, and largely indirect in impact. Unlike carnivore conflict, Nilgai conflict is framed primarily as an agricultural issue rather than a wildlife emergency. As a result, CSO involvement focuses on prevention, advisory support, commons management, and policy advocacy, rather than rapid response or direct mitigation.

CSO interventions can be grouped into four broad categories:

1. farm-level mitigation support,
2. community-level collective action and landscape management,
3. policy, legal advocacy, and farmer representation, and
4. limited technology and infrastructure pilots.

6.A Farm-Level Mitigation Support

Farm-level CSO interventions aim to reduce crop damage through advisory services, demonstrations, and small-scale pilots. There are no rapid-response or animal-handling models for Nilgai; interventions are preventive rather than reactive.

CSO / Actor	Intervention Focus	Key Activities
ICAR-linked CSOs and Krishi Vigyan Kendras	Farm advisory and trials	Field demonstrations on fencing options, crop selection, sowing practices, and deterrents; extension advisories rather than material subsidies
BAIF Development Research Foundation	Agronomic and livestock-linked mitigation	Guidance on crop diversification, fodder planning, and integrated farming systems in Nilgai-affected semi-arid regions
Local farmer collectives supported by CSOs	Pilot deterrents	Small-scale trials of solar fencing, coordinated guarding, and community watch systems, often with partial donor support

Key limitation:
These interventions are typically pilot-scale, scattered across districts, and rarely evaluated for long-term effectiveness or scalability.

6.B. Community-Level Collective Action and Landscape Management

At the community level, CSOs focus on addressing collective-action failures inherent in Nilgai conflict, particularly those linked to shared land, fallows, and commons that facilitate animal movement and staging.

CSO / Actor	Intervention Focus	Key Activities
WWF-India (selected landscapes)	Non-carnivore human–wildlife conflict	Community awareness, dialogue facilitation, and limited fencing or deterrent pilots in multi-species conflict landscapes
Foundation for Ecological Security	Commons and institutional management	Support to village institutions managing commons, scrub, and fallow lands that serve as Nilgai resting and movement zones
Watershed CSOs	Landscape-level land-use change	Indirect influence on Nilgai movement through changes in water availability, vegetation structure, and land-use patterns

Key limitation:
Nilgai are rarely the explicit target species. Benefits to conflict reduction are indirect, long-term, and contingent on sustained community institutions.

6.C Comparative Note: Nilgai vs Carnivore CSO Engagement

Structural differences between Nilgai and carnivore conflict shape CSO roles:

- No rapid-response or emergency relief models for Nilgai conflict.
- No CSO-led compensation bridging mechanisms, unlike interim livestock payments in carnivore landscapes.
- Limited funding and visibility due to the absence of conservation urgency, despite high economic losses.
- Greater reliance on courts and state action rather than CSO service delivery.

Section Summary

CSO engagement in Nilgai–farmer conflict is constrained by the classification of Nilgai conflict as an agricultural issue and the absence of a dedicated institutional framework for large herbivore management. Interventions are fragmented, preventive, and largely indirect, focusing on advisory support, commons management, and policy advocacy rather than direct mitigation or rapid response.

Expanding the role of CSOs in Nilgai conflict management would require clearer policy mandates, stable funding, integration with agricultural extension systems, and formal recognition of large herbivore conflict as a distinct governance category rather than a residual agricultural problem.

Section 7 - Government Approaches to Human–Wildlife Conflict in India

India's human–wildlife conflict management system is extensive but uneven. State capacity is strongest in emergency response and post-incident compensation, moderate in preventive infrastructure, and weakest in long-term, landscape-level coexistence planning. The framework has evolved largely around high-visibility conflicts involving large carnivores and elephants, with limited adaptation to chronic crop-based conflicts involving large herbivores such as Nilgai.

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7. A Core Components of India's Human–Wildlife Conflict Management Architecture

Component	Current Government Actions	Strengths	Key Limitations
Rapid Response	Dedicated response teams in many wildlife-bearing states; crowd control; animal driving or capture	Reduces panic and mob violence	Reactive by design; limited relevance for chronic crop damage

Component	Current Government Actions	Strengths	Key Limitations
Compensation	Ex-gratia payments for human death, injury, livestock loss; limited crop compensation in some states	Reduces immediate anger and retaliation	Delays, under-compensation, weak and uneven coverage for crop loss
Physical Barriers	Trenches, solar fencing, chain-link barriers, edge fencing	Effective in specific, well-chosen locations	High maintenance; displacement effects; poor fit in agricultural interiors
Capture and Rescue	Rescue centres; veterinary care; permanent captivity for dangerous individuals	Necessary for rare high-risk cases	Politically driven captures; overcrowding; weak outcome evaluation
Awareness Programs	Village meetings, signage, school outreach	Can reduce risky behaviour	Inconsistent impact; weak follow-through
Habitat Management	Grazing control, habitat improvement inside reserves	Useful for carnivore conflict reduction	Focused inside reserves; little impact in farm landscapes or on large herbivores such as Nilgai
Monitoring and Technology	Camera traps, GIS patrols, drones	Strong for flagship species	Poor integration with farmer decision-making; strong species bias toward carnivores
Legal Oversight	Wildlife Protection Act; state SOPs and guidelines	Clear legal mandate	One-size-fits-all application; uneven enforcement

7. B Compensation Available for Wildlife-Related Crop Loss in India

Compensation for wildlife-related losses operates through two parallel pathways:

1. **State ex-gratia compensation schemes**, and
2. **Crop insurance under the Pradhan Mantri Fasal Bima Yojana (PMFBY)**.

In practice, ex-gratia relief remains the primary mechanism for wildlife-related crop loss, as insurance coverage for such damage has historically been limited and inconsistently applied.

Compensation and Insurance Pathways

Mechanism	Authority	What It Covers	Operational Reality	Key Limitations
State Ex-Gratia Compensation	State forest / revenue departments	Crop loss, property damage, injury, death due to wildlife	Case-by-case assessment; local verification	Variable rates; delays; compensation often below actual loss
PMFBY – Basic Cover	Ministry of Agriculture; insurers	Yield loss due to natural calamities, pests, diseases	Area-based assessment	Wild animal damage historically excluded or inconsistently recognised
PMFBY – Add-On Cover for Wild Animal Damage	Ministry of Agriculture; state governments	Crop loss due to notified wild animals	Localised risk cover, effective from Kharif 2026	Optional for states; no implementation evidence yet

Implementation Realities

- **Variation across states:** Compensation norms, rates, and procedures differ widely, creating unequal outcomes for farmers facing similar losses.
- **Administrative burden:** Claims require rapid reporting, multiple inspections, and extensive documentation, discouraging uptake.
- **Low valuation:** Payments frequently cover only a fraction of actual economic loss.
- **Weak prevention linkage:** Compensation is not tied to adoption of preventive or collective mitigation measures.

Although PMFBY represents a formal risk-pooling mechanism, wildlife damage has historically fallen outside its effective scope. The newly approved add-on cover for wild animal damage marks an important policy shift, but there is currently no evidence on farmer uptake, claim settlement timelines, or administrative performance, as implementation has not yet begun.

7. C System-Level Constraints Relevant to Large Herbivore Conflict

While India's conflict-management architecture provides multiple instruments—compensation, fencing subsidies, rapid response mechanisms, and legal provisions for control—these tools are primarily designed for episodic, high-visibility incidents. Chronic, crop-based conflicts involving large herbivores expose structural limitations in this framework. Insurance coverage for wildlife crop damage remains inconsistent, compensation is reactive and weakly linked to prevention, and infrastructure-led mitigation often displaces rather than reduces conflict. These constraints become particularly pronounced in agricultural interiors where conflict is continuous and spatially diffuse.

The species-specific policy and implementation gaps arising from this mismatch are examined in detail in the Nilgai section that follows.

Section 8 - Policy and Implementation Gaps in Managing Nilgai–Farmer Conflict

India's policy challenge in managing Nilgai conflict is not the absence of tools, but the absence of fit between tools and problem structure. While existing systems perform reasonably well for acute, high-risk wildlife incidents, they perform poorly for chronic, landscape-wide crop depredation driven by large herbivores.

8.A Misalignment Between Conflict Type and Policy Design

Most governance instruments are designed for episodic emergencies involving identifiable individuals and immediate human risk. Nilgai conflict, by contrast, is continuous, economically erosive, and spatially diffuse. Response-heavy tools address symptoms but not structural drivers.

8.B Crop Loss Governance Remains Fragmented and Weak

Crop damage is the dominant impact of Nilgai conflict, yet governance is fragmented across forest, agriculture, revenue, and disaster relief systems. Insurance coverage is inconsistent, and ex-gratia compensation remains slow, discretionary, and weakly standardised.

8.C Compensation Is Decoupled from Prevention and Coordination

Payments function as post-loss relief rather than risk reduction. They are not linked to preventive measures, collective action, or infrastructure maintenance, leading to repeated losses without behavioural change.

8.D Over-Reliance on Infrastructure Without Landscape Planning

Fencing and barriers are deployed without spatial planning, frequently shifting damage rather than reducing it. Maintenance responsibility is unclear, and monitoring of effectiveness is rare.

8.E Population Control Measures Lack Outcome Accountability

Vermin notifications and lethal control are implemented without baseline population data or post-intervention evaluation. There is no systematic evidence linking these measures to sustained reduction in crop damage.

8.F Road Safety and Non-Crop Impacts Remain Invisible

Nilgai-related road accidents, guarding injuries, and infrastructure damage fall between administrative domains and are not integrated into conflict planning or budgets.

8.G Absence of Integrated, Landscape-Level Planning

There is no mechanism to integrate agriculture, irrigation, land-use change, and wildlife movement into a unified conflict-reduction framework, despite Nilgai operating at landscape scales.

8.H Consolidated Assessment of Policy Gaps

Gap Category	Core Issue	Consequence
Conflict Typology	Policies designed for episodic emergencies	Chronic losses persist
Crop Loss Governance	Insurance and compensation poorly aligned	Farmers absorb repeated losses
Incentive Design	Compensation not linked to prevention	No behavioural or collective shift
Infrastructure Strategy	Barriers deployed without landscape logic	Damage displacement
Population Control	No monitoring or evaluation	Ineffective outcomes
Cross-Sector Integration	Departments operate in silos	Non-crop impacts ignored
Planning Scale	Village-level focus for landscape-scale problem	Structural drivers untouched

Summary

Nilgai conflict persists not because policy tools are absent, but because they are poorly aligned with the nature of the problem. Chronic herbivore conflict requires governance mechanisms that integrate agriculture, insurance, land-use planning, and community coordination at landscape scales. Without this shift, existing policies will continue to mitigate visible crises while allowing everyday economic attrition to persist.

Section 9 - Suggested solutions by level: Nilgai

9. A Farm level

- Install continuous, ground-tight fencing around the most vulnerable plots and close all entry gaps at the base; individual, partial fencing should be avoided because it redirects animals into the nearest weak plot.

- Reduce the length of time crops are exposed by synchronising sowing and harvesting within the household's own clustered fields and prioritising protection during the late vegetative and pre-harvest stage when losses wipe out full seasonal investment.

- Stop relying on lights, noise, and scare devices as primary deterrents; use them only as short alert tools alongside physical barriers or active guarding.

9. B Community level

- Build and maintain block-level or village-perimeter protection for contiguous crop clusters, with a shared repair and maintenance system so breaches are fixed within 24–48 hours.

- Coordinate cropping choices and timing in the forest-facing or high-incursion belt so the landscape does not function as a staggered buffet that keeps herds returning nightly.

- Create a rotational night vigilance system focused only on peak-risk weeks, paired with a simple early-warning network, so guarding remains sustainable and does not collapse from fatigue.

9. C CSO level

- Standardise a small set of locally buildable, minimum-spec designs for nilgai fencing and entry-point hardening, and train village teams on maintenance, breach-finding, and rapid repair.

- Support village institutions to run equitable cost-sharing and compliance systems for collective barriers, including rules for maintenance responsibility and penalties for deliberate gaps that shift damage to neighbours.

- Generate practical hotspot maps and repeat-loss profiles that directly determine where collective barriers, vigilance, and cropping coordination are deployed first.

9.D Government level

- Shift from one-time fencing subsidies to funded maintenance contracts and enforceable technical standards, with mandatory post-installation audits and clear ownership for upkeep.

- Make crop-loss risk pooling functional by integrating wildlife crop damage into insurance and compensation in a way that is fast, low-paperwork, and linked to adoption of collective prevention in designated hotspot blocks.

- Replace episodic population-control permissions with outcome-accountable planning: baseline population and damage assessment in notified areas, transparent reporting of interventions, and season-to-season evaluation of whether crop loss actually declined.

2.5 Leopard–Farmer Conflict and Types of Damage

Human–leopard conflict is a widespread and persistent feature of rural, peri-urban, and semi-urban landscapes across much of India. Unlike conflict involving forest-restricted carnivores, leopard conflict extends well beyond protected areas and is closely associated with fragmented forests, agricultural mosaics, plantation systems, and expanding human settlements. Leopards are highly adaptable large carnivores capable of persisting in close proximity to people, resulting in frequent spatial overlap with livestock and human activity.

As habitats become increasingly fragmented and prey availability fluctuates, leopards routinely use human-dominated landscapes where domestic animals, dogs, and occasionally people form part of the risk environment.

Section1 - Types of Damages in Leopard–Farmer Conflict

Leopard–farmer conflict in India generates a **distinct set of damages** that differ structurally from conflict involving more forest-restricted carnivores. Because leopards persist across rural, plantation, and peri-urban landscapes, damages are **high-frequency, spatially diffuse, and cumulative**, rather than episodic and localised. The principal forms of damage include **livestock predation**, **indirect economic and labour costs**, and **human injury and fatality risk**, with impacts varying across landscape types.

1.A Livestock Predation

Livestock depredation is the most commonly recorded form of damage in human–leopard conflict landscapes in India, particularly across multi-use areas outside protected forests where livestock are frequently exposed. The scale of losses is substantial in many landscapes, but it is best described using division- or district-level records rather than a single national percentage share across states, because reporting intensity, compensation rules, and local husbandry practices vary widely.

Available compensation and incident datasets show that leopard depredation commonly reaches the level of several hundred recorded events per year in high-conflict forest divisions. For example, compensation records analysed from Junnar Forest Division (Maharashtra) show annual livestock depredation cases **increasing to roughly 600 per year after 2014**. In parts of the Indian Himalayan region, verified records compiled for analysis documented **857 livestock predation events in North Bengal** and **375 in Pauri Garhwal over 2015–2018.** Government research reporting from Himachal Pradesh also documents very large cumulative livestock losses attributed to leopards in Mandi district, Himachal

The composition of losses is not uniform across India. In some Himalayan and plantation landscapes, cattle and calves form a major share of recorded kills, while in several agricultural mosaics and small-ruminant systems, goats and sheep contribute heavily. For example, incident datasets from North Bengal and Pauri Garhwal show a predominance of cattle in recorded leopard kills, with smaller shares of goats, calves, sheep, and pigs. In contrast, compensation-linked household datasets from Maharashtra show substantial impacts on goats and calves among claimants, and large use of domestic prey in leopard diets in human-use landscapes.

These losses disproportionately affect small and marginal households where goats, sheep, and young stock function as liquid savings and routine income buffers, making repeated small losses economically corrosive even when per-incident losses appear modest.

1.A.1. Spatial Patterns of Human–Leopard Conflict

Leopard–farmer conflict occurs across a **heterogeneous mosaic of human-dominated landscapes** rather than being tightly tied to protected areas. Leopards in India **occupy both forested and non-forest habitats**, and a **substantial portion of suitable habitat for the species lies outside formal protected areas,** making conflict a landscape-integrated phenomenon.

Research shows that in many regions, livestock depredation and other human–leopard interactions are **spatially clustered within multi-use areas** where croplands, scrublands, and non-forest cover intermix with patches of natural vegetation. These mixed landscapes can offer both cover for leopards and access to livestock and human settlements.

1.A.2 Localized Hotspots in Human-Dominated Landscapes

Although leopards are widespread, conflict intensity varies across regions and landscape types. Several **hotspot typologies** emerge consistently in regional studies and spatial analyses:

- **Forest–Agriculture Interfaces:**

In mosaic landscapes where agriculture abuts residual forests or scrub cover, leopard depredation events cluster spatially. These edge areas create conditions where leopards and livestock are in close proximity, especially when livestock graze freely within or adjacent to these mixed habitats.

- **Plantation and High-Cover Agricultural Belts:**

High-cover crops such as sugarcane provide dense refuge that facilitates predator movement and hunting. Studies in some human-leopard conflict zones (e.g., sugarcane belts in western India) report clustering of attacks on livestock near these cover features, consistent with patterns observed in geospatial analyses of conflict locations.

- **Peri-Urban and Scrubland Zones:**

Peri-urban fringes and scrub–agriculture mosaics in semi-arid regions support leopard presence through a combination of cover, livestock, and commensal prey (e.g., dogs). Spatial mapping in urban and peri-urban contexts such as around large cities confirms frequent sightings and interactions in these human-dominated zones.

1.A.3 Major Regional Patterns - Illustrative

The following patterns have been reported in multiple regional studies or official status assessments:

- **Maharashtra (Western Agricultural Matrix):** Spatial analyses in multi-use landscapes such as parts of western India show clustering of livestock predation around sugarcane fields, water bodies, abandoned fallow lands, and grazing grounds, indicating significant conflict 'hotspots' within agricultural mosaics rather than in contiguous forests.

- **Himalayan Foothills and Mid-Hills:** Human–leopard conflict and livestock depredation in foothill mosaics (e.g., parts of the Indian Himalayan region) are documented in spatial risk mapping studies that identify pockets of elevated conflict based on landscape features.

- **Non-Forest Dominated Areas:** Habitat selection models show that a large share of leopard habitat use overlaps croplands and human-use areas where suitable cover (e.g., rocky outcrops, scrub) exists close to agricultural land, offering ecological conditions that facilitate carnivore presence outside formal reserves.

Unlike tigers, leopard conflict does not track prey scarcity alone, but shows strong alignment with **human and livestock activity patterns**.

1.A.4 Seasonal trends

- **Livestock depredation peaks during dry and post-monsoon periods**, when grazing pressure increases and livestock are more exposed.
- **Sugarcane and tall crops** create seasonal spikes in encounters by providing cover near villages.
- Human injuries occur more frequently during **early morning and evening hours**, coinciding with both leopard movement and human activity.

Season	Conflict Characteristics	Evidence
Summer (Mar–Jun)	Increased livestock grazing, higher depredation	State compensation data
Monsoon (Jul–Sep)	Dense vegetation, increased concealment	Field studies

Season	Conflict Characteristics	Evidence
Post-monsoon / Rabi	High livestock exposure near fields	Maharashtra, Uttarakhand records

Sources:
State HWC datasets; landscape-specific studies.

1.B Economic Impact of Livestock Loss

Leopard predation on livestock inflicts recurring economic costs on rural households in human-dominated landscapes, particularly where livestock husbandry involves free grazing or weak night enclosures. The financial burden arises from the **direct loss of animals**, repeated depredation over seasons, and the fact that livestock often function as both income and savings for smallholder families.

Empirical studies based on field-verified depredation records and household data demonstrate that leopard attacks can result in **measurable economic losses**, often amounting to a substantive share of household earnings.

1.B.1 Quantified losses in field studies:

- In a landscape study covering 2017–2018, researchers estimated that livestock depredation by leopards resulted in **total economic losses of approximately USD 87,818 (~₹7.3 lakh)**, with an **average annual loss per affected respondent of about USD 292.7 (~₹24,000)**. The authors found that these losses represented **between ~8% and ~24% of annual household income** in the study area.

- A separate incident dataset from central Gujarat documented **104 distinct leopard depredation events over a multi-month period, resulting in 134 livestock mortalities**. This provides concrete counts of the number of animals lost due to leopard attacks in a real-world conflict landscape.

1.B.2 Composition of livestock losses:

- In one Indian study of household respondents, **22% of 480 goats and 20% of 80 calves died due to leopard predation within a single year among compensation claimants**. The probability of a goat being killed in a given year was approximately **twice that of a calf** in this dataset.

1.B.3 Implications for households:

- These studies show that livestock predation by leopards is not an isolated, occasional event; rather, families routinely lose animals across seasons, and the **cumulative lost value** can be a **significant portion of an affected household's annual income**

- The loss of small stock can be especially consequential for marginal households that depend on goats and sheep for cash flow, savings, and risk buffering. In many rural contexts, repeated loss of livestock reduces productive capacity, increases vulnerability to debt, and can force changes in livelihood strategies.

Key insight:
Livestock depredation by leopards creates **oCSOing economic costs that go beyond simple head counts of animals killed**. These costs include recurring direct loss of productive assets, loss of labor investment in animal rearing, and downstream effects on household economic resilience. The documented share of income lost to depredation and sizeable annual per-respondent losses underscore the need to treat livestock protection as a central component of human–leopard conflict mitigation.

1.C. Indirect and secondary economic effects

Indirect costs in human–leopard landscapes often become substantial because households respond to risk by **changing livestock management**, not just absorbing the value of animals killed. The most consistently documented pathways are higher labour time, higher fodder/feeding costs, and changes in grazing behaviour.

1.C.1 Higher labour for stall-feeding and night protection

In a human-use landscape study from Maharashtra, most surveyed households had already shifted toward labour-intensive protection practices: **75% reported stall-feeding**, and **76% reported protecting smaller livestock in leopard-resistant sheds or having people sleep near livestock at night**. These practices reduce exposure, but they also imply recurrent labour costs (daily feeding, fodder collection/purchase, and night guarding) that extend across the season.

1.C.2 Reduced free grazing and associated fodder costs

Risk mapping work from the Indian Himalayan region reports that many depredation events occurred when livestock were **grazing freely within multi-use areas without supervision**, and recommends supervised grazing and management changes to reduce risk. In practical terms, shifting from free-ranging to supervised grazing and/or stall-feeding typically increases fodder demand (cut-and-carry, purchased fodder, or leased grazing), and moves the burden from "open grazing time" to "household labour + cash outlay."

1.C. 3 Household-level disinvestment in small stock in chronic hotspots

Across conflict landscapes, repeated losses and the need for intensive guarding can push households to reduce herd size or move away from small-ruminant rearing, especially where goats/sheep are kept close to settlements and are repeatedly targeted. Evidence for repeated, concentrated losses comes from multiple Indian datasets; for example, among compensation-claimant households in a Maharashtra landscape, respondents reported **22% of goats and 20% of calves dying due to leopard predation in one year** (within that claimant sample), indicating how quickly losses can accumulate for affected households.

1.C.4 Peri-urban dog losses and feedback loops near settlements

Dogs matter in two distinct ways:

1. **As prey that sustains leopard presence near people.** Work on Mumbai's urban-edge leopard system synthesizing multiple diet studies reports that dogs form a major component of leopard diet around Sanjay Gandhi National Park (dog biomass reported around **42% of diet**, with estimates that ~35 leopards could consume **~1,500 dogs/year**). This supports the mechanism that abundant dogs (often sustained by waste) can keep leopards hunting close to settlements.

2. **As guard/early-warning animals for households.** In the Maharashtra household study, domestic dogs were an outlier: leopard attacks were reported as the **dominant cause of dog mortality** in the sampled area. Loss of dogs can therefore reduce household alert capacity and perceived security, even if the same dogs can also function as prey that attracts leopards in some peri-urban settings.

1.D. Human Injuries and Fatalities

Human injuries and fatalities due to leopard attacks are **far less frequent than livestock depredation events**, but they occur consistently across India's conflict landscapes and carry **disproportionate social and administrative consequences**. Unlike major protected-area tiger attacks, many leopard attacks on people are reported from **peri-urban, agricultural, and plantation-edge settings** where leopards and humans live in close proximity.

Quantified Incidents and Trends

Peer-reviewed conflict analyses and state-level records indicate that:

- In long-term datasets from some Himalayan landscapes, the **average number of human injuries and fatalities due to leopards per year is measurable but low**. In one multi-site analysis, Pauri Garhwal (Uttarakhand) averaged about **11 injuries and 3 deaths per year between 2006 and 2016**, while North Bengal averaged about **70 injuries and 1.6 deaths per year** from leopard attacks in the same period, based on conflict incident records. These figures do not include unreported or minor injuries.

- In Himachal Pradesh, retrospective injury/death records show **approximately 30 lethal and 287 non-lethal human injuries from leopard attacks per year** in a dataset spanning 2004–2015 across multiple districts.

- Region-specific averages reported in conflict research include about **9 human attacks per year in the South Gujarat region between 2009 and 2022**, with a non-trivial share involving serious injury or death.

- Historical and longitudinal compilations note that conflict-related human fatalities from leopards have been reported consistently for decades. For example, mid-20th-century records from Uttarakhand show hundreds of deaths in earlier decades, underscoring that human–leopard conflict is not a recent phenomenon.

1.D.1 Underreporting and Record Variability

Due to differences in reporting mechanisms, surveillance effort, and record-keeping across states, official tallies likely **underestimate the true number of human–leopard injury incidents**. Many minor attacks or injuries treated outside formal medical systems never enter state compensation or conflict databases, and peri-urban incidents may be recorded in patchy ways. The published analyses cited above are based on **compiled, verified incident records and statistical modelling**, offering the most robust contemporary baselines available for specific landscapes.

Summary: Nature of Damages

Leopard–farmer conflict in India is characterised by **high-frequency livestock depredation**, predominantly affecting goats, sheep, calves, and dogs, with most incidents occurring **outside protected areas** in agricultural, plantation, and peri-urban landscapes. While individual losses are modest, repeated depredation produces substantial cumulative income loss and long-term changes in livestock

Human fatalities remain low in absolute numbers, but injuries and deaths—particularly involving children in peri-urban settings—generate disproportionate social and administrative response. Taken together, the evidence establishes leopard conflict as **economically widespread, spatially diffuse, and structurally distinct from tiger conflict**, requiring mitigation approaches tailored to human-dominated landscapes rather than protected-area edges alone.

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Section 2 -. Harm Caused to Leopards in Human–Leopard Conflict Landscapes

Human–leopard conflict is typically evaluated through impacts on people and livestock, but conflict landscapes also impose **substantial, under-documented harm on leopards themselves**. Because leopards occupy human-dominated and peri-urban environments, they are exposed to chronic risks including retaliation, accidents, capture operations, displacement, and long-term stress. These impacts occur largely outside protected areas and are therefore poorly captured in routine wildlife monitoring systems

2. A Direct Mortality of Leopards in Conflict Landscapes

Cause	Description	Key Notes
Poisoning	Pesticide-laced carcasses and deliberate baiting following depredation	Frequently misclassified or undetected
Electrocution	Illegal fencing and exposed live wires	Common in farms and plantations
Shooting	Killing during village entry or panic situations	Higher incidence in regions with firearm access
Capture-related mortality	Death during chase, darting, or transport	Risk increases under political pressure

2.B Injuries and Non-Lethal Harm from Defensive Human Behaviour

Mechanism	Typical Circumstances	Documented Effects
Mob violence	Leopards cornered in villages	Fractures, internal injuries, exhaustion
Firecrackers	Close-range deterrent use	Burns, eye injuries, hearing damage
Vehicle collisions	Roads near forest fragments and plantations	Severe injury or death

Note: Many injured animals escape initial encounters and die later from untreated trauma.

2.C Displacement, Fragmentation, and Ecological Traps

Impact Type	Mechanism	Consequence
Forced displacement	Repeated disturbance and conflict pressure	Movement into villages and peri-urban areas
Corridor disruption	Highways, railways, fencing	Increased road mortality; population isolation
Ecological traps	High dog density, livestock, plantation cover, garbage	Elevated encounter and mortality risk

2.D Physiological and Psychological Stress

Stressor	Source	Observed Effects
Chronic disturbance	Crowds, vehicles, noise, repeated chases	Reduced immunity; altered behaviour
Long-term captivity	Permanent removal from wild	Stereotypy, muscle atrophy, dental injury, reduced lifespan

2.E Population-Level Consequences

Category	Impact
Loss of breeding adults	Destabilisation of local population structure
Genetic bottlenecks	Reduced dispersal and gene flow
Behavioural distortion	Increased nocturnality, human tolerance, risk-prone foraging

2.F Harm Amplified by Public Narrative and Policy Response

Driver	Effect
“Man-eater” labelling	Rapid capture or killing without robust assessment

Driver	Effect
Politically driven interventions	Mass drives, blanket removals, unsuitable relocations
Reactive management	Increased long-term conflict risk

Sources: Case reviews; judicial observations; forest department records

Section 3 - . Why Leopards Behave the Way They Do in Human–Leopard Conflict Landscapes

Leopard behaviour in conflict landscapes is neither erratic nor anomalous. It reflects predictable ecological and behavioural responses shaped by evolutionary traits interacting with fragmented, human-dominated environments. Leopards are generalist predators with exceptional behavioural plasticity, enabling them to persist in landscapes where most large carnivores cannot. The behaviours associated with conflict arise from energetic optimisation, habitat transformation, demographic pressures, and learned responses to repeated human activity

Leopards are opportunistic carnivores capable of preying on a wide range of species, from rodents to medium-sized ungulates. Their optimal prey size, typically between 20 and 50 kilograms, closely matches common domestic animals such as goats, sheep, calves, dogs, and pigs. Small-bodied prey offer high energetic returns with lower handling risk than larger wild ungulates, and domestic animals often lack effective anti-predator behaviour. As a result, livestock depredation by leopards represents an energetically efficient foraging strategy rather than a behavioural deviation

Compared to other large carnivores, **leopards exhibit a high tolerance for human proximity**. Telemetry and camera-trap studies show that they routinely move through villages, farms, plantations, and peri-urban green spaces, often without detection. Their flexible activity patterns allow them to adjust between diurnal, crepuscular, and nocturnal behaviour in response to local disturbance. Conflict therefore arises not because leopards seek human presence, but because they are capable of functioning effectively within human-modified landscapes

Demographic processes further contribute to conflict dynamics. Leopard populations with stable or increasing numbers produce dispersing subadults, particularly males, that lack established territories and are excluded by dominant adults from high-quality habitat. Dispersal routes frequently pass through villages, plantations, canals, and urban fringes. Multiple studies indicate that a large proportion of individuals involved in high-conflict incidents are dispersing subadults rather than resident adults, explaining sudden spikes in conflict without invoking changes in aggression or temperament

Human-dominated landscapes also create ecological traps that draw leopards into areas of elevated risk. High densities of free-ranging dogs and livestock provide abundant prey, while sugarcane fields, plantations, and scrub offer concealment for movement and hunting. Garbage dumps attract prey species, and artificial water sources create predictable points of use. Although these features provide short-term foraging benefits, they substantially increase the probability of encounters with people and the risk of injury or mortality

Individual condition further shapes conflict risk. Leopards suffering from snare injuries, broken canines, limb impairments, advanced age, or nutritional stress experience reduced hunting efficiency and are more likely to shift toward low-risk, predictable prey such as livestock. While uncommon, some compromised individuals may also pose elevated risk to humans in close-contact environments. High-risk conflict behaviour is therefore more often associated with injured or debilitated animals than with healthy adults

Leopards are capable of learning from repeated interactions and demonstrate strong spatial memory. Where livestock is poorly secured, leopards may repeatedly return to the same locations. They adjust activity timing to avoid humans and preferentially use predictable movement routes such as paths, canals, and field edges. When deterrents impose no consistent cost, avoidance learning does not occur, and conflict behaviour becomes reinforced. In this way, leopard conflict is co-produced by predictable human practices and landscape design

Conflict landscapes also expose leopards to chronic stressors, including crowds, vehicles, noise, lights, and chase events. Physiological stress responses include increased nocturnality, heightened vigilance, and rapid flight behaviour. Defensive aggression may occur when escape routes are blocked. Incident reconstructions indicate that most leopard attacks on humans are defensive encounters rather than predatory events

Many serious escalations arise when basic behavioural thresholds are violated. Leopards generally avoid open confrontation and rely on cover and clear escape routes. Escalation commonly occurs when crowds surround an animal, exits are blocked, or individuals attempt close-range filming or pursuit. In such situations, conflict severity is often driven by human actions rather than leopard intent

Section 4 -. Deterrent and Mitigation Methods for Leopard–Farmer Conflict

Leopard–farmer conflict mitigation relies primarily on **preventive and non-lethal measures** due to the species' wide distribution across human-dominated landscapes. Unlike tiger conflict, which is often spatially concentrated and episodic, leopard conflict is frequent, dispersed, and cumulative. Evidence shows that no single intervention is sufficient; effectiveness depends on **scale, consistency, and coordination**

For clarity, mitigation measures are classified into **farm-level** and **community- and landscape-level** interventions.

4.A Farm-Level Interventions for Leopard Conflict

Intervention	Mechanism	Effectiveness	Key Limitations	Evidence Base
Night livestock enclosures (improved sheds)	Physical exclusion during peak activity hours	High (40–80% reduction in losses where well built and consistently used)	Construction cost; poor design; limited effect on free-ranging cattle	Strong
Modified grazing practices	Reduced exposure near forest edges and at night	Moderate	Increased fodder and labour costs; not viable for pastoralists	Moderate
Human guarding and lighting	Human presence and disturbance	Low–Moderate (short-term)	Rapid habituation; safety risks; labour intensive	Moderate
Livestock guardian animals	Alerting or deterrence	Low	Dogs frequently preyed upon; may attract leopards	Weak

4.B Community- and Landscape-Level Interventions

Intervention	Mechanism	Effectiveness	Key Limitations	Evidence Base
Collective livestock protection	Coordinated enclosures and guarding	Moderate–High	Requires cooperation and local governance	Moderate
Vegetation and attractant management	Reduced concealment and prey near settlements	Moderate	Slow impact; multi-agency coordination required	Moderate
Awareness and behavioural protocols	Reduced risky human behaviour during encounters	High (injury reduction)	Does not prevent livestock depredation	Strong
Early warning and local alerts	Advance notice of leopard presence	Moderate	Limited spatial accuracy; dependent on participation	Moderate
Reactive capture and translocation	Removal of individual leopards	Low (long-term)	Rapid replacement; stress and mortality risk	Strong (negative evidence)
Permanent removal or captivity	Elimination from landscape	Low (systemic impact)	Ethical, ecological, and welfare concerns	Moderate

4.C Comparative Evaluation of Leopard Conflict Mitigation

Intervention Type	Primary Target	Effectiveness	Key Constraints
Improved night enclosures	Livestock loss	High	Cost and construction quality
Modified grazing	Livestock loss	Moderate	Labour and fodder availability
Guarding and lighting	Livestock loss	Low–Moderate	Habituation and safety risk
Guardian animals	Livestock loss	Low	High predation risk
Collective protection	Livestock loss	Moderate–High	Social coordination

Intervention Type	Primary Target	Effectiveness	Key Constraints
Attractant management	Encounters and depredation	Moderate	Slow, requires coordination
Awareness protocols	Human injury	High	Limited effect on depredation
Early warning systems	Human encounters	Moderate	Participation dependent
Capture and translocation	Acute conflict	Low	Replacement effect
Permanent removal	Acute public pressure	Low	Long-term consequences
Compensation schemes	Economic loss	Moderate (social benefit)	No preventive effect
Landscape planning	Structural conflict	Potentially high	Long timelines, weak implementation

Evidence Synthesis

Available evidence consistently indicates that:

- **Livestock enclosure improvement** is the single most effective intervention for reducing leopard depredation.
- **Farm-level measures alone** displace conflict unless implemented collectively.
- **Community coordination** significantly improves outcomes.
- **Reactive capture and removal** provide short-term visibility but do not reduce long-term conflict due to rapid replacement of individuals.
- **Human injury risk** is most effectively reduced through awareness and behavioural protocols rather than predator removal

Section 5 - Civil Society Interventions in Leopard–Farmer Conflict

Civil society engagement in leopard–farmer conflict occupies an intermediate position between responses typically seen in tiger conflict and those associated with herbivore damage. Leopard conflict rarely triggers large-scale emergency mechanisms, yet it has attracted sustained civil society involvement because it combines **frequent livestock loss with non-negligible human safety risk**, particularly in human-dominated and peri-urban landscapes.

Civil society interventions in leopard landscapes tend to emphasise **prevention, coexistence, and institutional support**, rather than direct animal management or post-incident relief. These interventions can be broadly grouped into three functional categories.

5.A. Conflict Risk Reduction and Field-Level Support

These interventions focus on **reducing immediate risk of livestock loss and preventing escalation**, rather than responding after damage has occurred.

Typical activities include:

- Support for construction or upgrading of **predator-resistant livestock enclosures**, particularly for goats, sheep, calves, and night-held animals

- Technical guidance on **safe livestock housing design**, placement, and maintenance

- Community-level communication on safe practices and early response during leopard presence

- Informal coordination with forest staff during periods of heightened conflict

Across multiple landscapes, such measures have shown **substantial reductions in repeat livestock losses where adoption is consistent**, particularly for night-time depredation. However, coverage remains limited to selected villages or districts, and uptake is often constrained by cost, labour availability, and uneven household participation.

Key pattern: Civil society efforts prioritise **prevention and exposure reduction**, not post-loss compensation.

5.B Livelihood Protection and Coexistence-Oriented Interventions

A second category of intervention addresses the **economic vulnerability that amplifies leopard conflict**, especially among households dependent on small ruminants or free-grazing systems.

Common approaches include:

- Promotion of **stall-feeding, fodder planning, and controlled grazing** to reduce exposure
- Support for **integrated livestock and farming systems** that lower dependence on risky practices
- Encouragement of **collective livestock housing or cooperative guarding** in high-risk belts
- Awareness and training aimed at aligning livelihood practices with coexistence conditions

These interventions tend to reduce conflict **indirectly**, by lowering encounter probability and economic sensitivity to losses, rather than by influencing leopard behaviour. Their effectiveness depends heavily on fodder availability, labour capacity, and community cohesion, and they often require sustained engagement to produce durable change.

Key pattern: Livelihood-focused interventions reduce **risk and dependency**, not leopard presence.

5.C Technology, Awareness, and Institutional Support

A third set of interventions concentrates on **human behaviour, information flow, and institutional capacity**, which is particularly relevant in peri-urban and mixed-use landscapes.

These include:

- Awareness campaigns and safety communication aimed at reducing risky human behaviour
- Support to forest departments through **training, documentation, and standard operating procedures**

- Assistance in conflict recording, case documentation, and dissemination of evidence on conflict drivers

- Applied research on leopard ecology and human–leopard interaction to inform policy and planning

Such interventions are often effective in **incident management, injury-risk reduction, and longer-term policy influence**, but their benefits are typically indirect and not immediately visible at the household level.

Key pattern: These efforts strengthen systems and decision-making, rather than delivering direct loss reduction.

5.D Areas Where Civil Society Engagement Is Limited

Compared to tiger conflict, civil society involvement in leopard conflict is notably limited in several domains:

- No systematic provision of **interim livestock compensation**

- No dedicated, large-scale **leopard-specific rapid response mechanisms**

- Limited engagement in **capture, translocation, or population control decisions**

- Minimal involvement in **urban planning, land-use regulation, or infrastructure mitigation**

This reflects the prevailing framing of leopard conflict as a **diffuse coexistence challenge**, rather than an acute wildlife emergency requiring exceptional intervention.

Section 5 - What Governments in India Are Doing to Minimise Leopard–Human Conflict

Government responses to leopard–human conflict in India are shaped by the species' wide distribution across human-dominated landscapes and its frequent occurrence outside protected areas. Unlike tiger conflict, which is governed by a centralised national framework, leopard conflict management is **largely decentralised**, implemented through state forest departments, district administrations, and ad hoc coordination with municipal and revenue agencies. As a result, interventions focus primarily on **reactive response, compensation, and public reassurance**, with uneven emphasis on prevention and landscape-scale risk reduction

6.A Rapid Response and Incident Management

Most leopard-range states maintain Forest Department conflict response or rescue teams to manage sightings, livestock depredation incidents, and human injury cases. These teams are responsible for crowd control, on-site risk assessment, rescue of trapped or injured animals, and capture where deemed necessary.

Effectiveness:
Rapid response teams are effective in preventing mob violence, calming public panic, and resolving acute incidents.

Limitations:
Teams are unevenly distributed, often understaffed, and focused on incident resolution rather than prevention. Response times vary widely, particularly in rural and peri-urban areas.

6.B Physical Infrastructure and Preventive Support

Some states provide limited support for predator-proof livestock enclosures through subsidies, material assistance, or pilot grants.

Effectiveness:
Where well designed and consistently used, improved enclosures significantly reduce small-ruminant losses.

Limitations:
Coverage remains limited, design standards are inconsistent, and maintenance costs are borne entirely by households.

In peri-urban landscapes, governments coordinate with municipal bodies to clear dense vegetation, improve lighting, manage garbage, and control stray dog populations. These measures reduce encounter probability at specific sites but are typically reactive, short-term, and weakly coordinated across agencies.

6.C. Capture, Rescue, and Long-Term Holding

Forest departments frequently capture leopards following human injury incidents or intense public pressure.

Observed outcomes:
Capture may produce short-term reductions in sightings at the capture site.

Limitations:
Evidence consistently shows a strong replacement effect, with new individuals occupying vacated areas. Translocation carries high stress, injury, and mortality risks, and does not reduce long-term conflict. Rescue centres and holding facilities face capacity constraints and welfare concerns, and permanently remove breeding adults from the wild.

6.D. Preventive Community Measures

Governments conduct village awareness meetings, school programmes, and issue safety advisories during high-risk periods. These interventions reduce risky human behaviour and are particularly effective in peri-urban settings, but they do not directly reduce livestock depredation and require repeated engagement to remain effective.

Advisory support encourages night housing of livestock, avoidance of forest edges, and removal of attractants. Adoption is constrained by labour requirements, costs, and the absence of incentives or enforcement mechanisms.

6.E Habitat and Landscape Management Outside Protected Areas

Unlike tiger landscapes, there is no dedicated national programme for managing leopard habitat outside protected areas. Current approaches include limited corridor recognition in state plans and ad hoc interventions during infrastructure development.

Limitations:
Institutional authority is fragmented, and leopard habitat remains largely unrecognised in land-use planning, despite the species' heavy reliance on human-dominated landscapes.

6.F Monitoring and Technology Use

Camera traps are used primarily to confirm leopard presence and provide public reassurance. Data are rarely analysed longitudinally or integrated into early warning systems. Drones are occasionally deployed during high-profile incidents but remain reactive tools with limited operational guidelines.

6.G Policy and Institutional Framework

Leopards are fully protected under the Wildlife (Protection) Act, which prevents open hunting and trade. However, there is **no leopard-specific national framework**, no dedicated funding stream, and no standardised conflict protocols. As a result, response quality and outcomes vary widely across states.

6.H Compensation for Livestock Loss and Human Casualties

Compensation is the **primary formal policy mechanism** used by Indian states to address the economic impacts of leopard conflict on households. Payments are typically made under state forest department rules, often supported by centrally sponsored wildlife schemes, and are intended to reduce immediate distress, prevent retaliatory action, and maintain tolerance toward wildlife.

Indicative Compensation Ranges (State-Dependent)

Loss Type	Indicative Range	Basis
Goat / sheep	₹3,000–₹6,000	State forest department livestock schedules
Calf / young cattle	₹6,000–₹15,000	State forest department livestock schedules
Adult cattle	Higher ceilings than calves; approval varies	State-specific valuation and discretion
Human fatality	₹5–10 lakh	State ex-gratia norms aligned to central guidelines
Serious human injury	₹50,000–₹2 lakh	State ex-gratia norms

State notifications from Maharashtra, Uttarakhand, Himachal Pradesh, Gujarat, and Karnataka show that **livestock compensation is based on fixed schedules or capped market estimates**, revised periodically and differing by animal class and age.

Effectiveness and Structural Constraints

While compensation plays a critical stabilising role, multiple evaluations show that its effectiveness is **constrained by structural and administrative gaps** rather than policy intent.

Mismatch with market value
Independent reviews of compensation frameworks note that payments for livestock commonly fall **below prevailing market replacement value**, especially for breeding females and productive animals. This gap is particularly pronounced for goats and sheep, which function as savings assets for marginal households.

Coverage gaps in loss recognition
Across states, compensation systems typically:

- Do **not** cover veterinary treatment costs for injured animals
- Do **not** compensate for repeated partial losses (e.g., injured but surviving livestock)
- Do **not** recognise the loss of guard or companion dogs, despite their functional role in livestock protection

These exclusions are documented in both policy reviews and household-level conflict studies.

Processing delays and access barriers
Official timelines for livestock compensation often specify payment within a few weeks of verification, but field studies and audits show that **processing times vary widely**, ranging from a few weeks to several months, especially in remote or understaffed forest divisions.

Lack of preventive linkage
Compensation is generally **not linked to preventive behaviour** such as use of predator-resistant livestock enclosures, stall-feeding, or community-level coordination. Multiple policy analyses note that this weakens the incentive structure and allows conflict to persist as a recurring cost rather than being reduced over time.

Section 7 - Tiger vs Leopard Conflict — Structural Differences in Governance and Response

Human–carnivore conflict in India is often discussed as a single category, but evidence from tiger and leopard landscapes demonstrates that **conflict dynamics, governance structures, and effective responses differ fundamentally between species**.

Key Structural Differences

Dimension	**Tiger Conflict**	**Leopard Conflict**
Spatial pattern	Concentrated near protected areas	Diffuse across rural, plantation, and peri-urban landscapes
Event frequency	Low-frequency, high-severity	High-frequency, low-to-moderate severity
Primary loss	Cattle and human fatalities	Goats, sheep, calves, dogs
Governance framework	Centralised (NTCA-led)	Decentralised (state-led)
CSO engagement	Emergency response and interim relief	Livestock protection and coexistence
Policy visibility	High	Moderate to low

Governance Implications

Tiger conflict management benefits from:

- A dedicated national authority
- Central funding mechanisms
- Standardised protocols for response, compensation, and monitoring

Leopard conflict, by contrast:

- Falls between conservation and agriculture mandates
- Lacks species-specific national oversight
- Is managed reactively at state and district levels
- Relies heavily on capture and removal under public pressure

As a result, leopard conflict responses are **inconsistent, short-term, and often misaligned with ecological evidence**.

Evidence-Based Lessons Across Species

Across both tiger and leopard conflict landscapes, several consistent findings emerge:

- **Preventive measures outperform reactive removal** in reducing long-term conflict.
- **Compensation without prevention** reduces escalation but does not reduce conflict incidence.
- **Community-level coordination** is essential to avoid displacement of risk.
- **Public narrative and political pressure** strongly shape management decisions, often overriding evidence.

Section 8 - Suggested Solutions by Level: Leopard–Farmer Conflict

8. A Farm Level

- Secure night-housed livestock in predator-resistant enclosures, prioritising goats, sheep, calves, and tethered animals; close all gaps, strengthen doors, and prevent climb-in access from roofs or adjacent stacks.

- Stop high-risk grazing practices: avoid early morning/evening grazing near dense cover, scrub patches, cane/plantation edges, and nullahs; keep animals in groups with supervision and bring them back before dusk.

- Remove attractants around the homestead: keep carcasses, offal, and food waste out of open areas; keep poultry and small stock away from thickets and boundary vegetation where leopards approach unseen.

8.B Community Level

- Establish a village protocol for leopard sightings and incidents: one alert channel, designated callers, strict crowd control, no chasing, and clear safe zones for children and livestock.

- Create collective protection for small stock in hotspot belts: shared night enclosures or clustered livestock housing, rotating supervision during peak-risk weeks, and agreed rules to prevent "weak households" becoming repeat entry points.

- Reduce peri-urban drivers: improve waste handling, stop intentional feeding of dogs/wildlife, and coordinate dog management so settlements don't function as easy prey zones that keep leopards returning.

8.C CSO Level

- Standardise and train locally buildable livestock-shed designs and rapid repair skills, and support village teams to maintain them; focus on practical adoption rather than awareness-only campaigns.

- Run sustained safety education that targets the real risk moments: children walking alone at dawn/dusk, sugarcane/plantation edges, and crowding a leopard in a corner; build simple, repeatable behaviour drills with schools and RWAs.

- Support village institutions to implement compliance systems for collective action: shared enclosure rules, maintenance rosters, and a mechanism to resolve disputes when some households refuse to participate and shift risk to others.

8.D Government Level

- Make prevention financially feasible and consistent: provide subsidies for predator-resistant sheds with enforceable minimum standards, prioritise hotspot clusters, and include maintenance support rather than one-time construction.

- Improve incident management quality in human-dominated landscapes: dedicated trained teams for crowd control and safe resolution, publicly displayed contact lists, and clear jurisdiction protocols with police/municipal bodies to prevent escalation.

- Treat peri-urban leopard conflict as a multi-agency governance issue: coordinate garbage management, vegetation clearance in specific hotspots, and dog population management, with clear accountability and measurable targets at ward/division level.

2.6 Introduction: Monkey–Farmer Conflict and Types of Damage

Human–monkey conflict involving the rhesus macaque (*Macaca mulatta*), bonnet macaque (*Macaca radiata*), and, in some regions, Hanuman langur (*Semnopithecus entellus* complex)—represents one of the most widespread and persistent forms of human–wildlife conflict in India. Unlike carnivore or large herbivore conflict, primate conflict spans the full rural–urban continuum, affecting agricultural landscapes, forest fringes, villages, towns, and major metropolitan areas.

The drivers of monkey–farmer conflict are cumulative and structural. Expansion of irrigated agriculture, horticulture, and nutritionally rich crops has increased food availability, while forest degradation, loss of fruiting trees, urban growth, and widespread food provisioning have reshaped primate behaviour and population distribution. At the same time, strict legal protection under the Wildlife (Protection) Act constrains management options in densely populated rural and urban settings, intensifying everyday conflict without clear resolution pathways.

Section 1 - Types of Damage Associated with Monkey–Farmer Conflict

Monkey–farmer conflict generates multiple, overlapping forms of damage that differ in frequency, scale, and social impact from other wildlife conflicts. Damage is typically recurrent, diurnal, and group-based, producing cumulative loss rather than isolated events.

1.A Crop Damage

Crop raiding constitutes the dominant and defining impact of monkey conflict. Primates damage crops across all stages of the cropping cycle, including seed removal at sowing, vegetative damage during growth, and consumption or contamination of produce prior to harvest. A wide range of crops are affected, including cereals, pulses, oilseeds, vegetables, fruit crops, and plantation and horticultural crops, with impacts reported across subsistence and commercial farming systems.

Field studies and state-level assessments consistently report substantial seasonal yield loss in affected holdings, with repeated raids often resulting in severe cumulative damage, particularly for small and unfenced farms. While standard mesh fences are often ineffective because monkeys can climb or bypass them, electric fencing (including solar-powered options) is considered as one of the more effective methods, often reducing damage

1.A.1 Where These Conflicts Occur

Available studies and institutional reporting consistently indicate that **the majority of reported monkey conflict occurs outside protected areas**, primarily in agricultural, peri-urban, and urban landscapes. This reflects the synanthropic ecology of macaques rather than spillover from wildlife reserves. While no national proportion (e.g., “70–85%”) can be verified, multiple reviews emphasise that conflict governance falls largely outside conventional wildlife management systems.

Conflicts are recorded as mentioned below

1.A.2.Hill and Mid-Hill Agricultural Regions (North India)

Studies from **Himachal Pradesh** (Shimla, Solan, Kangra, Kullu) and **Uttarakhand** consistently document severe crop raiding by **rhesus macaques (Macaca mulatta)** affecting cereals, vegetables, and orchard crops. Research and state assessments note that conflict is concentrated in subsistence farming systems where small landholdings, proximity to forest fragments, and limited guarding capacity amplify losses.
Sources:

- Sinha & Vijayakrishnan, *Primate Conservation / Human–Monkey Conflict in India* (open review): https://pmc.ncbi.nlm.nih.gov/articles/PMC6131136/
- Uttarakhand forest department and academic case studies cited therein

1.A.3 Irrigated Plains and Canal Command Areas (Punjab–Haryana, Western UP)

In the **Punjab–Haryana plains** and adjacent western Uttar Pradesh, rhesus macaques are widely reported damaging wheat, vegetables, and fodder crops, particularly near settlements, canal belts, and village commons. Institutional reporting and field studies highlight the role of **year-round irrigated cropping**, which provides continuous forage and predictable access.
Sources:

- Down To Earth, institutional reporting on rural monkey conflict: https://www.downtoearth.org.in/governance/urban-menace-focus-on-human-monkey-conflict-management-90165
- Sinha & Vijayakrishnan (PMC review above)

1.A.4 Peninsular Rural Landscapes (Southern India)

In **Karnataka and Tamil Nadu**, conflict is primarily associated with **bonnet macaques (Macaca radiata)**. Field studies document damage to vegetables, pulses, and horticultural crops in rural and

peri-forest landscapes, often linked to fragmented habitats and long-standing human–primate coexistence.
Sources:

- ICAR-linked and regional studies on bonnet macaque ecology and crop raiding (reviewed in): https://pmc.ncbi.nlm.nih.gov/articles/PMC6131136/
- Indian Journal of Animal Sciences (bonnet macaque conflict summaries): https://epubs.icar.org.in/index.php/IJAnS/article/view/124173

1.A.5 Urban and Peri-Urban Centres

Urban and peri-urban monkey conflict is widely documented in cities such as **Delhi, Shimla, Jaipur, and Bengaluru**, where rhesus and bonnet macaques cause property damage, food theft, and human injuries. Studies emphasise that urban conflict is driven by **food conditioning, waste availability, and informal feeding**, rather than proximity to natural habitat.
Sources:

- Ministry of Environment & Forests–linked urban wildlife assessments (summarised in): https://www.downtoearth.org.in/wildlife-biodiversity/out-of-control-why-monkeys-are-a-menace-50817
- Urban ecology and public health studies reviewed in PMC article above

1.A.6 Temple, Pilgrimage, and Tourist Landscapes

Temple towns and pilgrimage centres show distinct conflict dynamics characterised by **food-conditioned aggression** and high human–monkey interaction. Studies identify religious feeding practices as a key driver of habituation, increased troop density, and aggressive encounters.
Sources:

- Primate behaviour and conflict reviews in India (PMC): https://pmc.ncbi.nlm.nih.gov/articles/PMC6131136/
- Case studies from temple towns cited in the same review

Sources:

- Sinha & Vijayakrishnan, PMC review: https://pmc.ncbi.nlm.nih.gov/articles/PMC6131136/
- Down To Earth institutional analysis: https://www.downtoearth.org.in/governance/urban-menace-focus-on-human-monkey-conflict-management-90165

Hotspots consistently align with:

- **Irrigated agriculture and horticulture belts** (continuous food availability)
- **Fruit-growing regions and orchards**
- **Religious, tourist, and informal feeding zones**
- **Urban green spaces and fragmented forests**

These associations are repeatedly observed across regional studies, though they remain **descriptive rather than quantitatively modelled**.

1.B Economic and Livelihood Impacts

Beyond yield loss, monkey conflict imposes significant indirect economic burdens on farming households. These include continuous daytime guarding, expenditure on fencing and deterrents, and long-term changes in cropping patterns away from high-value or vulnerable crops. In high-conflict regions, these pressures contribute to labour diversion, income erosion, and, in some cases, abandonment of fruit and horticultural cultivation. The scale and distribution of these impacts are analysed in detail in the Economic Impact section.

DIsproportionate Effects of Monkey - Farmer Conflict

Farming Households

- **Small and marginal farmers** experience the highest proportional losses due to limited netting or fencing capacity and reliance on family labour for guarding.
- **Orchard owners and vegetable growers** face higher absolute losses than cereal growers because of crop palatability and harvest-stage vulnerability.
- **Women and elderly farmers** are disproportionately affected due to daytime guarding responsibilities, which coincide with peak primate activity.

1.C Human Injury and Public Safety Risks

Human injury associated with monkey conflict is frequent, particularly in urban and peri-urban settings where primates are highly habituated to people and food sources. Injuries typically involve bites, scratches, or falls during encounters in farms, residential areas, and public spaces. While fatalities are rare, documented cases highlight the public safety dimension of what is often treated as an agricultural issue.

1.D Infrastructure and Property Damage

In addition to agricultural loss, monkeys cause widespread damage to roofs, water tanks, electrical wiring, solar installations, and stored food. In urban and peri-urban areas, property damage complaints frequently exceed agricultural complaints, placing additional strain on municipal grievance systems.

1. E Social and Psychological Impacts

Chronic monkey conflict contributes to farmer distress, erosion of tolerance toward wildlife, and increasing politicisation of primate management. Cultural and religious protections complicate response options, amplifying governance challenges and social tensions, particularly where economic losses remain unaddressed.

1. **F Overview: Scale and Character of Monkey–Farmer Conflict**

Impact Category	Nature of Damage	Indicative Scale
Crop Damage	Recurrent raiding across crop stages	Widespread; chronic in many districts
Economic Impact	Yield loss and indirect costs	High cumulative burden
Human Injury	Bites, scratches, falls	Frequent; underreported
Infrastructure Damage	Housing and utilities	Prominent in urban areas
Spatial Extent	Rural–urban continuum	>20 states affected
Governance Stress	Litigation and public pressure	Recurrent judicial intervention

Monkey–farmer conflict is therefore chronic, spatially expansive, and structurally embedded in India's agricultural and urban systems. Unlike episodic wildlife conflicts, primate conflict operates on a daily temporal scale, gradually eroding farm viability, household security, and public tolerance. Effective management requires approaches that address behavioural adaptation, land-use change, governance constraints, and cumulative economic impacts rather than relying solely on reactive or compensatory responses.

Sources for above section:

- https://www.downtoearth.org.in/wildlife-biodiversity/out-of-control-why-monkeys-are-a-menace-50817
- https://pmc.ncbi.nlm.nih.gov/articles/PMC6131136/
- https://www.downtoearth.org.in/governance/urban-menace-focus-on-human-monkey-conflict-management-90165

Section 2 - Harm Caused to Primates in Human–Monkey Conflict Landscapes

Human–monkey conflict generates substantial and often under-documented harm to non-human primates, including rhesus macaques, bonnet macaques, and Hanuman langurs. Because conflict occurs primarily in human-dominated rural, peri-urban, and urban landscapes, primate mortality and injury are fragmented across jurisdictions and poorly consolidated in national datasets. Harm arises largely as an unintended consequence of retaliation, deterrence, capture operations, displacement, and reactive policy responses.

2.A Categories of Harm to Primates in Conflict Landscapes

Harm Category	Mechanisms
Direct Mortality	Poisoning, illegal electrocution, airguns, improvised weapons
Capture-Related Mortality	Complications like injury, impact trauma, falling etc caused by use of darts while capturing Complications caused by heat stress, transport trauma during sterilisation/translocation
Injury from Human Deterrence	Stone-throwing, physical assault, firecrackers
Vehicle Collisions	Road and rail strikes in urban, peri-urban, and hill corridors
Displacement Effects	Forced movement from traditional ranges, troop fragmentation
Habitat Fragmentation	Roads, fencing, urban expansion disrupting daily movement
Ecological Traps	Garbage dumps, temples, markets, tourist zones
Chronic Stress	Continuous harassment, noise, crowding
Confinement & Captivity	Holding during sterilisation or relocation
Population-Level Impacts	Loss of breeding adults, reduced gene flow
Behavioural Distortion	Selection for boldness, food-conditioning

2.B. Policy-Driven and Governance-Linked Sources of Harm

Policy / Governance Factor	**Resulting Harm Pathway**	**Observed Outcome**
“Problem monkey” labelling	Blanket capture or translocation	Limited conflict reduction; elevated stress and mortality
Politically driven interventions	Rapid sterilisation or relocation without monitoring	High visibility, low long-term effectiveness

Policy / Governance Factor	Resulting Harm Pathway	Observed Outcome
Fragmented jurisdiction	Poor coordination across urban, forest, and veterinary agencies	Inconsistent welfare outcomes
Reactive enforcement	Deterrence escalates after high-profile incidents	Increased injury and retaliatory harm

Summary

Harm to primates in monkey–human conflict landscapes are cumulative, diffuse, and largely collateral rather than intentional. Mortality, injury, displacement, and chronic stress interact to distort primate behaviour, selecting for bold, food-conditioned individuals that are more likely to come into conflict with people. In the absence of coordinated governance and outcome monitoring, interventions intended to reduce conflict often intensify stress and injury while failing to address the underlying drivers of repeated human–primate interaction.

Section 3 - Why Monkeys Behave the Way They Do in Human–Monkey Conflict Landscapes

Monkey–farmer conflict is driven by predictable behavioural responses to human-modified environments rather than aberrant or aggressive tendencies. Rhesus macaques, bonnet macaques, and, in some contexts, langurs exhibit high behavioural flexibility, allowing them to exploit agricultural and urban landscapes efficiently. While these species differ in ecology and social organisation, the mechanisms driving conflict are broadly consistent across regions.

3.A Dietary Generalism and Cognitive Flexibility

Conflict-associated primates are omnivorous dietary generalists capable of exploiting both natural and anthropogenic food sources. Their diets include fruits, grains, seeds, leaves, insects, crops, and human food waste. Cultivated crops and processed foods provide high caloric returns with low foraging effort compared to wild foods.

High cognitive capacity enables primates to track crop calendars, identify vulnerable growth stages, and adjust foraging behaviour in response to human activity. Crop raiding and urban foraging therefore represent adaptive strategies that maximise energy intake while minimising effort and risk.

3.B Social Learning and Reinforcement by Human Behaviour

Primate conflict behaviour spreads through strong social learning mechanisms. Troops repeatedly target the same fields, orchards, or households, synchronise raids with predictable periods of low human presence, and transmit learned behaviours across generations.

Human actions—including intentional feeding, religious provisioning, tolerance in urban areas, and inconsistent deterrence—reinforce these behaviours. As a result, conflict patterns are culturally transmitted within troops rather than arising from isolated individuals.

3.C Population Growth and Demographic Pressure

Rhesus and bonnet macaques exhibit short inter-birth intervals, early sexual maturity, and high juvenile survival in human-dominated landscapes. Under strict legal protection and with sustained access to anthropogenic food, populations in several regions have increased over recent decades.

Growing troop sizes intensify competition for food, driving spatial expansion into farms, settlements, and urban infrastructure and increasing the frequency and scale of conflict.

3.D Human Landscapes as Ecological Traps

Agricultural fields, towns, and religious sites function as resource-rich environments offering predictable food, permanent water, reduced predation risk, and structural refuge. These features attract primates despite elevated risks of injury, capture, and mortality.

Such landscapes operate as ecological traps: they provide short-term fitness benefits while exposing primates to long-term survival costs and sustained conflict with people.

3.E Displacement-Oriented Control Alters Behaviour Without Resolving Conflict

Capture, translocation, and sterilisation programmes typically modify the spatial distribution of primates rather than reducing conflict intensity. Documented outcomes include rapid recolonisation of vacated areas, increased ranging and aggression following translocation, and disruption of social structure after partial troop removal.

In the absence of population-level planning and monitoring, these measures often displace conflict or intensify movement rather than achieving durable reduction.

3.F Stress, Harassment, and Escalation of Risk

Repeated exposure to chasing, stone-throwing, firecrackers, and crowding induces chronic stress responses in primates. Stress-related behavioural changes include heightened aggression, reduced flight distance, and increased likelihood of biting or scratching during close encounters.

Escalation in human injury risk is therefore frequently a consequence of stress-induced defensive behaviour rather than unprovoked aggression.

3.G Social Structure and Group Dynamics

Primate troops operate as cohesive social units in which dominant individuals influence foraging decisions and juveniles rapidly imitate adult behaviour. Collective raiding overwhelms individual or household-level deterrents.

Partial removal of individuals destabilises social hierarchies, often increasing unpredictability and conflict frequency rather than restoring stability.

3.H Role of Human Practices in Conflict Escalation

Conflict intensity increases when food is intentionally or unintentionally provided, crops are left unguarded during peak vulnerability, close human–primate interactions are encouraged, or deterrents are inconsistent and non-aversive. Monkeys exploit predictability and low-risk opportunities rather than actively seeking confrontation.

Human practices therefore play a decisive role in shaping both the frequency and severity of conflict.

Summary

Monkey behaviour in conflict landscapes reflects adaptive responses to abundant anthropogenic food, high learning capacity, strong social transmission, and sustained human reinforcement. Population growth, ecological traps, and chronic stress from harassment further intensify conflict dynamics. Control measures that do not alter underlying incentives or human practices tend to displace or amplify conflict rather than reduce it. Effective mitigation must therefore focus on reducing reinforcement, reshaping landscape-level rewards, and stabilising human–primate interactions, rather than relying primarily on population control or reactive interventions.

Section 4 - Deterrent and Mitigation Methods for Monkey–Farmer Conflict

Mitigation of monkey–farmer conflict requires continuous, preventive, and coordinated action. Because primates are diurnal, highly adaptive, and socially learned, deterrents that rely only on fear or harassment lose effectiveness rapidly. Measures that restrict access to food or alter incentives perform better, particularly when implemented at scales that match primate movement and learning.

For analytical clarity, mitigation measures are organised into **farm-level** and **community-level** interventions.

4.A Farm-Level Mitigation Measures

Farm-level interventions are implemented by individual households to reduce immediate crop vulnerability and repeated access to food rewards. These measures can reduce losses locally but are prone to habituation and relocation of the problem when applied in isolation.

Farm-Level Mitigation Measures for Monkey Conflict

Intervention Category	Mechanism	Indicative Effectiveness	Key Limitations
Physical barriers (fencing, netting)	Physical exclusion using fencing, nylon nets, barbed wire, or electrified fencing where legal	Moderate–High when continuous and well maintained	High cost; maintenance burden; exploitation of gaps; safety and legal concerns with electric fencing
Active guarding	Daytime human presence, watch platforms, chasing	Low–Moderate; short-term effectiveness during peak vulnerability	Labour-intensive; fatigue; high opportunity cost; rapid habituation
Visual, acoustic, and chemical deterrents	Scarecrows, reflectors, noise devices, firecrackers, chilli-based repellents	Low and short-lived; temporary displacement	Rapid habituation; safety risks; requires constant escalation
Crop choice and cropping pattern modification	Shifting away from highly attractive crops	Moderate reduction where consistently applied	Income loss; reduced crop diversity; infeasible for orchard-dependent farmers

Physical exclusion is the most reliable household-level strategy. Fear-based deterrents alone consistently fail due to primate learning and habituation. Farm-level measures reduce losses but cannot prevent repeated incursions without wider coordination.

4. B Community-Level Mitigation Measures

Community-level interventions address collective exposure, displacement, and reinforcement effects that individual farms cannot manage. These measures better align with primate movement and social learning but depend heavily on local institutions and sustained enforcement.

Community-Level Mitigation Measures for Monkey Conflict

Intervention Category	Mechanism	Indicative Effectiveness	Key Limitations
Community fencing and collective crop protection	Village-scale fencing, shared infrastructure, coordinated guarding	Moderate–High in contiguous farmland	Requires strong local governance; maintenance failure undermines system
Waste, food, and attractant management	Control of garbage, food waste, and intentional feeding	High in urban and peri-urban settings	Weak enforcement; cultural and religious resistance
Sterilisation and population management	Capture–sterilise–release programmes	Long-term only; effects visible after sustained high coverage (5–10 years)	High cost; slow impact; no short-term crop protection; capture-related risks
Awareness, behavioural protocols, and enforcement	Feeding bans, safety education, coordinated deterrence norms	High for reducing human injury risk	Limited effect on crop loss without complementary measures; enforcement dependent

Community-scale measures outperform farm-level actions by reducing displacement and reinforcement. Waste and attractant management is particularly effective in urban contexts. Sterilisation functions as a population-level tool and does not address immediate crop damage.

4. C What we can understand from the evidence

- Physical exclusion is the most dependable farm-level mitigation.
- Fear-based deterrents alone fail due to rapid habituation.
- Community coordination is essential to prevent displacement of conflict.
- Sterilisation is a long-term population strategy, not a short-term mitigation tool.

Section Summary

Monkey–farmer conflict mitigation is most effective when focused on restricting access to food rewards, coordinated community action, and sustained enforcement of attractant management. Farm-level measures can reduce losses locally but are insufficient in isolation due to primate learning and displacement effects. Community-level interventions—particularly collective fencing and waste management—offer greater long-term effectiveness but require institutional support and social consensus. Reliance on fear-based deterrents or sporadic population control consistently delivers limited and temporary outcomes.

Section 5 - Civil-Society Engagement in Monkey–Farmer Conflict

Civil-society engagement in monkey–farmer conflict differs markedly from interventions seen in carnivore-related conflicts. Because primate conflict is **chronic, high-frequency, and embedded in everyday agricultural, peri-urban, and urban settings**, non-state actors have focused primarily on **supporting mitigation, research, and governance processes**, rather than emergency response or direct animal removal. Engagement is uneven across regions and is shaped by legal protection for primates, cultural sensitivities around monkeys, and political contestation over acceptable control measures.

Most non-governmental involvement in monkey conflict operates in a **supporting or enabling role**, rather than as a primary implementing agency. Activities typically include advisory support on mitigation options, facilitation of community-level pilots, assistance with government-led population management programmes, documentation of conflict patterns, and engagement with courts and policy forums. These efforts are usually undertaken in partnership with state agencies or local institutions and are not designed for large-scale or rapid reduction of crop damage.

At the field level, civil-society actors have contributed mainly through **mitigation guidance and small-scale demonstrations**, such as advice on fencing design, deterrents, crop protection practices, and management of attractants. These interventions can reduce damage locally when combined with human presence and coordinated action, but they are inherently limited in scale and durability. As with other species, outcomes depend more on sustained maintenance and collective coverage than on the technical design of individual measures.

Non-state organisations have also played a role in **supporting government-led sterilisation and population management programmes**, particularly in northern and hill states. Available evaluations indicate that such programmes begin to influence population growth only after **several years of sustained, high-coverage implementation**, with limited short-term impact on crop damage. Civil-society involvement in this domain is largely operational or advisory and does not substitute for long-term state commitment or monitoring.

A significant contribution of civil society lies in **research, documentation, and policy engagement**. Through ecological studies, socio-economic assessments, and submissions to judicial and policy processes, non-state actors have helped shape the discourse on monkey conflict, challenged unscientific or ad hoc control measures, and highlighted governance gaps. This evidence-based engagement has influenced court directions and policy debates, even where on-ground conflict levels remain high.

In urban and peri-urban contexts, civil-society engagement has focused on **awareness and behaviour change**, particularly around feeding, waste management, and human conduct that conditions monkeys to human food sources. Such initiatives can reduce conflict locally but are constrained by weak enforcement, fragmented jurisdiction, and strong cultural practices that sustain feeding behaviour.

Notably, civil-society actors are largely **absent from several critical areas** of monkey conflict management, including compensation delivery, emergency response to crop loss, large-scale physical mitigation rollout, long-term monitoring of translocated or sterilised populations, and national-level economic valuation of losses. This reflects both resource constraints and the way monkey conflict is institutionally framed—as a diffuse agricultural or civic issue rather than a discrete wildlife emergency.

Overall, non-governmental engagement in monkey–farmer conflict has contributed to **knowledge generation, procedural accountability, and incremental local mitigation**, but it has not altered the structural drivers of conflict. Without integration into agricultural extension systems, urban governance, and sustained state-led monitoring, these efforts remain supportive rather than transformative.

Section 6 - Government Approaches to Monkey–Human Conflict in India

Government responses to monkey–human conflict in India are multi-sectoral, decentralised, and uneven. Because primate conflict occurs largely outside protected areas—across farms, villages, towns, and cities—responsibility is dispersed across forest departments, agriculture departments, municipal bodies, revenue administrations, and police. Unlike large carnivores, there is no national nodal authority or unified framework for primate conflict management; policy and operational control rest primarily with state governments.

Government action can be grouped into six functional areas: incident response, population management, preventive advisories, urban management, coordination mechanisms, and monitoring.

6.A Incident Response Mechanisms

Forest departments in most states maintain response teams tasked with handling aggressive encounters, crop-raiding incidents, and public safety risks.

Core functions include:

- capture of “problem” animals,
- facilitation of sterilisation or translocation,

- crowd control during high-risk encounters.

Response times vary widely, from hours in urban or district headquarters to several days in remote blocks, depending on staff and logistics. There is no standardised national protocol, and teams are often overstretched across multiple wildlife conflict types.

Police and emergency services support crowd control and medical response in injury cases, particularly in urban and peri-urban settings. However, awareness of reporting pathways is low in rural areas, and many minor injuries go unrecorded.

6.B Population Management Policies

Population control dominates government responses to monkey conflict, often driven by judicial directions and sustained public pressure.

6.B.1 Sterilisation Programmes

Several states operate capture–sterilise–release programmes for rhesus and bonnet macaques, implemented through forest and animal husbandry departments.

- Himachal Pradesh operates the most extensive programme, active since the early 2000s.
- Uttarakhand and Rajasthan maintain periodic sterilisation targets.

Evidence indicates that population growth slows only after sustained, high-coverage implementation over 5–10 years. Sterilisation does not reduce immediate crop loss or conflict frequency and requires continuous annual effort due to recruitment of new individuals.

6.B.2 Translocation and Holding

Temporary holding facilities and translocation to forest zones or rescue centres are used to manage acute conflict.

Short-term reductions at source locations are common, but outcomes are undermined by:

- rapid recolonisation,
- stress and mortality during capture and transport,
- disruption of troop social structure.

6.C Preventive and Advisory Measures

Agriculture departments issue advisories on crop guarding, fencing, and cropping practices to reduce vulnerability. Impact is moderate where advisories are combined with training or material support, but uptake is limited among small and marginal farmers.

Municipal bodies in several cities have issued notifications prohibiting feeding of monkeys and mandating waste control. Enforcement remains weak, particularly near religious sites and tourist zones.

6.D Municipal and Urban Conflict Management

In urban and peri-urban areas, municipal actions play a central role.

Key measures include:

- waste collection and attractant control,
- covered bins and reduced open dumping,
- urban animal care units and helplines in select cities.

Where reliably implemented, waste control has high potential to reduce troop attraction. However, service gaps, irregular collection, and entrenched feeding practices limit effectiveness. Dedicated urban wildlife units exist only in larger cities and remain patchily implemented.

6.E Inter-Departmental Coordination

Monkey conflict management requires coordination among forest, agriculture, revenue, municipal, veterinary, and police agencies. Existing mechanisms include district-level committees, joint task forces, and court-appointed panels in high-conflict states.

Effectiveness is mixed. Where coordination is formalised, outcomes improve; elsewhere, departmental silos persist. There is no national standard for coordination or accountability.

6.F Monitoring, Research, and Reporting

Compared to carnivore conflict, **systematic monitoring of primate conflict in India remains limited and fragmented**. No national framework exists for recording monkey-related crop damage, injuries, or conflict incidents, and available data are largely confined to **state- or city-specific registers**, court-mandated reporting, or research projects.

6.G State-level incident recording (limited and uneven)

A small number of states and urban administrations maintain **incident or complaint records** related to monkey conflict, primarily for administrative or legal purposes rather than ecological monitoring.

- **Himachal Pradesh** has maintained records of monkey-related crop damage and complaints through forest department registers and submissions to the High Court, particularly in the context of long-running litigation and sterilisation programmes. These records, however, are **not publicly aggregated or spatially analysed**, and are primarily used for compliance reporting rather than planning (Down To Earth; High Court proceedings).

- **Delhi (NCT)** maintains municipal and forest-department complaint registers related to monkey nuisance, injuries, and property damage, driven largely by public safety concerns. These datasets are **incident-based and urban-focused**, with no linkage to agricultural loss or population monitoring.

- **Karnataka and Tamil Nadu** record monkey-related conflict incidents sporadically through forest range offices and district administrations, typically as part of broader human–wildlife conflict registers. Available documentation indicates that formats vary by district and are **not consolidated at the state level**.

Across states, incident data are **rarely geo-tagged**, lack standard definitions of damage categories, and are seldom made publicly accessible. As a result, they do not support longitudinal analysis or comparison across regions.

Section 7 - Government Compensation and Support Mechanisms — and Policy Gaps

Compensation and support mechanisms for monkey conflict are fragmented, limited, and inconsistently implemented. The dominant impact—crop loss—falls between wildlife, agriculture, and disaster-relief frameworks, resulting in weak coverage.

7.A. Crop Loss Compensation

Routine compensation for monkey-related crop loss is largely absent nationwide.

Where compensation exists, it is typically:

- ad hoc,
- court-directed,
- district-specific,
- delayed and partial.

Examples include periodic relief announcements in Himachal Pradesh following High Court interventions and limited coverage in select districts of Uttarakhand. In most plains states, monkey-related crop loss is excluded from wildlife compensation.

7.B. Administrative Barriers

Claims fail frequently due to:

- difficulty attributing loss conclusively to monkeys,
- absence of valuation norms,
- delayed inspections,
- lack of acceptable documentation.

High transaction costs discourage reporting, leading to systematic underestimation of damage.

7.C Compensation for Human Injury and Fatality

States provide ex-gratia payments for injury and death under revenue or disaster-relief rules.

Indicative ranges vary by state:

- Fatality: ₹2–5 lakh
- Serious injury: ₹25,000–₹1 lakh

Minor injuries—especially bites and falls—are often excluded. Urban injuries are frequently treated as civic or health issues rather than wildlife conflict.

Implementation gaps include delays in certification, disputes over classification, and absence of interim relief.

7.D Preventive Subsidies and Funding

Some states provide partial subsidies for fencing or netting under agriculture or rural development schemes. Coverage is limited, waiting periods are long, and maintenance costs fall entirely on farmers. There are no primate-specific design standards.

Sterilisation programmes absorb a large share of funding but do not offset immediate livelihood losses.

7.E Insurance and Alternative Models

Formal crop insurance schemes do not explicitly cover monkey-related wildlife damage. Pilot insurance models have not scaled due to high verification costs, ambiguous attribution, and low farmer uptake.

7.E Structural Policy Gaps

Key systemic gaps include:

- absence of a national primate conflict compensation framework,
- no standard crop-loss valuation norms,
- fragmented institutional responsibility across departments,
- lack of consolidated reporting of claims and payouts.

Consequences

Inadequate compensation contributes to:

- farmer disengagement from reporting,
- increased use of illegal deterrents,
- political pressure for extreme measures,
- erosion of trust in institutions.

Government responses to monkey–human conflict rely heavily on reactive control, long-term population management, and fragmented compensation systems. While sterilisation and urban waste control have potential, they operate on long time horizons or require sustained enforcement. Crop loss—the primary livelihood impact—remains weakly addressed. Effective mitigation will require clear institutional mandates, standardised compensation norms, integration of urban and agricultural governance, and incentive-linked prevention measures. Without such alignment, monkey conflict will continue to impose cumulative economic and social costs despite sustained government intervention.

Section 8 Suggested solutions by level: Monkey - Farmer Conflict

8. A Farm level

- Use physical exclusion that matches primate behaviour: continuous electrified fencing where legally permitted, or full-height netting with an outward overhang and a smooth/climb-resistant top edge; patchy mesh fencing is a waste because monkeys climb and exploit gaps.

- Protect the most vulnerable crop stages with targeted daytime guarding, not all-season suffering: concentrate guarding on sowing/seedling stage and the 10–15 days before harvest, using a fixed watch point and coordinated chasing only when the troop enters.

- Remove farm-level attractants: store grain and fruit securely, do not leave harvested produce or culls in the open, and keep water/food waste away from field edges and labour areas.

8. B Community level

- Enforce a no-feeding norm with real consequences in the village core, schools, and temples, and back it with closed bins and regular waste pickup; as long as monkeys are being fed, farm deterrents will keep failing.

- Create a coordinated crop-protection system for the hotspot belt: one shared watch schedule during peak weeks, one alert channel, and a rule that no household "chases alone" into corners where bites and injuries happen.

- Build collective protection where farms are contiguous: a shared barrier or coordinated netting along the outer boundary of crop clusters, with a maintenance roster so the first tear or gap is repaired immediately.

8. C CSO level

- Standardise and demonstrate 2–3 proven, locally buildable barrier designs for farms and orchards, and train local repair teams; the main failure is not installation but poor specs and zero maintenance capacity.

- Run sustained behaviour-change work focused on feeding and waste practices, including temple/tourist interfaces and school zones, using local leaders and simple enforcement tools rather than one-off "awareness camps."

- Support sterilisation programmes only with quality control and monitoring: safe capture protocols, humane holding, post-release tracking of conflict complaints, and clear targets for coverage so effort isn't wasted.

8. D Government level

- Fix accountability by assigning one nodal authority at district level to coordinate forest, agriculture, municipal, veterinary, and police functions with a single complaint-to-action pathway and time-bound response standards.

- Make prevention financially feasible: subsidise approved fencing/netting designs for small and marginal farmers, include maintenance support, and prioritise hotspot belts rather than spreading funds thinly everywhere.

- Treat population management as a long-term tool with standards: sterilisation only with sustained high coverage, audited protocols, and outcome tracking; stop episodic capture/translocation cycles that merely shift the problem and increase injury risk.

2.7 Peafowl–Farmer Conflict

Peafowl–farmer conflict represents a distinct and under-acknowledged category of human–wildlife interaction in India. Unlike conflicts involving large mammals, peafowl conflict is driven by a legally protected, culturally revered species whose impacts are diffuse, chronic, and largely uncompensated.

The drivers of peafowl–farmer conflict are closely linked to landscape modification and human practices. Expansion of agriculture into scrub and grassland habitats, proliferation of irrigated cropping, availability of spilled grain and food waste, and absence of natural predators in human-dominated landscapes have enabled peafowl populations to persist and, in some areas, increase. Legal protection under wildlife law further constrains management options, reinforcing a pattern of coexistence characterised by low-level but continuous and uncompensated loss.

Section 1 - Types of Damage Associated with Peafowl–Farmer Conflict

Peafowl cause a range of impacts that differ in form and scale from those associated with large herbivores or primates. Damage is typically localised, repetitive, and concentrated during specific crop stages and particular timings of the day rather than catastrophic or sudden.

1.A Crop Damage

Crop damage is the primary and defining impact of peafowl conflict. Damage occurs at multiple stages of cultivation, including seed removal at sowing, uprooting of young seedlings, and consumption of standing crops nearing maturity. Ground-sown and low-growing crops are particularly vulnerable, as are small plots near settlements where peafowl movement is frequent.

Surveys and field studies from Rajasthan, Madhya Pradesh, Gujarat, Maharashtra, Karnataka, and Tamil Nadu consistently report peafowl presence across a large proportion of villages in affected districts, with many farming households identifying peafowl as a regular source of crop damage during peak agricultural seasons. These findings are based on district-level farmer surveys and crop-loss assessments rather than standardised statewide monitoring, and therefore reflect **high local prevalence rather than nationally comparable percentages**.

Commonly affected cropping systems include:

- rainfed cereals and pulses,
- oilseeds,
- vegetables,
- groundnut and millet-based systems,
- early-stage irrigated crops.

Field-level studies and exclusion-plot experiments demonstrate that peafowl feeding can cause **measurable seasonal yield loss** in affected plots, with damage concentrated during sowing and early vegetative stages. Losses are typically **partial rather than catastrophic**, but repeated feeding events across the cropping cycle result in cumulative yield reduction rather than a single discrete loss episode. Quantified loss estimates vary widely by crop, site, and season, reflecting the localised nature of peafowl damage and the absence of standardised assessment methods.

Conflict intensity is highest where:

- fields are small and fragmented as it is difficult for small farmers to install protective measures like netting, fences etc.
- crops are located close to villages,
- scrub patches, fallows, or commons provide roosting sites.

Losses are often partial rather than total, but repeated feeding can significantly reduce yields over a season. Because damage is dispersed and incremental, it is difficult to quantify precisely and is rarely captured through formal assessment mechanisms.

1.B Damage to Kitchen Gardens and Homestead Cultivation

Peafowl frequently target kitchen gardens, household vegetable patches, and backyard cultivation, particularly in villages and peri-urban areas. Such losses directly affect household food security rather than market income, amplifying their perceived impact. Because these losses occur outside formal agricultural fields, they are almost never reported or compensated.

1.C. Economic and Labour Impacts

Beyond direct crop loss, peafowl conflict imposes indirect economic costs on farming households. These include increased labour for daytime guarding, reduced planting of preferred or nutritionally important crops, and expenditure on low-cost deterrents. For small and marginal farmers, these indirect costs can outweigh the value of the crops lost, particularly in rainfed systems with narrow profit margins.

1.D Infrastructure and Nuisance Impacts

In some settings, peafowl contribute to minor infrastructure damage, including disturbance of thatched roofs, contamination of stored grain, and fouling of water sources. While these impacts are secondary compared to crop damage, they contribute to daily inconvenience and negative attitudes, particularly where peafowl congregate near human habitation.

1.E Social and Governance Dimensions

Peafowl conflict is shaped by strong cultural, religious, and legal constraints. Reverence for the species and its status as the national bird limit both formal control measures and informal deterrence. Farmers frequently report reluctance to complain or seek intervention, leading to under-documentation of impacts and limited policy attention. This combination of cultural protection and economic loss places peafowl conflict in a governance grey zone, where impacts are widely experienced but weakly acknowledged.

Overview: Character of Peafowl–Farmer Conflict

Dimension	Characteristics
Primary impact	Crop and garden damage
Temporal pattern	Diurnal; seasonal peaks linked to sowing and grain formation
Spatial pattern	Villages, agricultural interiors, peri-urban areas
Economic profile	Low per-incident loss; high cumulative burden
Reporting	Minimal; largely informal
Governance response	Limited; largely advisory

Peafowl–farmer conflict is therefore best understood as a form of chronic agricultural attrition rather than acute wildlife damage. Its impacts accumulate gradually, fall disproportionately on smallholders, and remain poorly integrated into existing compensation or mitigation frameworks. Effective management will require approaches that acknowledge the unique legal, cultural, and behavioural context of peafowl conflict while addressing its cumulative economic and labour costs.

2. Where These Conflicts Occur

Peafowl–Farmer Conflict: Geographic Spread and Evidence

Peafowl–farmer conflict is widely reported across agricultural interiors in India and is **not confined to forest-edge landscapes**. Evidence from exclusion-plot experiments near the Chulannur Peafowl Sanctuary in Kerala demonstrates substantial yield differences between protected and unprotected plots, confirming that peafowl foraging can translate into measurable crop loss at the field scale. (upto 40% on average between protected plots and unprotected plots)

Survey-based studies from cultivated landscapes further indicate that farmers frequently identify peafowl as regular crop-raiding species, especially in villages with long-established local populations.

These reports consistently place conflict within **semi-arid, rainfed, and mixed-irrigation systems**, where open fields, scattered tree cover, and proximity to settlements facilitate repeated incursions .

Across states, peafowl-related crop damage is typically recorded through **local studies, farmer complaints, and institutional or media reporting**, rather than through formal state-level mapping or standardised agricultural databases. As a result, while peafowl conflict has been documented from multiple regions and states, **no comprehensive national dataset exists** to quantify its full geographic extent or aggregate economic impact .

Peafowl conflict is increasingly reported in **peri-urban belts and expanding towns**, particularly where urban growth overlaps with agricultural land or scrub. Municipal complaint records and local studies from cities such as Jaipur, Udaipur, Coimbatore, Mysuru, and parts of Delhi NCR indicate rising reports of peafowl-related nuisance and garden damage over the past decade.

In peri-urban settings:

- conflict is linked to ornamental plants, lawns, and small vegetable patches,
- food waste and grain spillage increase attractants,
- peafowl exhibit high tolerance of human presence.

While per-incident damage is small, complaint frequency is high, placing strain on municipal grievance systems not designed for wildlife conflict.

Section 2 - Harm Caused to Peafowl Due to Conflict

Harm to peafowl in agricultural and settlement landscapes occurs through multiple pathways, most of which remain poorly documented in official records. While direct mortality and injury are intermittently recorded through veterinary or forest department channels, sub-lethal impacts, habitat displacement, and reproductive effects are largely inferred from field observation rather than systematically measured. The absence of standardised reporting mechanisms and the cultural status of peafowl contribute to persistent underreporting of animal welfare and population impacts, even where crop damage is widely acknowledged.

Category of Harm	Primary Mechanisms	Typical Contexts	Evidence Base	Key Limitations

Direct Mortality	Poisoning via pesticide-laced grain; electrocution from illegal fencing or lines; vehicle collisions; entrapment in netting or wire	Agricultural interiors, village edges, peri-urban roads	Local veterinary records, forest department case files, rescue reports	No national mortality estimates; reporting is incidental and incomplete
Injury from Deterrence and Harassment	Stone throwing; chasing with vehicles or dogs; firecrackers and noise devices; improvised barriers	Crop fields, homesteads, village commons	Wildlife veterinarians, rescue centres, field observations	Many injured birds are never recovered or reported
Sub-lethal Harm and Chronic Stress	Repeated disturbance; displacement from feeding and roosting sites; increased flight and vigilance	Intensively farmed landscapes; high human activity zones	Field observations; veterinary and behavioural accounts	Stress impacts are rarely quantified
Habitat Displacement and Ecological Traps	Loss of scrub and commons; shift to crop fields, temple areas, roadsides	Agricultural expansion zones; settlement fringes	Land-use studies; ecological observations	Difficult to isolate effects from broader land-use change
Reproductive Impacts	Nest disturbance; trampling; predation by dogs; farming operations	Ground-nesting sites near fields and villages	Field reports; indirect inference from breeding ecology	Lack of systematic nesting success data
Institutional Blind Spots and Underreporting	Absence of reporting incentives; jurisdictional	Across rural, peri-urban, and urban settings	Governance reviews; conflict	Animal harm largely invisible

	ambiguity; cultural reluctance		reporting practices	in official statistics

Section 3 - Why Peafowl Behave the Way They Do in Agricultural Landscapes

Peafowl behaviour in agricultural landscapes reflects predictable ecological responses to human-modified environments rather than anomalous or aggressive tendencies. The species combines opportunistic foraging, tolerance of human presence, and strong site fidelity, allowing it to exploit farming systems that provide reliable food, water, and shelter. Legal protection and cultural reverence further reduce deterrence pressure, reinforcing patterns of repeated use of agricultural and village spaces.

3. A. Opportunistic Foraging

Peafowl are omnivorous ground foragers with a broad diet that includes seeds, grains, shoots, insects, small reptiles, and cultivated crops. Agricultural fields offer concentrated and easily accessible food, particularly during sowing and early growth stages when seeds and seedlings are exposed.

Compared to natural scrub or grassland foraging, crop fields provide:

- higher caloric return per unit effort,
- predictable seasonal availability,

This makes agricultural landscapes energetically efficient foraging environments, especially in semi-arid and fragmented habitats.

3.B. Diurnal Activity and Visual Foraging Advantage

Peafowl are strongly diurnal and rely on visual cues while foraging. Open agricultural fields and village surroundings provide clear sightlines that allow birds to detect both food and approaching disturbance.

Daytime activity coincides with periods when:

- crops are exposed,
- guarding is intermittent and human presence is normalised rather than threatening.

As a result, peafowl can forage repeatedly with relatively low perceived risk.

3.C High Tolerance of Human Presence

Unlike many wildlife species, peafowl exhibit high tolerance of people and human activity. Long-term coexistence in villages, temples, and agricultural interiors has reduced flight responses, particularly where birds are not actively persecuted.

Cultural protection and social norms discourage lethal or aggressive responses, lowering risk thresholds and enabling peafowl to forage close to houses, fields, and roads.

3.D Landscape Change and Habitat Compression

Expansion of agriculture, loss of scrub and grassland, and degradation of village commons have reduced natural foraging and nesting habitats. Peafowl compensate by expanding use of croplands, fallows, and homestead spaces.

This is not a shift toward agriculture by preference alone, but a response to:

- reduced availability of native forage,
- fragmentation of traditional habitat,
- increased continuity of food within farms.

3.E. Site Fidelity and Repeated Use of Fields

Peafowl exhibit strong site fidelity, repeatedly using familiar foraging areas and roosting sites. Once a field or village plot is identified as a reliable food source, birds return across seasons and years.

This behaviour leads to:

- repeated damage to the same holdings,
- concentration of conflict in specific villages,
- perception of increasing abundance even when populations are stable.

3.F Social Learning and Group Foraging

Peafowl frequently forage in small groups, particularly females and juveniles. Observational learning allows birds to quickly identify safe feeding locations and adjust behaviour in response to deterrents.

Deterrence that is inconsistent or non-aversive is rapidly discounted, reinforcing continued use of agricultural areas.

3.G Reduced Predation Pressure in Human Landscapes

Human-dominated landscapes offer lower predation risk compared to natural habitats. Predators are scarce near villages and fields, while tall trees, buildings, and utility structures provide roosting and lookout points.

Reduced predation pressure allows peafowl to allocate more time to foraging and less to vigilance, increasing feeding efficiency in farms.

Section 4 - Deterrent and Mitigation Methods for Peafowl–Farmer Conflict

Peafowl conflict mitigation relies primarily on **non-lethal, preventive measures**, as legal protection and cultural norms strongly limit control options. Because peafowl are diurnal, visually oriented, and tolerant of human presence, deterrents based solely on disturbance tend to lose effectiveness over time. Measures that **restrict access to food or alter field-level incentives** perform better, especially when applied collectively.

For clarity, mitigation measures are grouped into **farm-level** and **community-level** interventions.

4.A Farm-Level Mitigation Measures

Farm-level measures are implemented by individual households to reduce immediate crop vulnerability. These measures can lower losses locally but are prone to habituation and displacement when used in isolation.

Table: Farm-Level Deterrent and Mitigation Measures for Peafowl Conflict

Intervention Category	Mechanism	Indicative Effectiveness	Key Limitations
Physical barriers (netting, fencing)	Nylon nets, low fencing, mesh barriers around plots or seed beds	Moderate; effective for small plots and kitchen gardens	Costly for large fields; requires maintenance; birds may bypass gaps
Crop covering at sowing	Temporary covering of seed beds with nets, mulch, or crop residue	Moderate–High during sowing stage	Labour-intensive; limited to early stages

Intervention Category	Mechanism	Indicative Effectiveness	Key Limitations
Active daytime guarding	Human presence, chasing, visual deterrence	Low–Moderate; short-term	High labour cost; rapid habituation
Visual deterrents	Reflective tape, flags, scarecrows	Low; temporary displacement	Very rapid habituation
Acoustic deterrents	Noise, clappers, firecrackers	Low; episodic effectiveness	Disturbance to people; short-lived
Crop choice and timing adjustment	Avoiding highly vulnerable crops or adjusting sowing windows	Moderate where feasible	Income trade-offs; limited flexibility
Kitchen garden protection	Net enclosures, raised beds	High for household plots	Initial cost; maintenance

Farm-level Summary
Physical exclusion and seed-stage protection are the most reliable household measures. Visual and acoustic deterrents alone are consistently ineffective over time.

4.B Community-Level Mitigation Measures

Community-level interventions address **shared exposure, reinforcement, and displacement**, and align better with peafowl movement and learning. These measures require coordination and local governance but offer greater durability.

Table: Community-Level Deterrent and Mitigation Measures for Peafowl Conflict

Intervention Category	Mechanism	Indicative Effectiveness	Key Limitations
Collective fencing or netting	Village- or hamlet-scale barriers around clustered fields	Moderate–High where continuous	Requires coordination; maintenance failures undermine effectiveness
Coordinated guarding schedules	Rotational guarding across adjacent fields	Moderate	Social coordination challenges; fatigue
Management of attractants	Control of spilled grain, waste, and intentional feeding	High in villages and peri-urban areas	Cultural resistance; weak enforcement
Crop zoning and buffer planting	Locating vulnerable crops away from village edges; use of less palatable buffers	Moderate	Requires planning; not always feasible
Commons and roost management	Managing scrub, roost trees, and fallows near fields	Moderate	Long-term; requires institutional support
Awareness and local norms	Agreed rules discouraging feeding and unsafe deterrents	Moderate for injury reduction	Limited impact on crop loss without physical measures

Community-level summary:
Collective measures reduce displacement and reinforcement effects that undermine farm-level actions. Attractant management is particularly important in village and peri-urban settings.

4.C Evidence Summary

Measure Type	Durability	Primary Benefit
Physical exclusion	High	Direct reduction in crop access
Visual/acoustic deterrents	Low	Temporary displacement
Crop-stage protection	Moderate–High	Reduced seed and seedling loss
Community coordination	High	Reduced displacement and repetition
Attractant management	High	Lower baseline conflict levels

Section 5 - CSO Engagement

CSO engagement in peafowl–farmer conflict is minimal and largely indirect. While some interventions incidentally reduce vulnerability through agricultural or commons management, there is no dedicated CSO-led framework for peafowl conflict mitigation, documentation, or compensation advocacy. The combination of cultural reverence, legal protection, and perception of peafowl damage as tolerable or routine has resulted in a significant institutional blind spot. Consequently, farmers bear cumulative losses with limited external support, and peafowl conflict remains weakly integrated into both wildlife and agricultural policy discourse.

5.A. Farm- and Village-Level Mitigation Support (Indirect)

Some CSOs working on sustainable agriculture, biodiversity-friendly farming, or rural livelihoods provide **indirect support** that incidentally reduces peafowl conflict.

CSO Type	**Nature of Intervention**	**Relevance to Peafowl Conflict**	**Limitations**
Agroecology and sustainable farming CSOs	Promotion of crop diversification, mulching, altered sowing practices	Can reduce seed-stage exposure and attractiveness	Not designed specifically for peafowl
Rural development CSOs	Support for kitchen gardens, fencing, and commons management	Localised reduction in damage	Small scale; not conflict-focused
Watershed and land restoration CSOs	Scrub regeneration, commons protection	Potential long-term habitat buffering	Indirect; slow impact

5.B Research, Documentation, and Evidence Generation

CSO and academic research organisations contribute primarily through **documentation rather than intervention**.

Organisation Type	**Contribution**	**Impact**
Conservation research CSOs	Studies on peafowl ecology, distribution, and habitat use	Improves understanding but rarely informs policy

Organisation Type	Contribution	Impact
Agricultural universities and ICAR-linked bodies (with CSO collaboration)	Field studies on crop damage and farmer perception	Localised; not scaled

5.C Awareness and Coexistence Messaging

In select regions, CSOs have engaged in **low-intensity awareness efforts**, particularly around:

- discouraging feeding near villages and temples,
- promoting tolerance narratives,
- highlighting the cultural and ecological value of peafowl.

Actor	Activity	Effectiveness
Local biodiversity CSOs	Village meetings, school outreach	Low–Moderate
Temple-linked civil society groups	Informal feeding regulation	Variable

5.D What CSOs Do Not Commonly Do in Peafowl Conflict

Compared to other wildlife conflict contexts, CSOs are largely absent from:

- rapid response or emergency handling,
- compensation facilitation or interim relief,
- large-scale deterrent deployment,
- population monitoring or management,
- litigation or policy advocacy specific to peafowl.

This absence is not accidental; it reflects the classification of peafowl conflict as **low-risk, low-priority, and culturally sensitive**, despite its wide geographic spread.

5.E Comparative Perspective: CSO Engagement Across Conflict Types

Conflict Type	**CSO Engagement Level**	**Primary CSO Role**
Elephant / Tiger	High	Emergency response, compensation support, coexistence
Monkey	Moderate	Sterilisation support, policy advocacy, urban awareness
Nilgai / Wild Boar	Low–Moderate	Mitigation pilots, policy advocacy
Peafowl	**Very low**	Indirect, non-specific engagement

Section 6 - Government and Policy Responses to Peafowl Conflict

Government responses to peafowl–farmer conflict in India are limited, fragmented, and largely indirect. Unlike conflict involving large mammals, peafowl conflict has not been institutionalised within wildlife management or agricultural risk frameworks. Responsibility is diffused across forest departments, agriculture departments, and local governments, with no dedicated policy instruments, compensation norms, or mitigation programmes designed specifically for peafowl.

The legal, cultural, and symbolic status of the peafowl strongly shapes this policy vacuum.

6.A - Legal Status and Its Policy Implications

The Indian peafowl is listed under **Schedule I of the Wildlife (Protection) Act, 1972**, affording it the highest level of legal protection. This status:

- prohibits killing, capture, or trade,
- restricts even aggressive deterrence in practice,
- places enforcement responsibility primarily with forest departments.

While this protection reflects conservation and cultural priorities, it also constrains the range of management tools available in agricultural interiors and villages where peafowl conflict occurs daily. Unlike species notified as vermin or “problem animals” in specific contexts, peafowl are not subject to population control or removal measures under current law.

6.B Absence of Species-Specific Conflict Policy

There is **no national or state-level policy framework** addressing peafowl–farmer conflict. Key gaps include:

- no species-specific mitigation guidelines,
- no standard operating procedures for field staff,
- no earmarked budget lines,
- no monitoring or reporting mandates.

As a result, peafowl conflict is typically subsumed under general advisories on crop protection or treated as a local nuisance rather than a wildlife conflict requiring structured intervention.

6.C Role of Forest Departments

Forest departments play a limited operational role in peafowl conflict management. Their involvement is largely restricted to:

- responding to injury or mortality reports,
- rescuing injured birds,
- enforcing legal protection where harm is reported.

Routine crop damage, kitchen garden loss, or nuisance complaints rarely trigger formal forest department action, particularly outside protected areas. Staff capacity and mandate are oriented toward conservation and enforcement rather than agricultural conflict mitigation.

6.D Agriculture and Rural Development Responses

Agriculture departments do not treat peafowl damage as a distinct category of crop loss. Existing advisories focus on general crop protection measures such as fencing, netting, or sowing practices, without species-specific adaptation.

There are:

- no peafowl-specific extension modules,
- no dedicated subsidies for peafowl mitigation,
- no integration with crop insurance or compensation schemes.

Consequently, farmers rely almost entirely on self-funded deterrents and informal coping strategies.

Section 7 - Compensation and Relief Mechanisms

Routine compensation for peafowl-related crop loss is **largely absent**. Unlike elephant, carnivore, or even monkey conflict, peafowl damage is rarely eligible for ex-gratia relief.

Where relief has occurred, it is typically:

- Court-directed
- limited to specific districts or periods.

The absence of valuation norms and attribution protocols further limits the feasibility of compensation. As a result, most peafowl-related losses remain unreported and uncompensated.

Summary of Government Response Characteristics

Dimension	**Current Status**
Legal framework	Strong protection; no management flexibility
Species-specific policy	Absent
Compensation	Rare; ad hoc
Mitigation support	General advisories only
Institutional ownership	Fragmented
Monitoring and reporting	Minimal

7. A Economic Impacts, Compensation Gaps, and Policy Failures in Peafowl–Farmer Conflict

Peafowl–farmer conflict generates **persistent, cumulative economic losses** that differ structurally from conflicts involving large mammals. Damage is typically **partial, repeated, and spread across many households**, rather than catastrophic in individual incidents. Losses occur most often at sowing and early vegetative stages and are concentrated in small fields, kitchen gardens, and subsistence plots. In addition to yield reduction, farmers incur **indirect costs** through repeated guarding, labour diversion, and low-cost deterrence. Because these losses accrue incrementally and are rarely total, they are frequently absorbed without formal reporting, leading to systematic underestimation of impact.

Existing **compensation and insurance systems are poorly aligned** with this loss profile. Wildlife compensation frameworks prioritise discrete, high-impact events, while crop insurance relies on area-based yield assessments that cannot capture localised, wildlife-driven attrition. As a result, peafowl-related losses are **largely excluded from routine compensation and insurance coverage**. Where relief has occurred, it has typically been court-directed, temporary, and subject to low payout ceilings and administrative delay. There are no standard valuation norms for repeated partial damage, kitchen garden loss, or labour costs, rendering most economic impacts institutionally invisible.

These compensation gaps reflect a deeper **policy recognition failure**. Peafowl conflict is not formally acknowledged as a distinct category within human–wildlife conflict governance. Strong legal protection exists, but without corresponding management tools, monitoring systems, or mitigation standards for agricultural interiors. Responsibility is fragmented across wildlife, agriculture, and local governance institutions, resulting in unclear ownership, inconsistent responses, and default inaction. In practice, mitigation responsibility is devolved almost entirely to farmers, producing uneven, labour-intensive, and often ineffective outcomes.

Cultural reverence for peafowl further constrains policy response. While social tolerance supports species conservation, it also discourages candid assessment of economic harm and limits experimentation with management options. The absence of systematic monitoring, applied research, and landscape-level planning means that conflict is addressed—where at all—at the level of individual complaints rather than structural drivers. The net result is a **governance blind spot**: widespread, chronic economic loss persists without recognition, measurement, or coordinated response.

Section 8 - Actionable recommendations for peafowl–farmer conflict

8. A Farmer and village level

- **Protect the first 3–4 weeks**: concentrate guarding and deterrence during sowing and early vegetative stages (where most loss occurs), instead of attempting full-season vigilance.

- **Reduce attractants near fields**: avoid leaving grain to dry in open areas; secure feed and spilled grain; manage compost/food waste near homes and field edges (peafowl learn predictable food sources fast).

- **Targeted physical protection for high-value plots**: use netting or simple barriers for **kitchen gardens, nurseries, and small vegetable patches** (where protection is feasible); avoid overpromising field-scale fencing.

- **Coordinate at hamlet scale**: rotate daytime watch in peak weeks; agree “no-feeding near fields” norms around temples/schools; maintain a shared log of damage days to identify peak windows and repeat routes.

8. B CSO and community institutions

- **Demonstration + maintenance model**: run small, replicable pilots for kitchen-garden protection and attractant management, with follow-up visits focused on maintenance and behaviour change (not one-time distribution of materials).

- **Simple village reporting kit**: one-page photo-based reporting format (crop stage + location + date + estimated area affected), compiled monthly. Goal: create evidence without heavy burden.

- **Support local rule-making**: facilitate village agreements on feeding practices and grain drying/storage norms in high-conflict pockets, especially around temples and peri-urban settlements.

- **Link to grievance systems**: help villages route complaints consistently to the correct department and maintain documentation (because fragmented jurisdiction is a major barrier).

8. C Government and department level

- **Official recognition in HWC reporting**: include peafowl as a standard category in district conflict registers, with a minimal template (location, crop stage, area affected, repeat frequency). Make geo-tagging optional but encouraged.

- **Micro-mitigation grants for vulnerable plots**: small, fast grants or subsidies for **kitchen gardens, nurseries, and seedling-stage protection** (netting/materials), delivered through panchayats or agriculture extension.

- **Pilot "cumulative loss" assessment**: in 2–3 high-conflict blocks, test a **seasonal, area-based verification** approach (multiple small damages rolled into one seasonal assessment) instead of incident-by-incident verification.

- **Clear institutional ownership**: issue a district-level SOP that assigns: agriculture extension = prevention guidance, local bodies = attractant management and community coordination, forest department = wildlife interface and enforcement of illegal harm. Without this, nothing sticks.

- **Behavioural risk management in peri-urban/temple zones**: enforce feeding and waste rules where feasible (signage + penalties only where administration can actually sustain it), coupled with predictable municipal waste control.

3. Civil Society Organizations in Human–Animal Conflict

1. Field Roles, Responsibilities, and Boundaries

Human–animal conflict unfolds in complex landscapes where communities live with daily risk, wildlife adapts to changing conditions, and government systems often operate within administrative limits. In this context, CSOs play an important role, but not as substitutes for the State or for community institutions. Their value lies in enabling informed decision-making, strengthening safety, supporting community-led processes, and contributing to long-term reform.

2. Use Shared Knowledge as a Foundation

Before initiating field interventions, CSOs should ground their work in established knowledge of species behaviour, conflict patterns, escalation dynamics, and risks associated with various responses. This reduces dependence on anecdotal experience and avoids repeating mistakes that have already caused harm elsewhere.

Conflict differs across regions, species, and seasons. No measure is universally applicable. CSOs must treat knowledge as guidance for narrowing options and identifying risk, not as a fixed template for action.

3. Enable Responsible Innovation and Learning

Innovation is often necessary where formal systems are slow or limited. However, experimentation must be responsible. Interventions should be grounded in prior understanding, designed to minimise harm, and monitored closely. Adjustments must be made when unintended consequences appear.

Learning should be treated as a public good. Approaches that show success or failure should be documented and shared so that other communities do not face avoidable risk.

4. Conduct Rapid and Context-Specific Assessments

Before recommending any intervention, CSOs should undertake a rapid but careful assessment of the local situation. This includes identifying the species involved, patterns of movement, timing of encounters, types of damage, existing community responses, and local decision-making structures.

Without such grounding, even well-known mitigation practices may fail or increase risk. Assessment functions as a safeguard for both communities and wildlife.

5. Support Informed Collective Decision-Making

Durable solutions are those that communities choose, maintain, and adapt themselves. CSOs are most effective when they provide information, clarify risks, and support collective discussion rather than prescribing fixed solutions.

Interventions should align with local capacity and willingness to maintain them. Promoting a small number of clearly chosen and manageable practices is often more sustainable than introducing multiple simultaneous measures.

Communities must be recognised as co-managers of shared landscapes. Participation must go beyond consultation and support genuine decision-making authority at the local level.

6. Reduce Harm by Phasing Out Dangerous Practices

In many conflict landscapes, communities use methods that are unsafe, illegal, or counterproductive, often because safer alternatives are unavailable or unknown. CSOs can help communities understand the risks associated with such practices and transition toward safer approaches.

This shift should be gradual and respectful. The objective is harm reduction, not enforcement. Explaining why certain methods increase danger is as important as proposing alternatives.

7. Act as a Bridge Between Communities and Public Institutions

Administrative delays, unclear responsibilities, and poor coordination frequently intensify frustration and mistrust. CSOs often play a bridging role by facilitating communication, supporting documentation, following up on cases, and helping clarify procedures.

This role can help prevent resentment from escalating into retaliation and can make existing systems function more predictably.

8. Document Patterns and Strengthen Evidence

Individual incidents are easily overlooked; patterns are harder to ignore. CSOs contribute significantly by documenting conflict trends, identifying hotspots, tracking procedural delays, and recording outcomes of interventions.

Such documentation supports dialogue with government agencies, strengthens advocacy for reform, and improves collective understanding of what works and what fails.

9. Address Inequality in Exposure and Impact

Conflict does not affect all households equally. Women, landless labourers, Dalit communities, Adivasis, migrant workers, and elderly residents often face greater exposure and fewer coping options.

CSO engagement must therefore be inclusive. Listening separately to different groups when necessary, recognising unequal risk, and ensuring participation beyond dominant landholders leads to more accurate assessments and fairer outcomes.

10. Support Long-Term Reform and Community Stewardship

Civil society has a broader role in advocating for decentralised, rights-based reforms that strengthen prevention, accountability, and equitable cost-sharing. This includes supporting community stewardship, encouraging safe living practices, and helping revive or adapt locally relevant mitigation approaches after assessing their safety and feasibility.

Field experience should feed into policy dialogue so that structural reforms reflect ground realities.

11. Recognise the Limits of the CSO Role

Clear boundaries protect long-term effectiveness. CSOs should avoid substituting for government responsibilities or becoming permanent intermediaries for compensation processes. Introducing technology without maintenance plans or encouraging high-risk confrontation undermines sustainability and safety.

The role of CSOs is to enable, support, document, and advocate, not to replace institutions that carry statutory responsibility.

Conclusion

Human–animal conflict requires cooperation across communities, civil society, and government. CSOs contribute most effectively when they strengthen informed community choice, reduce harm, build evidence, and support reforms that devolve authority and share costs fairly.

When civil society action is grounded in responsibility, inclusiveness, and institutional clarity, it helps move coexistence from aspiration to practical, safer, and more just reality in shared landscapes.

4. Reforming Public Policy for Human–Animal Conflict in Agriculture

Human–animal conflict in agriculture is often described as a problem of animals entering human spaces. This framing hides the more fundamental reality: what has failed is governance of shared landscapes. Across regions and species, conflict persists and spreads because policy design, institutional coordination, and implementation discipline remain inadequate.

This chapter consolidates the core governance failures and sets out a focused agenda for national and state governments, with decentralised authority and accountability as central principles.

1. The Problem Has Been Misframed

Current policy rests on an outdated assumption that conflict occurs at forest margins when animals stray into farms and can be managed mainly through containment, removal, or compensation. In reality, much conflict now occurs in long-settled agricultural and plantation landscapes where wildlife is a permanent presence. Treating conflict as an exception produces reactive, episodic action and often displaces risk from one village or division to another rather than reducing it.

At the same time, public and policy attention is disproportionately driven by incidents linked to human deaths, while the everyday agrarian burden is dominated by high-frequency crop-raiding species whose impacts are cumulative and often underreported.

2. Governance Failures That Reproduce Conflict

2.1 Absence of landscape-level governance

Wildlife movement cuts across farms, estates, villages, and infrastructure networks. Government action remains tied to beats, ranges, districts, and departmental mandates that rarely match ecological reality. Fragmented actions by different authorities and landholders frequently deflect animal movement and shift damage into neighbouring communities. Without binding mechanisms for coordination before major interventions, well-intentioned actions can worsen conditions.

2.2 Sequencing failures that turn intervention into escalation

A persistent implementation failure is acting out of sequence. Capture, translocation, or removal is often undertaken before addressing access routes, corridors, and attractants. Predictably, new individuals move in and conflict expands spatially, sometimes into areas with little prior experience.

These outcomes are preventable, but current systems rarely enforce sequencing protocols or assign responsibility when poor sequencing causes harm.

2.3 Compensation used as a substitute for prevention and responsibility

Compensation is necessary, but it has become the central instrument of conflict management. Payments are often delayed and inadequately designed for cumulative loss, preventive effort, and the psychological burden of living with constant risk. Budgets are absorbed by payouts, leaving insufficient investment in prevention, maintenance, and early warning. Inequities are pronounced for smallholders, landless households and those facing chronic crop-raiding losses, which erodes trust in conservation and government.

Crop insurance recognises wildlife damage under PMFBY localised risk cover, but strict timelines, digital dependence and uneven implementation exclude many farmers and fail to account for cumulative losses from high-frequency species.

2.4 Fragmented institutions and diffuse accountability

Human–animal conflict sits at the intersection of forest, agriculture, revenue, infrastructure, police and local governance. These systems largely operate in isolation, with poor data integration across movement patterns, land use, cropping and compensation. Farmers are left carrying paperwork and information between offices that do not coordinate. Because responsibility is dispersed, accountability is weak and failures repeat.

2.5 Data blindness and reactive budgeting

There is no comprehensive, standardised system for tracking incidents across India. Compensation records capture only a fraction of real losses and chronic, low-intensity damage is vastly underreported. Without reliable data, policy remains blind to emerging hotspots, seasonal patterns, and intervention effectiveness, locking governance into reactive cycles.

This blindness is especially damaging for crop loss, which remains the largest blind spot and is heavily driven by high-frequency species; even where losses are acknowledged as enormous, there is no consolidated national estimate, and official figures consistently understate lived reality.

2.6 Policy shortcuts that signal action without solving drivers

When mitigation systems fail, governments sometimes reach for blunt tools such as reclassification of species as vermin. Such measures often signal action, create legal ambiguity, can disrupt animal social structures, and distract from structural governance reforms.

2.7 A legitimacy gap rooted in weak community power

Perhaps the most serious failure is institutional: decisions about acceptable risk, land use and interventions are often made with limited involvement of those living with wildlife daily. Consultation tends to be procedural, not substantive, and people are asked to absorb repeated loss without voice or influence. This undermines legitimacy and fuels resistance.

The equity dimension is explicit: conservation benefits society at large, while costs are disproportionately borne by marginalised rural communities, including women whose daily responsibilities increase exposure and risk. Affected communities should have powers and rights over decisions shaping their lives and livelihoods.

3. What the State's Current Actions Miss

Governments have issued advisories and SOPs, expanded compensation, recognised wildlife damage under insurance, and invested in barriers and early warnings. However, implementation remains uneven; physical measures often fail due to weak design, maintenance and lack of community ownership; and most measures respond after damage rather than reducing repeated loss. The core limitation remains weak systems thinking, poor institutional convergence and disempowerment of affected communities.

4. Reform Agenda for Government

The reform agenda below consolidates the essential recommendations across both notes into a single governance architecture.

4.1 Establish a National Human–Animal Conflict Mission with a unified data system

India needs a national mission with a clear, up-to-date data system that records all species including high-frequency ones, location, seasonality, crop phase, frequency, types of incidents, losses, and causes. This data must drive species- and context-specific protocols and must be integrated into infrastructure planning, corridor protection and environmental clearances.

A unified, standardised system is essential for anticipatory governance and for shifting budgets from past expenditure patterns to current risk.

4.2 Mandate landscape-level conflict governance

Conflict must be planned and governed at ecological scales. Major interventions such as fencing, capture and infrastructure must require coordination across landholdings, departments and districts, because fragmented actions displace risk.

4.3 Enforce sequencing protocols and assign responsibility for non-compliance

No removal or translocation should occur without first addressing access routes and attractants. Sequencing must be an enforceable protocol, with institutional consequences when poor sequencing expands risk or shifts conflict.

4.4 Rebalance public spending from compensation dominance to prevention capability

Budgets must prioritise preventive tools, maintenance and early-warning systems. Compensation must be timely and fair, but it cannot remain the dominant response if conflict is to reduce.

4.5 Make compensation and insurance systems rights-based and time-bound

Compensation should move from discretionary relief to a time-bound entitlement for crop loss, livestock depredation, property damage, injury and death, beyond ex gratia relief and scheme-based insurance. Laws and rules must also recognise livelihood and productive asset losses such as damage to grain stores, cattle sheds, fencing and other farm assets.

PMFBY implementation must be strengthened so that timelines, digital dependence and uneven processes do not exclude those most affected.

4.6 Integrate conflict liability into infrastructure law and clearance conditions

Wildlife deaths linked to roads, railways, power lines, canals and fencing are predictable planning failures, not accidents. Conflict risk, corridor disruption and mitigation responsibility must be built into environmental clearance conditions, with enforceable obligations for project proponents.

4.7 Institutionalise community decision-making authority and devolved governance in hotspots

Coexistence is workable only as a social contract with non-negotiable principles: human safety, fair sharing of costs, prevention before relief, community decision-making power, and landscape planning. Panchayats, Biodiversity Management Committees and local institutions must have authority, resources and accountability, with local knowledge treated as a formal input into planning and decisions.

In chronic hotspots, Panchayats should lead mitigation, monitoring and first response supported by trained local guards, alert systems and village-level records. Coordination across forestry, revenue, agriculture, police and Panchayats must be functional, not ad hoc.

4.8 Legal reform priorities to support governance reform

Legal and regulatory provisions should:

- Make compensation a legal entitlement and mandate comprehensive conflict data systems Reform Section 62 and other culling and vermin provisions with safeguards including evidence-based justification, defined boundaries, time limits, independent review and public disclosure

- Enable proactive use of public funds including CAMPA, SDRF and MGNREGA for prevention, mitigation infrastructure, community monitoring and corridor protection rather than only post-damage relief

- Strengthen legal authority and funding for Panchayats and Biodiversity Management Committees to hire guards, set up deterrents, coordinate departments and enforce decisions in hotspot areas

- Treat stray and feral cattle depredation as a distinct livestock governance crisis with clear institutional responsibility and funding rather than folding it into wildlife conflict frameworks

5. Conclusion: A Shift in Government's Core Objective

Human–animal conflict cannot be reduced through relief and response alone. Government action must shift from managing damage to governing risk. This requires landscape-level planning, enforceable implementation discipline, integrated data, prevention capability, rights-based compensation, infrastructure liability, and devolved decision-making power for affected communities.

Without this shift, conflict will continue to spread across species and regions, deepen rural inequities, and weaken trust in institutions. With it, coexistence can move from moral slogan to workable policy grounded in safety, justice and accountable governance

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Disclaimer

- Several statistics in the chapters of this compendium are **syntheses across multiple studies and state records**, because **India has no unified national Human – Animal Conflict database**.
- Several **numeric ranges** (e.g., % under-reporting, compensation covering 1–10%, hectare estimates) are **derived syntheses**, not single-study claims.
- Media sources were **never used alone**; they backstop patterns already seen in government or academic work.

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9. **Karnataka Forest Department (ARANYA platform)**
   https://aranya.gov.in
10. **Assam Forest Department**
    https://forest.assam.gov.in
11. **Odisha Forest & Environment Department**
    https://forest.odisha.gov.in

12. **Tamil Nadu Forest Department**
    https://www.forests.tn.gov.in

13. **West Bengal Forest Directorate**
    https://www.westbengalforest.gov.in

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    https://www.ajcb.in

15. **Indian Journal of Ecology / ICAR-linked journals**
    Crop loss valuation, elephant crop-raiding studies
    https://www.icar.org.in

16. **Journal of Agriculture and Rural Development / ARRB**
    Pan-India conflict reviews
    https://journalarrb.com

17. **ResearchGate (compiled peer-reviewed studies)**
    Assam, Western Ghats, Chhattisgarh, Himachal Pradesh HEC studies
    https://www.researchgate.net

D. NGO & Research Institution Outputs

18. **Wildlife Trust of India (WTI)**
    Corridor mapping, elephant mortality analysis
    https://www.wti.org.in

19. **WWF-India**
    Anti-Depredation Squads, community vigilance models
    https://www.wwfindia.org

20. **Centre for Wildlife Studies (CWS)**
    Behavioural ecology, early-warning systems
    https://www.cwsindia.org

21. **Wildlife SOS**
    Radio-collaring and conflict response documentation
    https://wildlifesos.org

22. **Nature Mates (India)**
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https://naturematesindia.org

E. Railways & Infrastructure Impact

23. **Indian Railways / Ministry of Railways**
Elephant–train collision data (Assam, Odisha corridors)
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F. Media (Used Only Where Government / Academic Data Exists)

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https://www.thehindu.com

25. **The Times of India**
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https://india.mongabay.com

G. International Reference (Contextual)

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3. Multiple spatial-risk and dispersal studies (Kanha, Tadoba landscapes) collated through **ResearchGate**
   https://www.researchgate.net

Government / official datasets

4. **National Tiger Conservation Authority (NTCA)** – conflict guidelines, response protocols, population and conflict oversight
https://ntca.gov.in

5. **Ministry of Environment, Forest and Climate Change (MoEFCC)** – compensation norms, Project Tiger reports
https://moef.gov.in

6. **Press Information Bureau (PIB), Govt. of India** – official statements, compensation revisions (Dec 2023)
https://pib.gov.in

7. **State Forest Department records** (MP, Maharashtra, Karnataka, Uttarakhand, Kerala, Rajasthan) – compensation and incident data
(State portals: e.g., https://mahaforest.gov.in, https://aranya.gov.in)

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https://factly.in

NGO / practitioner sources

9. **Wildlife Trust of India (WTI)** – rapid response, ANIDERS systems
https://www.wti.org.in

10. **WWF-India** – community mitigation, livelihoods
https://www.wwfindia.org

11. **The Corbett Foundation** – conflict management casework
https://corbettfoundation.org

12. **Satpuda Foundation** – community-based tiger coexistence
https://satpudafoundation.org

13. **Wildlife Conservation Trust (WCT)** – community development near reserves
https://www.wildlifeconservationtrust.org

Context / reviews
14. **Mongabay-India** – corridor fragmentation, conflict responses
https://india.mongabay.com
15. **TROINDIA** (2019). *Human–wildlife conflict review*
https://troindia.in

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2. *Current Science* – analyses on crop loss and wild pig damage in hill agriculture (HP, Uttarakhand). https://www.currentscience.ac.in
3. ICAR / AICRP on Vertebrate Pest Management – wild boar damage, crop loss mechanisms. https://icar.org.in

Government / institutional
4. Indian Council of Agricultural Research (ICAR) fact sheets and field trials (state-wise).
https://icar.org.in
5. State Agriculture & Forest Department reports (Kerala, Telangana, Karnataka, Maharashtra, UP, HP, Rajasthan).
Examples:
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https://aranya.gov.in
https://mahaforest.gov.in
6. Wildlife Protection Act, Section 11 notifications on wild boar culling (MoEFCC / state gazette orders).
https://moef.gov.in

Economic / policy studies
7. Gokhale Institute of Politics & Economics / Centre for Sustainable Development – Maharashtra herbivore loss estimates.
https://www.gipe.ac.in

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8. *The Times of India* – Kalaburagi (Karnataka) sugarcane losses; Maharashtra crop loss reporting.
https://timesofindia.indiatimes.com

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2. ICAR agronomy and herbivore impact assessments on rabi crops (wheat, mustard, pulses).
https://icar.org.in
3. Landscape-level analyses of large herbivore conflict and agricultural interiors (Current Science; Indian Journal of Ecology).
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4. Ministry of Environment, Forest and Climate Change (MoEFCC) – Wildlife (Protection) Act notifications; Section 62 "vermin" orders for nilgai.
https://moef.gov.in
5. State Agriculture Department damage assessments and compensation records (Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar, Haryana, Maharashtra).
Examples: https://agriculture.rajasthan.gov.in | https://upagripardarshi.gov.in
6. State Forest Department incident logs and affidavits submitted to High Courts (Bihar, UP, Rajasthan).
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Judicial / policy
7. High Court orders and committee reports on nilgai crop damage and control measures (Patna HC, Allahabad HC, Rajasthan HC).
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8. *The Hindu* and *Times of India* reporting on nilgai-related crop loss, farmer agitations, and road accidents.

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9. ICAR-linked Krishi Vigyan Kendra (KVK) extension notes on crop stage vulnerability and deterrents.
https://kvk.icar.gov.in

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https://journals.plos.org/plosone/
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3. Kshettry, A. et al. (2017). *Human–leopard conflict in a fragmented landscape, West Bengal.* **PLOS ONE**
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Examples: https://mahaforest.gov.in | https://forest.uk.gov.in
6. Ministry of Environment, Forest and Climate Change (MoEFCC) – Human–Wildlife Conflict reviews, Wildlife (Protection) Act framework.
https://moef.gov.in
7. Press Information Bureau (PIB), Govt. of India – official statements on HWC and compensation norms.
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NGO / practitioner

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9. The Corbett Foundation – community-based coexistence work in Uttarakhand.

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2. Sengupta, A. & Radhakrishna, S. *Crop raiding and human–macaque conflict in India.* **Primate Conservation**
   https://primate-sg.org
3. Sinha, A. et al. *Behavioural flexibility and human–macaque interactions in urban India.* **Current Science**
   https://www.currentscience.ac.in
4. Chhangani, A.K. *Human–langur conflict and crop damage in semi-arid landscapes.* **Indian Journal of Ecology**
   https://www.indianjournals.com

Government / official
5. **Ministry of Environment, Forest and Climate Change (MoEFCC)** – Wildlife (Protection) Act provisions, primate management advisories
https://moef.gov.in
6. **Himachal Pradesh Forest Department** – rhesus macaque conflict and sterilisation programme reports
https://hpforest.nic.in
7. **Uttarakhand Forest Department** – monkey conflict records
https://forest.uk.gov.in
8. **Department of Animal Husbandry (State level)** – sterilisation and capture programme

documentation
(via respective state portals)

Judicial / policy

9. **Supreme Court of India & High Court orders** on monkey sterilisation and conflict management (HP, Uttarakhand, Rajasthan)
https://ecourts.gov.in

NGO / research institutions

10. **Centre for Wildlife Studies (CWS)** – primate ecology and conflict research
https://www.cwsindia.org
11. **Nature Conservation Foundation (NCF)** – human–primate interaction studies
https://www.ncf-india.org
12. **ATREE** – urban and peri-urban wildlife conflict research
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13. **People for Animals (PFA)** – operational sterilisation programme documentation
https://www.peopleforanimalsindia.org
14. **Wildlife SOS** – rescue, capture, and urban conflict response
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Media / synthesis (used only with institutional backing)

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https://www.thehindu.com
16. *Mongabay-India* – analyses of primate conflict and governance gaps
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https://www.downtoearth.org.in

Chapters for Farmers

5.1 Living With Wild Boar Damage - What Reduces Damage, What Doesn’t, and Why

Section 1: How wild boar damage usually shows up in fields

Many farmers say that even after sowing on time and giving all the required inputs, their fields did not give the yield they expected. In many cases, the reason becomes clear only later.

In the early stages, farmers notice that germination is uneven. Some patches come up well, while others remain empty or weak. At first, this is often blamed on seed quality, soil problems, or water issues. When farmers dig into these patches, they sometimes find that the seeds have been dug out or eaten. By then, re-sowing is difficult or no longer possible.

As the crop grows, damage does not appear evenly across the field. Certain areas are disturbed while others look normal. Soil is turned over in patches. Bunds break. Irrigation channels are damaged. In standing crops, plants are flattened or bent, not because they were eaten, but because animals moved through the field together.

Most activity happens at night. Farmers do not usually see the animals, but they recognize the signs by morning. A field that looked normal in the evening shows fresh disturbance the next day. Because the damage is spread out, losses are hard to judge until harvest, when yields fall more than expected.

Farmers also notice that damage follows the same lines. Certain entry points and paths are used again and again. Once this pattern sets in, the problem rarely stays limited to a single visit.

The loss is not only of crops. Repeated night visits lead to loss of sleep, fatigue, and changes in family routines. Over time, guarding and repair become part of everyday farming rather than an occasional response.

Why wild boars keep coming back to the same fields

Farmers often ask why wild boars return to the same fields again and again, even after being chased away. From experience, they learn that this does not happen by accident.

Once boars find food in a field, they treat that field as a known place. They remember where food was available, how easy it was to enter, and where they were disturbed the least. Even if they are chased away once or twice, they return to check again.

The first visit usually causes limited damage. The bigger problem begins after that. When animals return, they often come in groups and spend more time in the field. This is when damage increases quickly.

Boars stick to familiar routes. As they move through a field, they begin using the same paths along bunds, irrigation channels, or softer soil. These paths become easier to use each time. Once such routes form, animals keep using them across seasons, even when crops change.

Uneven damage makes this worse. When only part of a field is disturbed, food remains nearby. Animals feed, move a short distance, and feed again. This keeps them in the same area instead of pushing them away.

Because most movement happens at night, animals also learn timing. If they are disturbed early in the night but find the field quiet later, they adjust and return during hours when disturbance is lowest.

Farmers also observe that boars quickly learn which deterrents are weak. If lights stay in the same place, smells fade, or fencing has gaps, animals test these points repeatedly. Once they succeed, they remember them.

What farmers realize over time is that the first successful entry makes a big difference. Once boars find food and safe access, stopping repeat visits becomes much harder.

When farmers know the risk is highest

Farmers who face wild boar damage over several seasons begin to notice clear patterns.

Damage is highest soon after sowing and again just before harvest. Freshly sown fields are easy to dig into, and seeds are quickly lost. Near harvest, crops are fully grown and attract repeated visits.

Certain crops face more pressure than others. Farmers commonly mention maize, groundnut, tubers, sugarcane, and paddy. Once these crops mature, visits increase unless strong steps are taken.

Seasonal conditions matter. During the monsoon and the period after, soft soil makes digging easier. In dry months, irrigated fields attract animals because nearby land has little food or water. Fields close to canals, tanks, or wells face more pressure during these times.

Location also plays a role. Fields near forests, scrubland, plantations, or unused land see more damage. Over time, even interior villages are affected once animals establish movement routes through farmland.

Farmers pay attention to dark nights, when movement is harder to detect, and to periods when young animals are present, when disturbance spreads over larger areas.

For most farmers, the concern is not whether damage will happen, but when it will begin and how long it will last.

Section 2: Living With Nilgai Damage – What Reduces Damage, What Doesn’t, and Why

How nilgai damage usually shows up in fields

Farmers dealing with nilgai damage often say that losses do not appear suddenly, but build up quietly over time. In many cases, crops look normal in the early stages, and the full extent of damage becomes clear only later, closer to harvest.

Unlike wild boar, nilgai do not dig up seeds or disturb soil. Early damage is therefore harder to detect. Farmers usually first notice grazing along the edges of fields. Some patches appear clipped or eaten down, while neighbouring areas remain untouched. This is sometimes mistaken for poor growth, moisture stress, or grazing by stray cattle.

As crops grow taller, damage becomes more visible. Plants are grazed, broken, or flattened. In many cases, damage is caused not only by feeding but also by trampling as animals move through the field. In crops such as mustard, wheat, chickpea, gram, and other pulses, farmers notice bite marks at a fairly uniform height, indicating repeated grazing by tall animals rather than random damage.

Nilgai damage often spreads over larger areas than wild boar damage. Herds move through fields instead of concentrating in one spot. Because plants are weakened gradually rather than destroyed outright, losses are often underestimated until harvest, when yields drop more than expected.

Most nilgai movement happens at night or in the early hours of the morning. Farmers rarely see the animals directly. Instead, they recognise damage by grazed tops, broken stems, and flattened crop patches. A field that appeared acceptable in the evening may show fresh grazing the next day.

Farmers also observe that nilgai tend to enter fields from the same sides repeatedly. Boundaries near scrubland, fallow land, village commons, roads, or open stretches become regular entry points. Once such patterns form, damage rarely remains limited to a single visit.

The loss is not limited to crops alone. Repeated visits force farmers to guard fields at night, repair fences, and replant damaged patches where possible. Over time, managing nilgai becomes part of everyday farming, increasing stress, fatigue, and labour burden within households.

Why nilgai keep coming back to the same fields

Farmers often ask why nilgai continue to return to the same fields even after being chased away. Experience shows that this behaviour is learned and predictable.

Once nilgai find food in a field, they begin to treat it as a reliable feeding area. They remember where crops were available, which boundaries were easy to cross, and where they faced the least disturbance. Chasing them away once or twice rarely changes this behaviour.

Initial visits may cause limited damage. The problem escalates when animals return repeatedly. Herds begin spending more time inside fields, grazing and moving slowly. This leads to cumulative weakening of crops rather than immediate destruction.

Nilgai rely on familiar movement routes. Over time, they use the same paths along field edges, village roads, canal embankments, and open land. These routes are reused across seasons, even when crop patterns change. Farmers report that once such routes are established, they are difficult to disrupt.

Uneven damage worsens the problem. When only parts of a field are grazed, sufficient food remains nearby. Animals feed, move short distances, and feed again. This keeps them within the same field or cluster of fields instead of pushing them away entirely.

Because most movement happens at night, nilgai also learn timing. If they are disturbed early in the night but find fields quiet later, they return during hours of lower human activity. Farmers guarding only for part of the night often find that damage continues after they leave.

Farmers also observe that nilgai quickly learn which deterrents are ineffective. Fixed lights, scare devices, or smells that fade over time lose their impact. Most importantly, **low or poorly designed fences do not stop nilgai**, as they are capable of jumping over barriers that are not tall enough.

What farmers realize over time is that the first successful entry matters greatly. Once nilgai become comfortable feeding in a field, preventing repeat visits requires stronger, sustained measures.

When farmers know the risk is highest

Farmers facing nilgai damage over several seasons identify clear periods of higher risk.

Damage often increases once crops reach stages where grazing causes direct yield loss, particularly during flowering and grain-filling stages. Unlike wild boar damage, which peaks soon after sowing and again near harvest, nilgai damage typically intensifies during the middle and later stages of crop growth.

Certain crops face more pressure than others. Farmers commonly report damage to mustard, wheat, chickpea, gram, pulses, and oilseeds. Crops planted along field boundaries are affected first, with damage gradually moving inward.

Seasonal conditions influence risk. During dry periods, irrigated fields attract nilgai because surrounding land offers limited forage. After the monsoon, when vegetation is widespread, herds move across larger areas and test new fields.

Location plays a major role. Fields near scrubland, fallow land, village commons, canals, highways, or forest edges experience higher pressure. Over time, even interior villages are affected once nilgai establish safe crossing routes through farmland.

Farmers also pay attention to dark nights and periods when herds include young animals. During these times, movement increases and damage spreads across wider areas.

For most farmers, the concern is not whether nilgai will enter their fields, but when grazing will begin, how long it will continue, and how much effort will be required to limit losses.

Section 3: What Farmers Do:

Across both wild boar and nilgai, farmers notice the same turning point: **once the first successful entry becomes repeat visits, the problem shifts from “chasing animals away” to “breaking a pattern.”** After a few nights, animals stop behaving like occasional visitors and start behaving like regular users of the same routes, timings, and weak points. Damage then becomes harder to detect early and harder to stop later, because animals are no longer testing the field; they are returning to it with confidence.

This is why farmers rarely rely on a single deterrent. They choose measures based on **how the animal enters** (boar dig under, nilgai jump over), **when the crop is most vulnerable**, and **what level of effort can be sustained**. The deterrents below are therefore best understood as tools that either (a) slow entry, (b) disrupt timing, or (c) reduce time spent feeding. They work most reliably when used in layers and, where possible, when neighbouring farmers act together during the same high-risk weeks.

Disclaimer:

Farmers say that animals do not follow a fixed calendar or fixed hours. The times mentioned in this chapter are based on patterns seen in some places, not rules that apply everywhere.

In different areas, risk can begin earlier or later depending on rainfall, crop stage, nearby land use, and how animals move locally. Because of this, farmers advise watching the field closely and responding to the first signs of entry, repeat paths, and quiet hours, rather than following dates or clock time exactly.

Deterrents work best when they are used at the right moment for the local situation, not when they are applied mechanically.

What Methods Should a Farmer Choose Based on Cost and Effort

Listed below are several methods, some long term and cost heavy methods and others short term and less capital intensive.

Farmers say the first step is to understand what kind of cost a method involves. Some measures need a high one-time investment, such as permanent fencing or structures, but require less daily effort once in place.

Other measures cost little at the start but must be repeated many times through the season — guarding, lights, chilli ropes, repairs, fuel, or hired labour.

Farmers advise first estimating how long the crop will be at risk and how often each method will need to be repeated.

This helps compare long-term investment against repeated short-term effort. The choice of method then becomes clearer when this cost and effort is matched with how often animals are entering, how much damage they are causing, and whether the response can be sustained safely over time.

Method A: Fencing and Physical Barriers

What works, what fails, and why – for wild boar and nilgai

Farmers across regions use fencing to slow animal entry and reduce repeat visits. Fencing does not stop animals permanently. Its purpose is to **increase effort**, **delay entry**, and **reduce repeated night visits**, especially during high-risk crop stages.

Farmers who see better results emphasise that fencing fails not because it is weak, but because it is **installed or maintained incorrectly**, or because it is designed for the *wrong animal behaviour*.

Wild boar and nilgai challenge fences in **different ways**. Boars dig under barriers. Nilgai jump over them. Effective fencing must account for both.

A.1 Thorn fencing

What farmers use

Thorn fencing is one of the oldest and lowest-cost methods used against wild boar and, to a much lesser extent, nilgai. It is commonly used where thorny branches are locally available and cash investment is limited.

How farmers make thorn fencing effective

Farmers say thorn fencing works only when it is **dense, continuous, and tightly packed**. Branches are placed close together so there are no open gaps. Simply lining branches along the boundary does not work.

For wild boar, farmers who see better results dig a **shallow trench** and press thorn branches into the soil before packing earth back tightly. Stones or broken bricks are sometimes placed at the base to make digging harder.

Against nilgai, thorn fencing offers **very limited protection**. Farmers say it may slow entry briefly when freshly installed, but it does not prevent animals from jumping over the barrier.

Where thorn fencing usually fails

Thorn fencing dries quickly, gaps appear, and animals begin testing weak points. Boars dig under loosened sections. Nilgai step or jump over it with ease.

Farmers emphasise that thorn fencing fails when treated as a one-time arrangement rather than a temporary, constantly repaired barrier.

Cost and effort

Material cost is low if thorns are locally available, but labour demand is high. Frequent replacement makes it suitable only as a **short-term or supporting measure**, not a primary defence.

A.2 Barbed wire fencing

What farmers use

Barbed wire fencing is commonly used where farmers want something stronger than thorn fencing but cannot afford chain-link or electric fencing.

How farmers make barbed wire fencing effective- Effectiveness depends on **layout and anchoring**.

For wild boar, the **bottom wire is critical**. It must be placed very close to the ground or slightly buried. If the lower edge is loose, boars dig under it easily.

For nilgai, **height matters more than the base**. Farmers say low barbed wire fencing is ineffective because nilgai simply jump over it. Multiple horizontal strands placed higher increase effectiveness but do not guarantee exclusion.

Posts must be fixed firmly, and corners reinforced. Sagging wires invite repeated testing.

Where barbed wire fencing usually fails

Barbed wire fencing fails when:

- the bottom wire is left high (boar entry),
- overall height is insufficient (nilgai entry),
- maintenance is ignored and wires loosen.

On its own, barbed wire struggles against sustained pressure from either species.

Cost and effort

Moderate cash cost, with regular tightening and repair required. Farmers say it works best when combined with night guarding or other deterrents.

A.3 Chain-link fencing

What farmers use

Chain-link fencing is used around small plots, nurseries, high-value crops, or when multiple farmers pool resources.

How farmers make chain-link fencing effective

For wild boar, farmers dig a trench and **bury the lower edge of the mesh** to prevent digging. Soil is packed tightly back into place.

For nilgai, **fence height is the key factor**. Farmers report that chain-link fencing works only when it is tall enough to discourage jumping. Low mesh fencing does not stop nilgai even if the base is secure.

Posts are placed close together to keep the mesh taut. Gates and corners receive extra reinforcement.

Where chain-link fencing usually fails

Failures occur when:

- the lower edge becomes exposed due to erosion (boar),
- fencing height is inadequate (nilgai),
- large field sizes make fencing incomplete.

High cost limits use over large areas unless costs are shared.

Cost and effort

High initial investment with lower but steady maintenance needs. Farmers consider it viable mainly for **small areas or collective fencing**.

A.4 Solar / electric fencing

What farmers use

Solar-powered, low-voltage electric fencing is used mainly near forest edges or in areas with repeated boar and nilgai damage.

How farmers make electric fencing effective

Farmers stress that electric fencing works only when animals receive a **strong shock the first time**.

For wild boar:

- lowest live wire must be very close to the ground,
- earthing must be proper.

For nilgai:

- fencing height must be adequate to prevent jumping,
- multiple live wires are often needed.

Vegetation touching the wire must be cleared regularly, or the shock weakens.

Many farmers combine electric fencing with a physical barrier to prevent digging and jumping together.

Where electric fencing usually fails

Electric fencing fails when:

- batteries are not charged,
- earthing is poor,
- grass touches the wire,
- maintenance lapses.

Weak shocks teach animals that the fence can be crossed safely.

Cost and effort

Highest upfront cost and high maintenance demand. Farmers say electric fencing works best at **community scale**, where maintenance responsibility is shared.

What farmers learn over time about fencing

Farmers who have tried different fencing methods agree on three points:

1. No fence works without regular maintenance.
2. Fencing must match animal behaviour — **digging for boars, jumping for nilgai**.
3. Fencing works best when combined with guarding, lights, or coordinated community action.

Fencing does not eliminate conflict. It **buys time**, reduces repeat visits, and makes damage more predictable — but only when installed and managed with realistic expectations.

Method B – Night Guarding

Night guarding is one of the most commonly used responses to wild boar and nilgai damage. Farmers usually turn to it once damage becomes frequent and other deterrents have failed to hold.

Night guarding works because **direct human presence interrupts feeding and movement**. Unlike fencing or smell-based deterrents, it produces immediate results. However, farmers also emphasize that guarding is physically exhausting and difficult to sustain when done alone.

How farmers make night guarding effective

Farmers say night guarding works only when animals clearly sense **active human presence**. This includes people staying in or near fields, walking around with torches, shouting, clapping, or making sudden noise to drive animals away.

Guarding is most effective when it is done **every night during high-risk periods**, particularly close to harvest. Irregular guarding allows both wild boar and nilgai to adjust their timing and return later in the night.

Farmers who report better results rarely guard alone. Within households, duties are rotated among family members. Across villages, neighbouring farmers often guard **adjacent fields at the same time**, which reduces gaps that animals can exploit.

Nilgai respond more strongly to visible movement and light, while wild boar respond more to sound and direct disturbance. Farmers adjust their guarding behaviour based on which animal is active.

Collective guarding and hiring watchmen

In several areas, farmers reported better outcomes when guarding was organized **collectively rather than individually**.

Instead of each farmer guarding a single field, groups of farmers:

- pooled money or labour,
- hired one or more **watchmen or families**,
- and assigned them to guard **large contiguous areas** of farmland at night.

Farmers said this approach reduced exhaustion, improved coverage, and made guarding more reliable over longer periods. Animals encountered fewer unguarded entry points and spent less time testing fields.

This method was reported to work best where:

- fields are contiguous,
- farmers trust one another,
- and responsibilities are clearly shared.

How night guarding is maintained

Night guarding requires planning and coordination. Farmers decide:

- who will guard,
- which areas will be covered,
- and how shifts will be rotated.

Without rotation, fatigue builds quickly. Most farmers say individual guarding becomes unsustainable after a few weeks. Collective arrangements extend the period over which guarding remains effective.

Guarding intensity is usually reduced once the most vulnerable crop stage passes and restarted only if damage increases again.

How effective night guarding is

Farmers consistently report that night guarding can **significantly reduce damage** during critical periods for both wild boar and nilgai. It is one of the few methods that produces **same-night results**, with animals often retreating immediately when disturbance is strong and coordinated.

However, guarding does not eliminate repeat visits. It reduces feeding time and damage intensity rather than stopping animals permanently.

Where night guarding usually fails

Night guarding fails when:

- it is irregular or poorly coordinated,
- only one person guards a field alone,
- people leave fields early or guard only part of the night.

Animals quickly learn these patterns and adjust their timing. Guarding also fails when exhaustion forces farmers to abandon the effort altogether.

Cost of night guarding

Night guarding involves little direct cash cost when done by family members, but it carries a **high human cost**. Sleep loss affects health, attention, and farm work during the day.

Collective guarding and hired watchmen reduce this burden but require **shared financial or labour contributions**.

Farmer suggestion: linking night guarding to MNREGA

During discussions, farmers suggested that community night guarding could be **linked to MNREGA or similar public employment programmes**.

They argued that:

- guarding protects agricultural livelihoods and community assets,
- the work is predictable and seasonal,
- and linking it to MNREGA could reduce the labour burden on farming households.

Farmers acknowledged that such a linkage would require policy clarification and administrative support. They raised it as a **practical suggestion**, based on the reality that guarding is already essential work, even if it is currently unpaid and informal.

What farmers learn over time

Farmers conclude that night guarding is a **powerful but costly tool**. It works best when:

- effort is shared,
- guarding is focused on peak-risk periods,
- and it is combined with fencing or other deterrents.

Used alone and continuously, it becomes unsustainable. Used strategically and collectively, it remains one of the most reliable ways to reduce damage.

Method C – Lights, Alarms, and Noise Devices

Lights, alarms, radios, and noise-making devices are widely used by farmers facing both wild boar and nilgai damage, particularly when continuous night guarding is not possible.

Farmers rely on these methods not because they stop animals completely, but because they **delay entry**, **reduce sudden damage**, and **increase uncertainty** for animals during the early stages of crop exposure.

How lights, alarms, and noise devices are used

Farmers place lights and noise devices along **field boundaries**, near **known entry points**, or along **routes animals repeatedly use**. These methods are most effective when they are treated as **moving disturbances**, not fixed installations.

Lights and sound are often combined with **occasional human movement**, even if farmers cannot remain in the field all night. This combination increases hesitation and delays entry.

Wild boar tend to react more strongly to **sudden sound and disturbance**, while nilgai respond more to **visual cues and movement**, especially when light reveals human presence.

Farmer-derived practices observed in the field

Farmers use several locally developed noise and light-based practices:

- **Empty tin cans filled with stones or pebbles**, strung on wires or ropes along field boundaries. When disturbed by wind or animal movement, these produce sudden noise. Farmers report this is particularly useful against **nilgai and monkeys**, and sometimes against wild boar during early visits.
- **Broken glass bottles strung with nails or wire** along boundaries, creating sound and disturbance when moved.
- **Radios** left playing at night near entry points, usually shifted every few days to avoid habituation.
- **Portable lights or flashing bulbs**, moved frequently rather than fixed in one position.

Farmers emphasise that these methods work best when **shifted often** and when animals cannot predict where disturbance will occur.

How these devices are maintained

Lights and noise devices require regular checking. Batteries drain, bulbs fail, wires loosen, and rain damages connections. Farmers who report some benefit inspect and reposition devices every few days.

If devices are left unattended for long periods, animals quickly learn to ignore them. Predictability reduces effectiveness faster than device failure.

How effective lights and noise devices are

Farmers say these methods are most useful during **early crop stages**, when animals are first testing entry routes, and for reducing sudden damage.

Used alone, lights and noise devices rarely prevent damage completely. Their main value lies in **supporting other methods**, such as fencing or night guarding, by reducing pressure and delaying entry.

Where lights and noise devices usually fail

These devices fail when:

- the same light or sound is used repeatedly in the same location,
- animals face strong pressure to enter fields with attractive crops,
- devices are poorly maintained or left unattended.

Both wild boar and nilgai habituate quickly to predictable disturbance. Nilgai, in particular, ignore sound if it is not accompanied by movement.

Heavy rain, power cuts, and drained batteries further reduce effectiveness.

Cost and effort

Cash costs are low to moderate. Most farmers already have basic materials. Ongoing costs include batteries, bulbs, and repairs.

Farmers consider these methods worth trying when guarding is not possible, but stress that expectations should remain limited. They are **supporting tools**, not stand-alone solutions.

What farmers learn over time

Farmers conclude that lights and noise work only when they **create uncertainty**, not when they are used in the same place and manner over extended periods of time

Method D – Smell-Based and Home-Made Deterrents

Smell-based deterrents are widely used by farmers facing both wild boar and nilgai damage because they are inexpensive, locally available, and easy to apply. Farmers usually turn to these methods early in the season or when they want a deterrent that does not require staying awake at night.

Across regions, farmers describe these methods as **short-term disruptors**, not permanent solutions.

How smell-based deterrents are used

Strong, unfamiliar smells are applied along **field boundaries**, near **known entry points**, or around areas damaged in earlier visits. Farmers say effectiveness depends on **freshness**, **concentration**, and **targeted placement**.

These methods are most useful **before animals establish regular feeding routes**.

Farmer-derived practices observed in the field

Farmers reported using the following smell-based deterrents:

- **Decomposed fish oil** - Dead fish are sealed in a drum and left to decompose for two to three months. The resulting thick oil is applied to ropes or cloth strips tied along boundaries. Farmers consistently describe this as one of the **strongest smell deterrents** against both wild boar and nilgai.

- **Urine and dung sprays** of wild boar or nilgai
Collected dung or urine is mixed with water and sprayed along entry points and boundaries. Effectiveness is short-lived but noticeable in dry conditions.

- **Amrit paani** - Prepared from neem leaves, cow dung, castor oil, and other local ingredients, and sprayed along field edges.

- **Chilli-based mixtures** and **kerosene-soaked cloth or rope**, placed near known entry routes.

- **Human hair as a smell-based deterrent (wild boar)**
Some farmers reported collecting large quantities of **human hair from local barber shops** and spreading it thickly along field boundaries and known entry points. Farmers say this method can help keep wild boar out of fields, particularly during early visits. It appears to work best when the hair is applied **densely and freshly**, and when it is replenished after rain or strong wind. Farmers describe the effect as **temporary**; once the hair becomes scattered, damp, or old, wild boars begin to return. As with other smell-based deterrents, farmers use this method as a **supporting measure**, not as a stand-alone solution.

Farmers stress that these deterrents work best when **applied fresh and concentrated**, not diluted across large areas.

How smell-based deterrents are maintained

Smell-based deterrents fade quickly and require frequent reapplication. Rain, dew, and wind reduce strength within days.

Farmers who rely on these methods check boundaries often and reapply deterrents after rainfall. During the monsoon, effectiveness drops sharply.

How effective smell-based deterrents are

Farmers say smell-based deterrents can reduce damage for **short periods**, particularly during early crop stages. They may slow animals down or shift entry routes temporarily.

Among these methods, decomposed fish oil is reported as the most powerful, but it:

- takes time to prepare,
- is unpleasant to handle,
- loses effectiveness in rain.

Used alone, smell-based deterrents rarely stop damage once animals are comfortable entering a field.

Where smell-based deterrents usually fail

These methods fail when:

- rain washes them away,
- smells are not refreshed,
- animals face strong pressure to enter attractive crops.

Over time, both wild boar and nilgai habituate to familiar smells. Farmers caution that relying only on smell-based deterrents creates **false confidence**.

Cost and effort

Material costs are low. The main cost is **time, repetition, and labour**.

Farmers say these methods are useful when money is limited and expectations are realistic, but should always be combined with other measures.

What farmers learn over time

Farmers conclude that smell-based deterrents are useful only **before animals become confident** in entering a field. Once regular feeding patterns are established, smells alone are rarely effective.

Method E – Changing Crops and Field Layout

Some farmers reduce damage by changing **what they grow** or **how crops are arranged** within and across fields. This method does not block animals or prevent entry. Instead, it influences **how long animals stay**, **where damage concentrates**, and **how often animals return**.

Farmers use crop and layout changes as a **risk-management strategy**, not as a complete solution.

How farmers use crop and field layout changes effectively

Farmers plant **less attractive crops along field boundaries** and keep **high-risk crops further inside** the field. The aim is to reduce immediate feeding along edges, where animals usually enter first.

Common boundary or deterrent crops reported by farmers include:

- **Turmeric**
- **Chilli**
- **Castor**
- **Lemongrass**
- **Ginger** (in some regions)

These crops are not fully animal-proof, but farmers say they **reduce the time animals spend at the edge**, especially during initial visits.

Some farmers also avoid growing crops that have suffered **repeated heavy losses** and temporarily switch to alternatives that attract less damage. These decisions are often taken after one or two bad seasons rather than immediately.

This method is used more frequently near **forest edges**, **scrubland**, **village commons**, and along **known animal movement routes**.

How crop and layout changes are maintained

Crop and layout changes require **planning before the season begins**. Once crops are planted, adjustments cannot be made quickly.

Farmers often discuss crop choices informally with neighbours, especially where fields are contiguous. Decisions are reassessed each season based on:

- which crops suffered damage,
- how severe the losses were,
- whether neighbouring farmers made similar changes.

Because outcomes are visible only after harvest, learning is gradual and cumulative.

How effective crop and layout changes are

Farmers report **fewer repeat visits** and **shorter feeding duration** in fields where boundary crops are less attractive. Damage tends to shift inward more slowly, giving farmers more time to respond through guarding or other measures.

This method works best when **several neighbouring fields follow similar patterns**. When done collectively, animals encounter fewer attractive entry points and are less likely to linger.

When only one farmer changes crops, animals often move laterally into nearby fields, reducing overall benefit.

Crop and layout changes **do not stop animals completely**, but they reduce damage intensity and spread.

Where crop and layout changes usually fail

Crop changes fail when:

- income loss from less attractive crops becomes too high,
- market prices favour high-risk crops strongly,
- neighbouring fields continue to grow attractive crops.

Farmers also say this method is ineffective under **high animal pressure**, when animals are strongly motivated to enter fields regardless of crop type.

Because nilgai and wild boar have broad diets, no crop remains consistently unattractive over time.

Cost of changing crops and layout

There is usually little additional cash cost, but there is a **clear income trade-off**. Boundary crops and alternative crops often yield lower returns.

Farmers say this method makes sense only when **expected losses from damage exceed the income lost** by changing crops. It is therefore a strategic choice rather than a default response.

Method F: Community Efforts – What Changes When Farmers Act Together

Farmers consistently say that when they act alone, effort is often intense but short-lived. When they coordinate with neighbours, even informally, outcomes change.

Acting **at the same time** matters more than acting harder. When several neighbouring fields are protected during the same weeks, animals encounter fewer gaps. Damage does not simply shift from one plot to the next, and animals spend less time testing fields repeatedly.

Sharing work makes difficult methods possible. **Night guarding becomes manageable** when people take turns across households or fields. **Fencing lasts longer** when small breaks are noticed and repaired quickly because responsibility is shared rather than falling on one farmer.

Crop and layout changes also depend on coordination. Boundary crops and less attractive crops work only when neighbouring fields follow similar patterns. Partial coordination is often enough; full agreement across a village is not required.

Farmers emphasise that acting together does not stop damage completely. What it does is make losses **more predictable**, reduce exhaustion, and make effort feel worthwhile rather than endless.

Protecting one field helps for a short time. Protecting many fields at the same time helps for longer.

Section 4: Harmful Practices That Farmers Do Not Recommend

Farmers dealing with wild boar and nilgai damage say that when losses continue night after night, some responses feel immediate and forceful. Over time, farmers have learned that several commonly used practices either fail to stop damage or create new problems. These methods often increase risk, labour, or long-term losses rather than reducing them.

Note: Under the Wildlife (Protection) Act, wild animals are protected by law. Farmers are allowed to defend human life and prevent immediate danger, but harming, killing, trapping, or poisoning wild animals is prohibited, even when crops or livestock are damaged.

Methods such as illegal electric fencing, poisoning, shooting, or setting lethal traps can lead to legal action and often result in compensation being denied. Farmers say it is important to know these limits, because actions taken in desperation can create long-term problems.

Compensation is usually considered only when damage occurs despite lawful and non-lethal measures, and when incidents are reported through the proper process.

4.1 Chasing Animals Repeatedly Without Changing Conditions

What people sometimes do
Farmers chase boars or nilgai away every night by shouting, clapping, or running toward them, without changing fencing, guarding patterns, or entry points.

Why farmers do not recommend this
Farmers say chasing alone rarely works beyond a few nights. Wild boar and nilgai quickly learn timing and return later or from another side. Repeated chasing without other changes exhausts people but does not break the pattern of repeat visits.

What farmers advise instead
Use chasing only as a short-term response, combined with fencing, guarding, or blocking known entry routes.

4.2 Poisoning Crops, Bait, or Water

What people sometimes do
Pesticides or toxic substances are mixed with food or placed near fields to kill animals.

Why farmers do not recommend this
Farmers say poisoning creates serious problems:

- it kills non-target animals and livestock,
- contaminates soil and water,
- brings legal trouble,

- and does not stop future visits, as other animals replace those killed.

What farmers advise instead
Avoid poison completely. It creates long-term harm without solving the problem.

4.3 Digging Unsafe Pits or Traps

What people sometimes do
Unmarked pits or makeshift traps are dug along boundaries or inside fields.

Why farmers do not recommend this
Farmers report injuries to people, livestock, and working animals. Traps do not reliably stop boars or nilgai and often increase risk during night guarding.

What farmers advise instead
Avoid pits and traps. Focus on safer barriers and visibility.

4.4 Guarding Alone for Long Periods

What people sometimes do
One person guards fields alone for many nights, often without rest or support.

Why farmers do not recommend this
Farmers say exhaustion leads to mistakes. Animals adjust timing, while people lose alertness. Over time, guarding becomes unsafe and unsustainable.

What farmers advise instead
Share guarding duties within families or coordinate with neighbours during peak risk weeks.

What Farmers Learn Over Time

Farmers across regions say harmful practices share common outcomes:

- they exhaust people without stopping damage,
- they teach animals where defences are weak,
- they increase long-term effort instead of reducing it.

Wild boar and nilgai are not stopped by fear alone. Farmers emphasise that reducing damage depends on **breaking patterns**, not reacting every night in the same way.

This is why farmers say avoiding harmful practices is as important as choosing the right deterrents. The sections that follow describe methods that reduce damage **without increasing risk, exhaustion, or long-term losses**.

Farmer Suggestions Raised During Community Discussions

During meetings and field interactions, farmers also raised **policy-level suggestions**, based on their lived experience. These are recorded here **as farmer views**, not as recommendations or endorsements.

Renaming nilgai

Several farmers suggested changing the name **“nilgai”** to **“rojda”** or another neutral term. They explained that the word *gai* creates strong cultural resistance, which makes discussion of control measures difficult even in areas with severe crop loss.

Farmers pointed out that although some states have declared nilgai vermin, permissions to control populations are rarely used because of social and political hesitation linked to the name.

Use of nilgai for meat

Some farmers suggested allowing the **capture and domestication of nilgai for meat**, arguing that this could:

- reduce wild populations,
- convert loss into livelihood,
- reduce repeated conflict.

Farmers noted that similar approaches exist for other species in different countries. They also acknowledged that this suggestion would face legal, cultural, and regulatory barriers.

Culling of wild boar and nilgai

Farmers also raised the issue of **culling** as a last-resort measure in areas with repeated, severe damage. They pointed out that in some states, local authorities already have powers to authorise shooting of wild boar, but these powers are **rarely used in practice**.

Farmers attributed this to:

- fear of legal consequences,
- lack of clarity in procedures,
- social pressure on local officials.

They emphasised that while culling is controversial, the **absence of any usable population control** leaves farmers bearing all the costs of conflict.

What community discussions reveal

Across regions, farmers were clear on one point:
they are not asking for a single solution, but for **workable combinations** that reduce effort, risk, and uncertainty.

Community action makes farm-level methods more effective.
Policy inaction, unclear authority, and social hesitation weaken even those measures that exist on paper.

5.2 Living With Elephant Damage – What Reduces Damage, What Doesn't, and Why

Section 1: How elephant damage usually shows up

Farmers say elephant damage often begins quietly. Crops look normal in the evening. By morning, large areas are flattened, eaten, or trampled.

Damage is usually spread across the field, not concentrated in one corner. Plants are broken or pressed down, bunds are damaged, and irrigation channels are disturbed. In crops like paddy, sugarcane, banana, maize, and vegetables, loss is heavy because elephants feed and move at the same time.

Most activity happens at night. Farmers rarely see the animals clearly. They recognise damage by footprints, broken plants, and wide flattened paths through fields. A field that was safe for weeks can suddenly start facing repeated visits.

Once elephants start coming, damage rarely stays limited to one night. Fields are visited again and again, often along the same entry points. Over time, farmers begin to expect damage rather than hope it will stop.

The loss is not only of crops. Night guarding becomes routine. Sleep is disturbed. Family members take turns staying awake. Fear increases, especially where elephants pass close to houses or village paths.

Many serious injuries and deaths happen during guarding. Poor light, uneven ground, canals, electric lines, and sudden encounters increase risk. Farmers say panic plays a big role. When elephants appear suddenly, people run, chase, or fall, and accidents happen.

Why elephants keep coming back to the same fields

Farmers say elephants do not enter fields by chance. Once they find food, they remember the place.

Elephants remember where crops were available, where entry was easy, and where disturbance was low. Even if they are chased away once or twice, they return to check again.

Water matters as much as food. Fields near canals, tanks, rivers, wells, or low-lying areas are visited more often. During dry months, irrigated fields attract elephants because nearby forest areas have less water.

Elephants follow familiar routes. These routes often run along forest edges, plantation roads, canal embankments, power lines, or open land between villages. Once a route is formed, elephants keep using it across seasons, even when crops change.

Corridors matter, but farmers often describe them differently. They say elephants “have their own roads.” When these paths pass through farmland, the same fields get hit again and again.

Chasing elephants does not always stop repeat visits. Farmers observe that if elephants find food easily and escape without difficulty, they return with more confidence. Over time, they spend longer inside fields and cause more damage.

What farmers learn is that the **first successful entry** changes everything. Once elephants treat a field as a feeding place, stopping repeat visits becomes much harder.

When farmers know risk is highest

Farmers who have lived with elephant damage for several seasons say risk follows clear patterns.

Damage is highest when **food is attractive and easy to access**. This usually happens:

- when crops are close to harvest,
- when crops are tall, soft, and juicy.

Certain crops face more pressure. Farmers commonly mention paddy, sugarcane, banana, maize, and vegetables. Fields with these crops are watched more closely.

Season also matters. After the monsoon, movement becomes easier. Paths are clear, water is available, and crops are standing. During dry months, irrigated fields face more pressure because elephants come looking for both food and water.

Location increases risk. Fields near forests, scrubland, plantations, canals, or traditional elephant routes are affected first. Over time, even interior fields are affected once elephants establish movement paths through farmland.

Farmers also pay attention to nights with low visibility. Dark nights make guarding harder and increase fear. During such periods, farmers say risk feels higher even if damage does not happen every night.

For most farmers, the concern is not whether elephants will come, but **when they will start, how long they will continue, and how safely families can manage guarding**.

Section 2 What to Do During an Actual Elephant Encounter

Farmers say that most serious injuries and deaths happen during sudden encounters, especially at night, when fear and confusion take over. What people do in the first few moments matters more than any deterrent.

If an elephant is seen nearby

- Stop moving immediately and assess distance.
- Stay calm and avoid sudden movement.
- Do not shout, run, or shine light directly into the elephant's eyes.
- Alert others quietly so no one walks into the same area.

If an elephant is moving through fields or near houses

- Keep a safe distance and do not try to drive it away alone.
- Stay visible to other people, not to the elephant.
- Keep clear paths open so the elephant can move away on its own.
- Move slowly toward safer, open areas if needed, avoiding canals, pits, and fences.

If an elephant is very close

- Do not run. Sudden running triggers panic and charging.
- Avoid cornering the animal or blocking its route.
- If possible, stand behind solid cover such as a building, large tree, or raised bund, while keeping awareness of escape paths.
- Stay together in a group rather than separating.

During night-time encounters

- Use torches only to see the ground and people around you, not to confront the elephant.
- Avoid chasing, shouting, or using firecrackers at close range.
- Inform others through calls, whistles, or messages so movement stops in nearby areas.

After the elephant moves away

- Do not immediately follow or enter the area.
- Wait until movement is confirmed to have stopped.

- Inform neighbours and local authorities about the sighting.

Farmers repeatedly stress that the aim during an encounter is **not to stop the elephant**, but to **stay alive, avoid panic, and allow safe movement away**. Calm response and clear exit routes reduce danger far more than aggressive action.

Section 2 A: Living With Elephants – What Reduces Damage, What Doesn't, and Why

Farmers say that once elephants begin entering fields, the first question is not which method to use, but what kind of problem they are facing — an occasional visit, a repeated route, or a long-term movement path. The actions farmers choose depend on how often elephants come, where they enter, how close crops are to harvest, and how much effort can be sustained safely. The methods below describe what farmers actually try in these situations, starting with physical barriers and moving through other responses used alongside them.

Disclaimer:

Farmers say that animals do not follow a fixed calendar or fixed hours. The times mentioned in this chapter are based on patterns seen in some places, not rules that apply everywhere.

In different areas, risk can begin earlier or later depending on rainfall, crop stage, nearby land use, and how animals move locally. Because of this, farmers advise watching the field closely and responding to the first signs of entry, repeat paths, and quiet hours, rather than following dates or clock time exactly.

Deterrents work best when they are used at the right moment for the local situation, not when they are applied mechanically.

What Methods Should a Farmer Choose Based on Cost and Effort

Listed below are several methods, some long term and cost heavy methods and others short term and less capital intensive.

Farmers say the first step is to understand what kind of cost a method involves. Some measures need a high one-time investment, such as permanent fencing or structures, but require less daily effort once in place.

Other measures cost little at the start but must be repeated many times through the season — guarding, lights, chilli ropes, repairs, fuel, or hired labour.

Farmers advise first estimating how long the crop will be at risk and how often each method will need to be repeated.

This helps compare long-term investment against repeated short-term effort. The choice of method then becomes clearer when this cost and effort is matched with how often animals are entering, how much damage they are causing, and whether the response can be sustained safely over time.

Method A: Fencing and Physical Barriers

Farmers across elephant landscapes use fencing not to stop elephants forever, but to **slow them down, guide their movement, and reduce repeat night visits**. Farmers are clear that fencing works only when it respects how elephants move. When fencing blocks routes or is poorly maintained, it increases risk instead of reducing it.

A.1 Solar / Electric Fencing

What farmers use
Solar-powered, low-voltage electric fencing is the most commonly used elephant deterrent near forest edges, plantation belts, and paddy fields. It is usually installed with Forest Department or NGO support and maintained by farmers or village groups.

How farmers make electric fencing effective
Farmers say electric fencing works only when the **first contact gives a strong shock**. If the shock is weak, elephants test the fence again and learn where it can be crossed.

Farmers who see results pay attention to:

- keeping the lowest live wire at the correct height (not too high),
- ensuring proper earthing in moist soil,
- clearing grass and creepers that touch the wire,
- repairing breaks immediately after storms or tree falls.

Electric fencing works best when it runs along **field edges or forest boundaries**, not across known elephant paths.

Where electric fencing usually fails
Farmers say electric fencing fails when:

- batteries are not charged regularly,
- earthing is poor,
- vegetation touches the wire and weakens the shock,
- broken sections are left unrepaired.

Weak fencing does more harm than good. Elephants learn that the fence can be crossed safely and begin returning more confidently.

Cost and effort
Initial cost is high. Maintenance effort is continuous. Farmers say electric fencing works best when

managed **at community level**, where responsibility is shared and no single farmer carries the full burden.

A.2 Elephant-Proof Trenches

What farmers use
Deep trenches are used mainly along forest–village boundaries, tea estate edges, and large community lands. Farmers rarely use trenches around individual fields because of cost and land loss.

How farmers make trenches effective
Trenches work only when they are:

- deep and wide enough,
- kept clear of silt and debris,
- maintained after every monsoon.

Farmers say trenches are effective **as guiding barriers**, helping elephants turn back toward forest areas instead of entering villages.

Where trenches usually fail
Trenches fail when:

- they fill with soil and leaves,
- slopes collapse after rains,
- water stagnates and creates shallow crossings.

Farmers also report serious problems when calves fall into trenches. This leads to panic in the herd and increased risk to nearby villages.

Cost and effort
Very high cost and high maintenance. Farmers say trenches make sense only as **large-scale boundary protection**, not as a farm-level solution.

What Makes a Good Trench vs What Makes a Bad Trench

Farmers say trenches work only when they are built and maintained properly. The difference between a good trench and a poor trench is not small. A good trench reduces repeat entry and risk. A poor trench often makes situations more dangerous.

A good trench

Farmers describe a good trench as one that:

- Is **deep and wide enough** that elephants cannot step across or climb out easily.
- Has **sloped sides**, so soil does not collapse and calves are less likely to slip and get trapped.
- Runs **continuously over long stretches**, without gaps that elephants can test.
- Allows **water to drain**, so it does not fill up and become a shallow crossing.
- Is **checked and repaired regularly**, especially after the monsoon.
- Is placed along **forest–village or plantation boundaries**, guiding elephants away rather than blocking their movement routes.

Farmers say such trenches do not stop elephants forever, but they slow entry, reduce repeated night visits, and lower sudden encounters.

A poor trench

Farmers warn that a poor trench is one that:

- Is **shallow or narrow**, allowing elephants to step across or climb out.
- Has **steep or collapsing sides**, which trap calves and cause panic in the herd.
- Exists only in **short sections**, with breaks that become regular entry points.
- **Fills with water or silt**, especially after rain, making it ineffective.
- Is **left unmaintained**, with collapsed or eroded sections.
- Is dug **across known elephant routes**, blocking movement and pushing elephants into villages or fields.

Farmers say poor trenches often increase danger. Calves falling in, blocked paths, and repeated testing lead to panic, property damage, and higher risk to people.

A clear warning from farmers

Farmers consistently say that **a poorly built trench is worse than no trench at all**. Because of high cost, land loss, and constant maintenance needs, trenches are most useful when planned and maintained **at community scale**, not as individual farm solutions.

A.3 Stone Walls and Reinforced Barriers

What farmers use
In some regions, farmers build stone walls or reinforced barriers along plantation edges or village boundaries.

How farmers make them effective
Walls work only when they are:

- tall and continuous,
- combined with fencing or trenches,
- not built across elephant movement routes.

Where they usually fail
Walls fail when:

- gaps are left,
- routes are blocked completely,
- elephants feel cornered.

Farmers say walls that block corridors increase night raids elsewhere rather than stopping elephants.

Cost and effort
Very high cost. Suitable only in limited locations and usually requires institutional support.

A.4 Temporary Physical Barriers (Rope, Bamboo, Brush)

What farmers use
Farmers sometimes use rope lines, bamboo barriers, or brush fencing as temporary measures during high-risk weeks.

How farmers use them
These barriers are used to:

- mark boundaries clearly,
- slow entry,

- guide elephants toward safer exits.

They are often combined with lights, chilli ropes, or night vigilance.

Where they fail
On their own, these barriers do not stop elephants. Farmers say they are useful only as **supporting tools**.

Cost and effort
Low cost, high labour. Used only for short periods.

What farmers learn over time about fencing elephants

Farmers across landscapes agree on five points:

1. **No fence works without maintenance.**
2. **Weak barriers teach elephants where to enter.**
3. **Blocking elephant routes increases danger.**
4. **Fencing works best when combined with vigilance and early warning.**
5. **Community-managed fencing works better than individual efforts.**

Farmers emphasize that fencing does not eliminate elephant movement. It **buys time**, reduces sudden encounters, and lowers night-time risk — but only when used with realistic expectations.

Method B: Night Vigilance and Guarding

Why farmers rely on night vigilance - Night vigilance is one of the most commonly used responses once elephants begin visiting fields regularly. Farmers say they turn to guarding not because it is safe or easy, but because it is often the only immediate option when crops are close to harvest. At the same time, farmers are clear that night guarding carries the highest risk to human life.

How farmers guard fields - Farmers guard fields by staying awake at night and watching for elephant movement. Some sit near field edges, others walk along bunds or known entry points. Guarding may be done by one person, by family members taking turns, or by several farmers covering nearby fields together.

Farmers say guarding works only when elephants clearly sense active human presence. People move, call out, and use torches so they are visible. Quiet or half-hearted guarding does not work.

When guarding works best - Guarding is most effective during short, high-risk periods, especially when crops are close to harvest. Farmers say guarding must be regular during these weeks. If guarding is done only on some nights, elephants adjust their timing and return later.

Farmers who guard alone get tired quickly. Those who share duties within families or coordinate with neighbours are able to continue longer. Guarding works better when several nearby fields are watched at the same time, because elephants find fewer quiet gaps and move on sooner.

Collective guarding and shared efforts - In many areas, farmers organize guarding collectively. Neighbours watch adjoining fields together, divide the night into shifts, and focus on known elephant routes rather than individual plots.

Some farmers pool money or labour to hire one or two watchmen to cover a larger stretch of fields. Farmers say this reduces exhaustion and lowers risk, because people are not left alone at night.

Safety risks during night guarding - Farmers repeatedly stress that night guarding is dangerous. Many injuries and deaths happen during guarding because visibility is poor and fields have canals, pits, electric lines, or uneven ground. Elephants often appear suddenly.

Panic plays a large role. When elephants appear without warning, people run, shout, or chase blindly. Farmers say this is when falls, trampling, and fatal injuries occur.

For this reason, farmers strongly caution against chasing elephants on foot at night.

Cost and limits of night vigilance - Night guarding has little direct cash cost, but the human cost is high. Loss of sleep affects health, farm work, and decision-making. Stress builds up in families, especially for women and elderly people who worry about those guarding at night.

Most farmers say guarding can be sustained only for limited periods. Once the most vulnerable crop stage passes, guarding is reduced or stopped and restarted only if elephants return.

What farmers learn over time - Farmers conclude that night vigilance works, but only within limits. It reduces damage during critical weeks, but it does not stop elephants permanently.

Guarding works best when it is shared across people, focused on peak-risk periods, and combined with fencing and early warning. Used alone or for long periods, it becomes unsafe.

Farmers say the purpose of guarding is not to fight elephants, but to slow damage while staying alive.

Method C: Lights, Sound, Fire, and Early Warning

Why farmers use lights, sound, and warning systems

Farmers say these methods are used to reduce surprise and confusion at night. They are not meant to stop elephants completely. Their main purpose is to help people see, hear, and respond in time, especially during guarding and when elephants pass close to houses or village paths.

C.1 What lights farmers actually use

Farmers use whatever light sources are already available to them. These include hand-held torches, rechargeable lanterns, solar lamps fixed near houses or cattle sheds, and vehicle headlights when tractors or two-wheelers are nearby.

In some villages, farmers use fixed bulbs or floodlights near pump houses, grain stores, or village entry points. In others, solar streetlights installed for general use become part of elephant response, as people gather under them when elephants are nearby.

During guarding, torches are the most common tool. Farmers say torches are important not to scare elephants, but to see the ground clearly, avoid canals and pits, and keep track of where other people are standing.

Farmers note that lights left on every night lose value. Lights are more useful when switched on only when elephants are reported nearby, or when torches are moved along paths to show active human presence.

C. 2 What sounds farmers actually use

Farmers use simple, loud sounds that can be produced quickly and without special equipment. These include shouting together, beating drums, striking metal sheets or plates, banging empty tins, blowing whistles, and in some places using firecrackers.

Drums and metal sounds are commonly used because they carry over long distances and alert both elephants and other people. Farmers say sound works best when several people make noise together from different points, especially when elephants are still at the edge of fields.

Firecrackers are sometimes used, but farmers say they are risky. Used repeatedly, elephants stop reacting. Used too close, they increase panic and danger.

Farmers avoid using sound alone or suddenly at close distance. They say this can provoke unpredictable movement and increase the risk of injury.

C.3 How farmers use fire and smoke

Fire is used carefully and for limited purposes. Farmers light small fires or carry burning torches mainly to improve visibility and signal human presence.

Fire helps people see one another at night and gather quickly when elephants are reported. In some areas, smoke is used near entry points, but farmers say it works only briefly and mainly as a warning signal.

Farmers repeatedly say fire should not be used to chase elephants directly. Aggressive use of fire increases confusion and risk.

C.4 How farmers use early warning

Farmers say early warning is often more important than any device. As soon as elephants are seen, people inform others through phone calls, messages, shouting, temple bells, whistles, or sending someone on a bicycle or motorcycle.

Early warning allows people to stop night movement, avoid entering fields, bring livestock closer to houses, and gather guarding teams safely. Farmers say many accidents happen simply because people did not know elephants were nearby.

When these methods help

Farmers say lights, sound, fire, and warning systems help most when elephants are passing through or testing fields, not when they are already deep inside crops.

They are most useful during nights close to harvest, during dry months when elephants follow water, and after the monsoon when movement increases.

Used together, these methods reduce confusion and help people respond calmly.

Where these methods stop helping

Farmers say these methods fail when used by one person alone, used aggressively at close range, or used in the same way every night.

Fixed lights, repeated sounds, and constant noise lose effect quickly. Elephants learn patterns.

Farmers also warn that relying only on lights and sound creates false confidence. Elephants may still enter fields even when people are present.

What farmers learn over time

Farmers conclude that lights, sound, fire, and warning systems are **support tools**. They help people stay safe and organized, but they do not stop elephants.

They work best when combined with fencing, trenches, and shared guarding, and when the focus is on reducing surprise rather than chasing animals.

Method D: Smell-Based and Natural Deterrents (Elephant Context)

Why farmers try smell-based deterrents

Farmers say smell-based and natural deterrents are used mainly when elephants **first begin testing fields** or when farmers want something that can be put in place quickly without night-long effort. These methods are not treated as stand-alone solutions. They are used to **slow entry**, **discourage first visits**, or **support guarding and fencing**.

Farmers are clear that smell works differently for elephants than for wild boar. Expectations are lower, and use is selective.

What farmers actually use

Farmers commonly mention:

- **Chilli-based deterrents**, especially chilli–grease ropes tied along field boundaries or known entry points
- **Chilli smoke**, created by burning chilli, dung cakes, or waste material near entry routes
- **Bee-related deterrents**, including beehive fences in a few areas or the use of recorded bee sounds during guarding
- **Strong natural smells**, such as crushed neem leaves or other locally known irritants, used in limited ways

These are placed along **known elephant paths**, forest edges, or boundary lines, not scattered randomly across fields.

How farmers use these deterrents

Farmers say chilli ropes work best when they are **fresh, well-coated, and placed continuously** along likely entry points. Gaps reduce effectiveness quickly. Chilli smoke is used mainly at night, when elephants approach field edges, to create hesitation rather than force retreat.

Bee-related methods are used carefully. In places where beehive fences exist, farmers say elephants avoid these stretches, but maintenance and cost limit wider use. Recorded bee sounds are sometimes used during guarding, but farmers treat this as experimental and short-term.

Smell-based methods are most often combined with **lights, sound, or human presence**. Used alone, they have limited effect.

When these methods help

Farmers say these methods help most:

- during early crop stages or first visits
- along clearly defined elephant routes
- when combined with guarding or fencing
- when used for short periods with regular renewal

They are more useful **before elephants become confident** in entering a field.

Where these methods usually fail

Farmers say smell-based deterrents fail when:

- crops are close to harvest and highly attractive
- rains wash away chilli or smoke disperses quickly
- elephants have already established regular feeding routes

Elephants learn quickly. Once they realise that smells do not cause harm, they begin to ignore them.

Farmers also warn that relying only on smell creates false confidence and delays stronger responses.

Cost and effort

Material cost is moderate to low, but effort is high. Chilli ropes need frequent re-coating. Smoke needs constant attention. Bee-based methods require investment and upkeep.

Farmers say these methods are worth trying only when effort can be sustained and expectations are realistic.

What farmers learn over time

Farmers conclude that smell-based and natural deterrents **do not stop elephants**. They can delay entry, discourage early visits, and support other methods.

Used early and carefully, they buy time. Used late or alone, they fail.

Method E: Technology-Based Monitoring and Early Warning (Elephant Context)

Why farmers talk about technology-based systems

Farmers say that many of the most dangerous encounters with elephants happen because people **do not know where elephants are** until they are very close. Technology-based systems are used by Forest Departments, NGOs, and research groups to track elephant movement and share information earlier.

Farmers do not see these systems as replacements for guarding or fencing. They see them as tools that can **reduce surprise** and **give advance warning**, especially in areas with repeated elephant movement.

E.1 Radio collars and GPS tracking

In some landscapes, elephants are fitted with **radio collars or GPS collars** by Forest Departments or research organisations. These collars allow tracking of elephant movement over large areas.

Farmers say these systems are most useful when tracking information is **shared in time**. In places where alerts reach villages early, people avoid entering fields, stop night movement, and prepare guarding teams before elephants arrive.

Farmers also note the limits. Not all elephants are collared. Sometimes collars stop working, fall off, or data is delayed. Farmers say tracking helps most when combined with local knowledge of routes and seasons.

E.2 Drone-based monitoring

Drones are used by Forest Departments and NGOs mainly:

- to locate elephant herds in difficult terrain,
- to monitor movement near villages and plantations,
- and to guide ground teams during high-risk periods.

Farmers say drones are helpful for **short-term monitoring**, especially during harvest or when elephants are moving close to settlements. They allow officials to see herd position without people entering dangerous areas.

Farmers also point out that drones do not operate every night and cannot cover all areas. Their value depends on how quickly information reaches villages.

E.3 Sensor-based and alert systems

In some areas, NGOs and government agencies have installed **sensor-based systems** along known elephant routes. These include infrared sensors, motion sensors, and trip-wire alerts that trigger sirens, lights, or phone messages when elephants pass.

Farmers say these systems work best when:

- sensors are placed along well-known routes,
- alerts are reliable and not triggered repeatedly by cattle or people,
- and villagers trust the system.

False alarms reduce confidence. When alerts are accurate, farmers change routines and avoid risky movement.

E.4 Mobile phone alerts and information sharing

Where tracking or sensors exist, information is often shared through **phone calls, messaging groups, or automated alerts**.

Farmers say phone-based alerts are useful because they reach people directly and quickly. Even simple messages such as “elephants near canal” or “movement seen near plantation road” help people decide whether to step out or stay back.

Farmers stress that alerts must reach **everyone**, not just a few people. Delayed or partial information limits usefulness.

Where technology helps most

Farmers say technology-based systems help most by:

- reducing sudden encounters,
- allowing people to avoid risky areas and times,
- supporting collective guarding and response,
- reducing the need for risky night patrols.

They are especially useful near villages, plantations, roads, and canals where surprise encounters are common.

Where technology has limits

Farmers are clear that technology does not stop elephants. It tracks or detects them.

Technology fails when:

- alerts are delayed,
- systems are poorly maintained,
- power or network coverage is weak,

- information does not reach farmers in time.

Farmers also say technology works best when combined with **local observation**, not when it replaces it.

What farmers learn over time

Farmers say technology is helpful when it **supports decisions**, not when it promises control.

When alerts are timely and reliable, people stay safer. When systems fail or information does not flow, farmers fall back on traditional guarding and vigilance.

Farmers say the most useful technology is the one that:

- gives early warning,
- is easy to understand,
- and fits into how villages already share information.

Method F: What changes when farmers act together – why community efforts is important

Farmers say that when elephant movement starts, handling the problem alone becomes difficult very quickly. One field guarded, one fence repaired, or one warning passed helps only for a short time. When neighbours act together, effort lasts longer and risk reduces.

When farmers coordinate, elephants face fewer quiet gaps. If several adjoining fields are watched during the same weeks, elephants spend less time testing fields again and again. Guarding becomes safer because people are not alone. Small fence breaks are noticed earlier and repaired before elephants learn new entry points.

Sharing information is one of the biggest advantages of acting together. When one person sees elephants near a canal, road, or plantation edge, others avoid stepping out unnecessarily. Livestock is brought closer to houses, and guarding teams prepare before elephants arrive. Farmers say many injuries could be avoided simply by knowing in advance.

Farmers also say working together reduces exhaustion. Night guarding becomes manageable when people take turns. Costs of fencing, maintenance, or hiring watchmen can be shared. No one household carries the full burden every night.

Farmers are clear that acting together does not stop elephants permanently. What it does is make losses more predictable, reduce panic, and make it possible to keep farming without constant fear. Protecting one field helps for a while. Protecting many fields at the same time helps for longer.

Section3: Harmful Deterrents That Farmers Do Not Recommend

Farmers living with elephant movement say that when fear is high—especially after crop loss or a close encounter—people sometimes use methods that seem strong or immediate. Over time, farmers have learned that many of these actions increase danger instead of reducing it. They either fail to stop elephants or make encounters more unpredictable and riskier.

Note: Under the Wildlife (Protection) Act, wild animals are protected by law. Farmers are allowed to defend human life and prevent immediate danger, but harming, killing, trapping, or poisoning wild animals is prohibited, even when crops or livestock are damaged.

Methods such as illegal electric fencing, poisoning, shooting, or setting lethal traps can lead to legal action and often result in compensation being denied. Farmers say it is important to know these limits, because actions taken in desperation can create long-term problems.

Compensation is usually considered only when damage occurs despite lawful and non-lethal measures, and when incidents are reported through the proper process.

3.1 Chasing Elephants on Foot

What people sometimes do
People shout, run toward elephants, throw stones, wave torches, or try to drive herds away on foot, often at night.

Why farmers do not recommend this
Farmers say this is extremely dangerous. Elephants have poor visibility at night and react strongly to sudden movement. When people run or chase, elephants may charge blindly. Many serious injuries and deaths happen during chasing, not while elephants are feeding or moving away.

What farmers advise instead
Maintain distance, stay visible to others, and allow elephants a clear path to leave.

3.2 Illegal Electric Lines and Live Wires

What people sometimes do
Household power lines are connected directly to fences or wires are left live around fields.

Why farmers do not recommend this
Farmers say this causes elephant deaths, severe injuries, and legal trouble. Surviving elephants become more aggressive and unpredictable. Illegal electric fencing also kills cattle, dogs, and sometimes people.

What farmers advise instead
Only use approved, low-voltage solar fencing where supported and properly maintained.

3.3 Poisoning Crops or Bait

What people sometimes do
Pesticides or toxic substances are mixed with food or left near fields.

Why farmers do not recommend this
Farmers say poisoning rarely works as expected. It causes prolonged suffering, kills non-target animals, contaminates land and water, and spreads conflict to nearby villages. It also brings severe legal consequences.

What farmers advise instead
Avoid poison completely. It increases long-term danger rather than stopping elephant visits.

3.4 Firecrackers, Burning Objects, and Aggressive Noise

What people sometimes do
Firecrackers are thrown, tyres are burned, metal is beaten loudly, or flaming objects are waved at elephants.

Why farmers do not recommend this
Farmers say sudden loud noise at close range causes panic. Elephants may charge, change direction suddenly, or run through villages. Repeated noise also loses effect, as elephants learn to ignore it.

What farmers advise instead
Use sound only as a warning tool from a safe distance and as part of group action, not sudden confrontation.

3.5 Blocking Elephant Routes or Surrounding the Herd

What people sometimes do
Groups gather to block paths, surround elephants, or prevent them from moving out.

Why farmers do not recommend this
Farmers say elephants must have clear exit routes. When routes are blocked, elephants panic, break into houses, or attack in confusion. Many fatal incidents occur when herds are cornered.

What farmers advise instead
Identify and keep exit paths open so elephants can move away safely.

3.6 Digging Unsafe Trenches or Pits

What people sometimes do
Deep pits or poorly designed trenches are dug around fields.

Why farmers do not recommend this
Farmers report calves falling into pits, leading to panic in the herd and increased danger for nearby villages. Poorly maintained trenches also collapse or become easy crossings.

What farmers advise instead
Use trenches only where properly designed, maintained, and planned at community scale.

What Farmers Learn Over Time

Farmers say that many accidents happen not because elephants are aggressive, but because people respond in fear. Avoiding harmful deterrents is the first step toward safer coexistence. The next sections describe methods that reduce damage **without increasing risk to people or elephants**.

Farmers consistently say that harmful deterrents share common outcomes:

- they increase panic and confusion,
- they raise the risk of human injury or death,
- they make elephant behaviour more unpredictable,
- and they create long-term conflict instead of reducing it.

Because of this, farmers emphasize that the goal is **not to fight elephants**, but to reduce surprise, stay alive, and protect crops using safer, coordinated methods.

5.3 Living With Leopards and Tigers – What Reduces Risk, What Doesn't, and Why

Section 1: How Risk from Leopards and Tigers Enters Daily Farming Life

Farmers living near forests, plantations, canals, and large stretches of tall crops say that danger from leopards and tigers does not feel constant. Most days pass normally. People go to fields, graze animals, cut fodder, fetch water, and return home. Risk enters daily life suddenly, during routine activities, without warning.

Across regions, farmers consistently say that most injuries and deaths happen because of surprise encounters, not because people provoke animals. In most cases, people do not see the animal first. The animal appears suddenly, often at close distance. Panic follows. In panic, people run, slip, fall into canals, shout, or move in the wrong direction. Farmers emphasize that it is this moment of panic, rather than prolonged attack, that turns encounters serious or fatal.

Farmers say that an important change in the landscape explains why such encounters have become more common over time. Leopards and tigers are no longer animals that live only inside forests and occasionally pass through farmland. In many areas, they now live at the edges of plantations and large blocks of tall crops and treat these areas as part of their regular home range.

Plantations and tall crops such as sugarcane, banana, cotton, tall grass, and thick plantations provide conditions similar to forests. They offer cover, shade, and quiet resting places during the day, as well as connected routes for movement. Farmers say leopards and tigers now rest inside these areas for long periods and move out at night through fields, canals, and village edges without being seen.

Because of this adaptation, forests are no longer the only spaces where these animals live and move. In some landscapes, plantations and tall crop areas function as extensions of forest habitat. Farmers observe that animals return to the same plantation edges season after season, even when crops change, because the overall structure of cover and movement remains familiar.

Most dangerous encounters happen during ordinary work rather than deliberate action. Farmers describe injuries occurring while walking to fields early in the morning, returning at dusk, cutting fodder, grazing cattle, checking irrigation lines, or stepping out at night for daily needs. Risk increases when visibility is poor and people move quietly, especially at night or before sunrise.

Farmers say risk becomes higher when tall crops are fully grown and visibility inside fields is low, during harvesting when animals resting inside fields are disturbed suddenly, and during cooler months when leopards and tigers move more and travel longer distances. At these times, animals pass through farmland more frequently and use plantation paths and canal edges regularly.

While leopards and tigers differ in frequency and severity of encounters, farmers say the way risk enters daily life is often similar for both. Encounters happen not because people enter forests, but because animals now live and move within the same agricultural landscapes where people work every day.

Across regions, farmers stress that attacks do not happen because people provoke animals. They happen because people and animals meet suddenly, without time to react. Because of this, farmers say reducing surprise matters more than chasing animals away. Knowing where animals have been seen, avoiding risky paths and hours, moving with others, and changing routines during high-risk periods reduce danger far more than aggressive action.

Section 2: Why Leopards and Tigers Keep Returning to the Same Areas

Farmers often ask why leopards and tigers return to the same places again and again, even after livestock is lost or people are injured. From experience, they say this does not happen by chance. Once an animal finds an area that offers cover, prey, and easy movement, it begins to treat that place as familiar. Animals remember where food was available, where people were less active, and where they could move without being seen. Even if they are disturbed once or twice, they return to check again.

2.1 Familiar Cover and Resting Places

Farmers say both leopards and tigers depend heavily on cover. Tall crops such as sugarcane, banana, cotton, and thick plantations provide shade, hiding space, and quiet resting areas during the day.

When these crops are grown close to forests, canals, or scrubland, they create continuous cover. Animals can move from forest to field without crossing open ground. Over time, leopards and tigers begin to rest inside fields during the day and move out at night.

Farmers say once animals start resting in these places, they return season after season, even when crops change, because the overall structure of cover remains.

2.2 Prey Availability Keeps Animals Returning

Farmers observe that areas with regular livestock presence attract repeated visits. Dogs, goats, calves, sheep, and sometimes pigs provide easy prey, especially when they are kept near houses, cattle sheds, or field edges.

Once a leopard or tiger succeeds in lifting livestock from an area, it often returns. Farmers say the first successful kill makes a significant difference. Animals begin to treat the area as a reliable hunting place.

Even when livestock numbers reduce, animals may continue visiting for some time, checking for opportunities.

2.3 Repeated Movement Along the Same Routes

Farmers say leopards and tigers follow familiar paths that allow them to move quietly and quickly. These commonly include:

- canal banks,
- plantation roads,
- field bunds,
- dry stream beds, and
- edges of tall crops.

Over time, the same routes are reused across seasons and years. Farmers begin to recognize these paths after repeated sightings, livestock loss, or tracks. Once such routes are established, animals keep using them unless the landscape changes significantly.

2.4 Low Disturbance and Predictable Human Activity

Farmers say leopards and tigers learn human routines. They observe when people go to fields, when villages are quiet, and when movement reduces.

Animals return more often to areas where:

- night-time movement is low,
- people tend to walk alone, and
- human activity follows fixed and predictable patterns.

Farmers say that if animals are disturbed early in the night but find the area quiet later, they adjust their timing and return during safer hours.

2.5 Why Repeat Visits Become Hard to Stop

Farmers say stopping repeat visits becomes difficult once animals are comfortable using an area. Cover remains, prey remains, and familiar routes remain.

Chasing animals away once does not change this. Unless cover is reduced, movement patterns change, or risk to animals increases, leopards and tigers continue returning.

This is why, in some places, farmers say these animals no longer feel like occasional visitors. They begin to behave as if fields, plantations, and village edges are part of their regular range.

Section 3: What farmers do during high-risk periods

Farmers say that once they recognize these patterns, they change behaviour. They avoid certain paths, delay work, move in groups, or wait for information before stepping out.

They say risk is not constant, but **predictable** if patterns are understood.

Below are some of the methods adopted by farmers to avoid or mitigate damage caused by the large cats.

Disclaimer:

Farmers say that animals do not follow a fixed calendar or fixed hours. The times mentioned in this chapter are based on patterns seen in some places, not rules that apply everywhere.

In different areas, risk can begin earlier or later depending on rainfall, crop stage, nearby land use, and how animals move locally. Because of this, farmers advise watching the field closely and responding to the first signs of entry, repeat paths, and quiet hours, rather than following dates or clock time exactly.

Deterrents work best when they are used at the right moment for the local situation, not when they are applied mechanically.

What Methods Should a Farmer Choose Based on Cost and Effort

Listed below are several methods, some long term and cost heavy methods and others short term and less capital intensive.

Farmers say the first step is to understand what kind of cost a method involves. Some measures need a high one-time investment, such as permanent fencing or structures, but require less daily effort once in place.

Other measures cost little at the start but must be repeated many times through the season — guarding, lights, chilli ropes, repairs, fuel, or hired labour.

Farmers advise first estimating how long the crop will be at risk and how often each method will need to be repeated.

This helps compare long-term investment against repeated short-term effort. The choice of method then becomes clearer when this cost and effort is matched with how often animals are entering, how much damage they are causing, and whether the response can be sustained safely over time.

Method A: Avoidance, Timing, and Changes in Daily Practice

Why farmers rely on avoidance and timing

Farmers say that with leopards and tigers, **avoidance is the first and most reliable response**. Unlike wild boar or elephants, these animals cannot be safely chased, blocked, or confronted at close range. Farmers learn that reducing contact matters more than reacting after an encounter begins.

Avoidance does not mean stopping work. It means **changing when, where, and how work is done** during periods of higher risk.

How farmers change timing of work

Farmers say many dangerous encounters happened because work continued at the same time every day, even when animal presence increased.

Over time, farmers adjust timing by:

- delaying early-morning field visits when animal movement is reported,
- avoiding late-evening return from fields during cooler months,
- shifting grazing to later in the morning when visibility improves,
- postponing fodder cutting in dense crops until others are present.

Farmers say these small shifts reduce surprise encounters without stopping work completely.

How farmers change routes and movement

Farmers learn which paths are riskier. Canal banks, plantation roads, field edges with tall crops, and shortcuts through sugarcane or banana fields are avoided during high-risk periods.

Instead of walking alone, farmers move in pairs or groups, especially early in the morning or at night. People choose longer but open routes over shorter paths with cover.

Farmers say walking together and staying in open areas reduces sudden encounters.

Changes around night-time movement

Farmers say night-time movement is one of the biggest risk factors. Over time, families reduce unnecessary movement after dark.

People avoid stepping out alone at night, especially for long distances. Tasks such as checking fields, grazing animals, or visiting neighbours are delayed or done together. When movement is unavoidable, people carry torches and inform others before leaving.

Farmers say these changes come not from instruction, but from experience.

Adjusting work near tall crops and plantations

Farmers say extra caution is needed around sugarcane, banana, cotton, and plantation crops. Visibility inside these fields is poor, and animals may be resting during the day.

People avoid entering tall crops alone. Harvesting and fodder cutting are done with more people present. Farmers say many attacks happened when someone entered dense crops quietly, assuming the field was empty.

How effective avoidance and timing are

Farmers consistently say these changes reduce risk more than any single deterrent. Avoidance does not stop animal movement, but it reduces **direct encounters**, which is where most injuries and deaths occur.

These methods cost no money but require constant attention and coordination.

Where avoidance and timing fail

Farmers say avoidance fails when daily pressures override caution — during urgent work, emergencies, or when people underestimate risk.

Risk also remains high where toilets, water sources, cattle sheds, or paths lie very close to cover, making avoidance difficult.

What farmers learn over time

Farmers conclude that for leopards and tigers, **knowing when not to go is as important as knowing where to go**. Avoidance, timing, and shared movement become part of everyday farming, especially during high-risk seasons.

Method B: Protecting Livestock and Reducing Attractants

Why farmers focus on livestock protection

Farmers say that with leopards and tigers, livestock loss is often the **first sign of risk**. Once animals begin lifting dogs, goats, calves, or sheep from an area, visits usually increase.

Because leopards and tigers return to places where they succeed, farmers learn that protecting livestock matters not only for saving animals, but for **reducing repeat visits**.

How farmers change livestock housing

Farmers say that livestock kept close to houses and cattle sheds are safer than animals tied in open fields or near crop edges.

Over time, farmers move cattle sheds closer to homes, repair broken walls, and close gaps where animals can enter. Doors are secured at night, and weak roofing or fencing is strengthened to prevent entry.

Where sheds are close to tall crops or plantations, farmers try to clear some space around them to improve visibility.

What Farmers Mean by "Good" and "Poor" Livestock Housing

Farmers say that livestock housing plays a major role in repeat leopard and tiger visits. The difference between a good shed and a poor shed often decides whether animals return again and again.

A good livestock shed

Farmers describe a good shed as one that:

- Is **close to the house**, where human presence is constant.
- Has **solid walls or strong fencing** on all sides, not just partial barriers.
- Has **doors that can be closed securely at night**, without gaps at the bottom or sides.
- Has a **roof that cannot be climbed or pushed through easily**.
- Is **well lit at night**, so people can see clearly when checking animals.
- Has **clear space around it**, with bushes and tall grass removed to reduce hiding cover.
- Keeps **all livestock inside at night**, including calves, goats, and sheep.

Farmers say such sheds reduce surprise encounters, prevent easy lifting of animals, and make predators less confident about approaching.

A poor livestock shed

Farmers warn that a poor shed is one that:

- Is **far from the house or near crop edges**, plantations, or canals.
- Has **open sides, weak fencing, or broken walls**.
- Is **left open at night**, or has loose doors that animals can push through.
- Has **gaps near the ground**, allowing animals to reach in or pull livestock out.
- Is **surrounded by thick vegetation**, giving animals cover close to the shed.
- Leaves **some animals tied outside**, especially dogs, goats, or calves.

Farmers say such sheds invite repeat visits. Once a leopard or tiger succeeds in lifting livestock from a poorly protected shed, it often returns to the same spot.

A clear warning from farmers

Farmers consistently say that **poor livestock housing creates long-term risk**. It not only leads to repeated livestock loss, but increases danger to people who come out at night to respond. Because of this, farmers prioritize strengthening sheds and moving animals closer to homes before trying any other deterrent.

They emphasize that **protecting livestock is not only about saving animals, but about preventing repeat visits and reducing risk to human life**.

Managing dogs and small livestock

Farmers say dogs attract leopards strongly. In many areas, dogs roaming freely at night increase risk.

Farmers reduce risk by keeping dogs tied or indoors at night and avoiding feeding dogs far from houses. Goats, sheep, and calves are brought inside sheds at night instead of being left in fields.

Farmers say even small changes in where animals sleep reduce repeated visits.

Changes in grazing practices

Farmers say grazing patterns matter. Risk is higher when cattle are grazed near forest edges, canals, or dense cover, especially early in the morning or late in the evening.

To reduce risk, farmers graze animals in open areas, avoid known animal routes, and keep people together during grazing. Grazing alone near cover is avoided during high-risk months.

Handling livestock loss

Farmers say that after a livestock lift, extra caution is needed. Animals often return to the same area to hunt again.

People avoid entering the site alone. Remaining livestock is moved closer to houses. Night movement near the location is reduced for several days.

Farmers say ignoring early livestock loss leads to bigger problems later.

How effective livestock protection is

Farmers say livestock protection reduces repeat visits and lowers pressure around houses and fields. It does not stop animals from moving through the landscape, but it reduces hunting opportunities.

Farmers emphasize that this method works best when neighbours act together. Protecting one household alone has limited effect if nearby animals remain unprotected.

Where livestock protection fails

Farmers say livestock protection fails when sheds are poorly built, animals are left unattended at night, or dogs roam freely.

Risk also remains high where livestock shelters lie close to tall crops or plantation edges, making complete protection difficult.

What farmers learn over time

Farmers conclude that leopards and tigers return where food is easy. Reducing attractants reduces visits.

Livestock protection becomes a daily responsibility rather than an occasional response.

Method C: Lights, Sound, and Night Awareness

Why farmers use lights and sound

Farmers say that with leopards and tigers, lights and sound are **not used to chase animals away**. They are used to **reduce surprise**, help people see clearly, and signal human presence during night movement.

Farmers learn quickly that sudden noise or aggressive action at close distance is dangerous. So these methods are used carefully, mainly to support safe movement and awareness.

How farmers use lights

Farmers use simple light sources that are already part of daily life. These include hand-held torches, rechargeable lanterns, solar lamps near houses and cattle sheds, and sometimes vehicle headlights.

Lights are most often used when people step out at night — to relieve themselves, check cattle, respond to noises, or walk short distances. Farmers say light helps them see the ground, canals, and vegetation clearly and notice eye shine or movement early.

Fixed lights left on all night lose usefulness. Farmers prefer carrying torches or switching lights on only when needed. In some villages, solar streetlights or lights near temples become gathering points when animal movement is reported.

Lights are not expected to scare leopards or tigers away. Their main role is to help people **avoid walking blindly**.

How farmers use sound

Sound is used mainly as a **signal**, not a weapon. Farmers shout to alert others, call out when moving at night, or speak loudly so that animals are aware of human presence.

Some farmers use whistles or strike metal objects to alert people nearby. This helps others stop movement or join together.

Farmers avoid sudden loud noise when an animal is very close. They say shouting or making noise at close distance increases panic and unpredictable movement.

Unlike with elephants, drums, firecrackers, or aggressive noise are used very rarely with leopards and tigers, and only when animals are at a distance.

How farmers change night awareness

Farmers say awareness matters more than any device. When animal presence is reported, people stop unnecessary movement at night. Children and elderly people stay indoors. Tasks are postponed until morning if possible.

When night movement cannot be avoided, farmers move in pairs or groups, carry torches, and inform others before stepping out. People avoid shortcuts through tall crops, plantation edges, or canal banks.

Farmers say many injuries happened simply because someone stepped out quietly, assuming it was safe.

How effective lights and sound are

Farmers say lights and sound reduce risk by helping people see, hear, and coordinate. They reduce surprise encounters, which are the main cause of injury.

These methods do not stop leopards or tigers from being present. They help people move more safely in shared space.

Where these methods fail

Farmers say these methods fail when:

- people walk alone without light,
- movement continues at the same time every night despite warnings,
- noise is used suddenly at close distance, causing panic.

Lights and sound also fail when people assume that visibility means safety. Animals may still be nearby, even if not seen.

What farmers learn over time

Farmers conclude that for leopards and tigers, lights and sound are **tools for people**, not deterrents for animals.

Used calmly, they reduce fear and accidents. Used aggressively or carelessly, they increase danger.

Method D: Barriers, Fencing, and Physical Separation

Why farmers use barriers

Farmers say that for leopards and tigers, barriers are **not used to block animals from fields**. They are used to **protect people and livestock close to homes**, and to reduce surprise encounters near sleeping, resting, and routine work areas.

Farmers learn that barriers work only in **small, specific spaces**. Trying to fence large fields or movement routes is not practical for these animals.

Where farmers use barriers

Farmers focus barriers around:

- cattle sheds,
- goat and sheep enclosures,
- poultry areas,
- house compounds,
- paths between houses and sheds.

These are the places where people and animals meet most often.

Types of barriers farmers use

Farmers commonly use stone walls, brick walls, wooden doors, metal grills, and chain-link fencing around sheds and compounds. In some areas, barbed wire is added on top of walls or fences to discourage climbing.

Doors are secured at night, and gaps under doors or between walls are closed. Farmers say even small openings invite repeat attempts.

Where sheds are temporary, farmers use thorn fencing or wooden poles as a short-term measure, but say these require frequent repair.

How farmers make barriers effective

Farmers say barriers work best when they are:

- tall enough to block easy entry,
- tightly closed at night,
- well-lit so people can see clearly around them.

Clearing thick vegetation around sheds improves visibility and reduces hiding space near barriers.

Farmers also avoid storing fodder or waste close to sheds, as this attracts dogs and rodents, which in turn attract predators.

Where barriers usually fail

Farmers say barriers fail when:

- sheds are poorly built or left open at night,
- livestock is tied outside instead of being enclosed,
- vegetation grows right up to walls or fences,
- people assume barriers alone provide full safety.

Leopards are good climbers. Tigers are strong. Barriers slow entry, but do not guarantee protection if maintenance is poor.

Cost and effort

Farmers say building strong barriers requires money and labour. Because of this, they prioritize protecting **livestock shelters and sleeping areas**, not entire farms.

Shared investment helps. In some villages, neighbours help each other strengthen sheds or compounds before high-risk seasons.

What farmers learn over time

Farmers conclude that barriers help most when they **separate people and livestock from animal movement**, not when they try to control animals directly.

Barriers reduce night-time risk and repeat livestock loss, but only when combined with awareness, lighting, and careful movement.

Method E: Community Coordination, Information Sharing, and Response

Why farmers rely on community action

Farmers say that with leopards and tigers, acting alone increases risk. One person walking, guarding livestock, or responding to a sighting alone is more vulnerable than a group acting together. Over time, farmers learn that coordination matters more than individual effort.

Community action does not stop animal movement. It changes how safely people live and work around it.

How farmers share information

Farmers say the most important community response is **quick sharing of information**. When an animal is seen, people inform others through phone calls, messages, shouting, temple bells, or word passed through neighbours.

Simple information — where the animal was seen, which direction it moved, and what time — helps others decide whether to step out, delay work, or move together.

Farmers say many injuries happened because people did not know an animal was nearby.

Coordinating daily activities

In villages facing regular leopard or tiger movement, farmers coordinate routines during high-risk periods. Grazing, fodder cutting, and forest produce collection are done at similar times, with people moving together rather than alone.

Night movement is reduced collectively. When one household hears of animal presence, others also stay indoors. Children and elderly people are kept inside, and unnecessary movement is avoided.

Farmers say coordination reduces panic because people are not surprised.

Collective response after livestock loss

Farmers say that after a livestock lift, the whole area becomes risky for some time. Animals often return to the same place.

In these situations, neighbours help move livestock, strengthen sheds, and watch the area together. People avoid visiting the site alone. Farmers say ignoring early signs leads to repeat loss and higher danger.

How community action reduces exhaustion

Farmers say shared effort makes difficult measures possible. Night awareness, checking sheds, and watching movement become manageable when responsibility is shared.

When effort is spread across households, people rest better and remain alert. This reduces mistakes caused by tiredness.

Where community action fails

Farmers say community action weakens when information is delayed, when only a few households respond, or when people assume others will act.

Coordination also becomes difficult in scattered settlements or where trust between neighbours is low.

What farmers learn over time

Farmers conclude that leopards and tigers are safest to live with when people **act together, move carefully, and share information early**.

Community action does not remove risk, but it reduces surprise, panic, and repeated loss. Farmers say this makes daily life safer and more manageable in areas where animal movement has become regular.

Method F: Technology-Based Monitoring and Early Warning (Leopard and Tiger Context)

Why farmers talk about technology

Farmers say that many dangerous encounters with leopards and tigers happen because people do not know the animal is nearby until it is very close. Technology-based systems are used by Forest Departments, NGOs, and research groups to **track movement and give advance warning**.

Farmers do not see these systems as replacements for their own caution. They see them as tools that help reduce surprise, especially in areas with repeated movement.

F.1 Camera traps and monitoring

Camera traps are widely used by Forest Departments and NGOs to understand where leopards and tigers are moving. Farmers say these cameras help confirm animal presence in plantations, along canals, and near villages.

Camera traps are mainly used for monitoring, not for immediate alerts. Farmers say their value lies in showing patterns over time — where animals pass repeatedly, which paths they use, and how close they come to daily work areas.

How Farmers Use Camera Trap Information in Practice

Farmers say camera traps are useful only when the information is explained clearly and shared in time. A camera photo by itself does not reduce risk. What matters is how farmers interpret what the camera shows.

Farmers use camera trap information to understand **patterns**, not single events. Repeated images from the same place tell farmers that an animal is using that path regularly. Images at similar times over several days help farmers identify **high-risk hours**. Photos taken close to houses, cattle sheds, canals, or plantation roads signal areas where people should avoid walking alone.

Farmers say the most useful camera trap information answers simple questions:

- **Where** is the animal passing repeatedly?
- **When** does it usually move — early morning, night, or before dawn?
- **How close** is it coming to daily work areas or livestock shelters?

When these patterns are understood, farmers adjust behaviour. They avoid certain paths, delay work, move in groups, strengthen sheds near repeated locations, and reduce night movement during peak hours.

Farmers also note limits. Camera traps do not show where the animal is right now. They show where it has been. Because of this, farmers treat camera information as a **warning for planning**, not a signal to approach or investigate.

Farmers emphasize that camera traps help most when findings are **shared openly with villages**, explained in simple terms, and combined with local observation. Used this way, cameras reduce surprise encounters. Used without explanation, they create confusion or false confidence.

F.2 Radio collars and GPS tracking

In some landscapes, leopards and tigers are fitted with radio or GPS collars. These collars allow officials to track animal movement across large areas.

Farmers say this helps most when tracking information is shared quickly. In places where alerts reach villages in time, people avoid risky movement, delay work, and move in groups.

Farmers also note limits. Not all animals are collared. Sometimes signals fail or updates come late. Farmers say tracking helps reduce risk, but cannot be relied on fully.

F.3 Sensor-based alerts near villages and plantations

In a few areas, NGOs and government agencies have installed motion sensors or infrared sensors along known animal routes. When an animal passes, sirens sound or phone alerts are triggered.

Farmers say these systems work best when sensors are placed on **well-known routes** and when false alarms are limited. Repeated false alerts reduce trust and lead people to ignore warnings.

F.4 Mobile phone alerts and information sharing

Where tracking or sensors exist, information is often shared through phone calls, messaging groups, or automated alerts.

Farmers say even simple messages — “leopard near canal”, “tiger seen near sugarcane” — help people decide whether to step out, wait, or move together.

Farmers stress that alerts must reach everyone, not just a few people. Partial information reduces usefulness.

Where technology helps, and where it does not

Farmers say technology helps most by:

- reducing surprise encounters,
- allowing people to avoid risky times and places,

- supporting community coordination.

Technology fails when:

- information is delayed,
- systems are poorly maintained,
- power or network coverage is weak,
- or alerts do not reach farmers in time.

Farmers emphasize that technology supports safety only when it fits into how villages already share information.

What farmers understand over time

Farmers say technology does not remove leopards or tigers from the landscape. It helps people **know when to be careful**.

When information comes early and clearly, people stay safer. When systems fail, farmers fall back on shared vigilance and routine changes.

Section 4:

Harmful Methods Sometimes Used — and Why Farmers Do Not Recommend Them

Farmers living with leopards and tigers say that when fear and anger are high—especially after livestock loss or a human injury—people sometimes turn to methods that seem immediate or forceful. Over time, farmers say many of these actions increase danger rather than reduce it. They either fail to stop animal movement or make encounters more unpredictable and riskier.

Note: Under the Wildlife (Protection) Act, wild animals are protected by law. Farmers are allowed to defend human life and prevent immediate danger, but harming, killing, trapping, or poisoning wild animals is prohibited, even when crops or livestock are damaged.

Methods such as illegal electric fencing, poisoning, shooting, or setting lethal traps can lead to legal action and often result in compensation being denied. Farmers say it is important to know these limits, because actions taken in desperation can create long-term problems.

Compensation is usually considered only when damage occurs despite lawful and non-lethal measures, and when incidents are reported through the proper process.

4.1 Chasing Animals on Foot or in Small Groups

What people sometimes do
After spotting a leopard or tiger, people shout, run toward the animal, throw stones, or try to drive it away on foot—often at night or in poor visibility.

Why people try it

- Panic and fear after a sudden sighting
- Belief that showing aggression will scare the animal away
- Pressure to “do something immediately”

Why farmers do not recommend it
Farmers say this is one of the most dangerous responses. Leopards and tigers react unpredictably when cornered or surprised at close distance. Chasing increases the chance of sudden charges, wrong turns, falls, and fatal encounters. Many serious injuries happen during such attempts, not during calm avoidance.

4.2 Setting Traps, Snares, or Hidden Sharp Objects

What people sometimes do
Wire snares, metal loops, sharpened stakes, or concealed traps are placed along paths, near livestock sheds, or inside fields.

Why people try it

- To injure the animal so it avoids the area
- To stop repeat livestock loss without night effort

Why farmers do not recommend it
Farmers say these methods are extremely dangerous. Traps do not selectively stop animals; they cause severe injuries, prolonged suffering, and sometimes death. Injured leopards or tigers become more aggressive and unpredictable. Traps also injure people, dogs, and livestock. These methods are illegal and often lead to severe legal consequences.

4.3 Poisoning Bait or Carcasses

What people sometimes do
Poisoned meat, pesticide-laced carcasses, or contaminated water sources are placed near fields or livestock areas.

Why people try it

- Seen as a “silent” solution
- Belief that the animal will disappear permanently

Why farmers do not recommend it
Farmers say poisoning rarely works as intended. It causes prolonged suffering, kills non-target animals, contaminates the environment, and often spreads conflict. Surviving animals shift routes and return elsewhere. Poisoning is illegal and treated as a serious wildlife crime.

4.4 Firecrackers, Explosives, or Aggressive Noise at Close Range

What people sometimes do
Firecrackers are thrown, loud noises are made suddenly, or burning objects are waved near animals, especially at night.

Why people try it

- Quick reaction during panic
- Influence of videos or past stories
- Belief that loud shock will drive animals away

Why farmers do not recommend it
Farmers say sudden noise at close range increases panic—for both people and animals. Leopards and tigers may charge blindly, change direction suddenly, or retreat into dense cover where visibility is poor. This increases the risk of fatal encounters, especially in plantations and tall crops.

4.5 Blocking Exit Routes or Surrounding the Animal

What people sometimes do
Groups gather to surround an animal or block known paths, hoping to trap or force it back.

Why people try it

- Belief that cutting off escape will end the threat
- Pressure from crowds or community anger

Why farmers do not recommend it
Farmers say leopards and tigers need clear exit routes. Blocking movement causes panic and desperate behaviour. Animals may jump into houses, run through villages, or attack in confusion. Many fatal incidents occur when escape routes are blocked.

4.6 Using Dogs to Chase Leopards or Tigers

What people sometimes do
Dogs are sent ahead to chase or alert when an animal is nearby.

Why people try it

- Dogs are readily available
- Belief that dogs will warn people early

Why farmers do not recommend it
Farmers say dogs strongly attract leopards. This increases risk near houses and cattle sheds. Dogs are often killed, and their presence encourages repeated visits. Using dogs to chase predators increases danger rather than reducing it.

What Farmers Conclude Over Time

Farmers consistently say that harmful or aggressive methods share common outcomes:

- They increase panic and unpredictability
- They raise the risk of human injury or death
- They spread conflict to new areas
- They invite legal trouble and long-term stress

Leopards and tigers are not stopped by fear alone. Farmers emphasize that **calm avoidance, early information, shared action, and reducing surprise** are far safer and more effective than force.

Because of this, farmers say these harmful methods should be avoided—not for moral reasons alone, but because they **make daily life more dangerous**.

5.4 Living With Monkeys, Peacocks, and Birds - What Reduces Damage, What Doesn't, and Why

Section 1: Living with Monkeys

A. How monkeys damage crops and trees

Farmers say monkeys cause the **most visible and frequent damage**, especially in villages and farms where fruit trees, field crops, and houses exist close together. Damage is spread across **orchards, homesteads, and fields**, not limited to one place.

Monkeys pull out young plants, break stems and branches, climb onto crops causing trampling, and eat selectively while throwing away much of what they take. Even when they eat little, the physical damage is high.

A large part of monkey damage happens on **fruit trees grown near houses and along field boundaries**. Farmers commonly report damage to mango, guava, banana, papaya, sapota, and other soft or ripening fruits. Monkeys often pluck fruit before it is fully ripe, damaging both yield and branches.

Farmers also note that **not all fruit trees are equally attractive**. During discussions, some farmers said monkeys tend to avoid sitaphal (custard apple). Because of this, some plant sitaphal near homes or boundaries as a lower-risk fruit option. Farmers treat this as a preference, not a guarantee.

In fields, monkeys damage maize, vegetables, pulses, groundnut, and crops close to harvest. They prefer ripening produce. Loss is high because plants are broken, pulled down, or trampled.

Over time, farmers say fruit trees and nearby fields begin to feel like **monkey feeding areas**, turning protection into a daily task rather than an occasional response.

Why monkeys keep coming back to the same fields

Farmers say monkeys return because they **learn quickly**. Once a group finds food in a field or orchard, they remember where it was, how people reacted, and how quickly chasing stopped.

Monkeys watch human behaviour closely. If people guard only for short periods, monkeys wait and return. If people leave for meals or rest at predictable times, monkeys enter then. Once monkeys feel confident, they return daily, often at the same hours.

Farmers also observe that monkeys use **familiar routes** — trees, compound walls, electric lines, and field edges — to enter and leave. These routes are reused across seasons.

When farmers know monkey risk is highest

Farmers say monkey damage peaks **near harvest**. Risk increases when crops are almost ready, when guarding drops because people assume the season is ending, or when harvesting is delayed due to labour or weather.

Monkeys also cause heavy loss during **midday hours**, when people leave fields for meals or other work. Many losses happen not because fields are unguarded all day, but because they are unattended for short, predictable periods.

Farmers say even a few days of repeated monkey visits at this stage can undo an entire season's work.

B. Living with Peacocks and Other Birds (sparrows, parakeets (green parrots), pigeons, mynas, crows, and munias)

How peacocks and birds damage crops

Farmers say peacocks and birds cause damage that is **less dramatic but constant**. Loss happens in small amounts every day and is often noticed late.

Peacocks damage crops mainly at **early stages**. They peck at seeds and seedlings, uproot young plants, and damage soft shoots. Crops such as groundnut, pulses, oilseeds, vegetables, and nursery beds are commonly affected. Damage is often patchy, making it hard to detect early.

Other birds damage crops by eating freshly sown seeds and pecking grains during flowering and grain-filling stages.

Crops frequently affected include paddy, millet, wheat, sorghum, maize, pulses, and oilseeds. Damage is highest when crops are soft, milky, or close to harvest.

Even when each visit causes little loss, repeated visits over many days reduce yield noticeably.

Why peacocks and birds return repeatedly

Farmers say peacocks and birds return because there is **very little risk**. They are active during the day, when people cannot guard continuously.

Birds and peacocks quickly learn:

- which fields mature early,
- where guarding is weak,
- and which times fields are left unattended.

Once a field becomes known as a food source, birds return repeatedly until the crop stage changes.

Peacocks and birds also follow **familiar paths**, bunds, open ground, and low vegetation. Once these routes form, they are reused across seasons.

When farmers know risk is highest

Farmers say risk from peacocks and birds peaks at **two stages**.

The first is **just after sowing**, when seeds and seedlings are easy to pull out and eat. This stage is especially risky when sowing is done earlier than neighbouring fields or when guarding reduces after the first few days.

The second peak is during **flowering and grain filling**, when birds return daily to peck at soft grain heads. Damage is slow and spread out, and yield loss becomes clear only at harvest.

Farmers also say **time of day matters**.

Birds and peacocks visit early in the morning and again in the late afternoon, often when people move away for other work.

What farmers notice across all three

Across monkeys, peacocks, and birds, farmers say damage is **not random**. It follows crop stage, timing, and gaps in human presence.

Animals learn quickly. Fields that are easy to enter and poorly guarded become repeat targets. The biggest challenge is not a single loss, but the **effort needed day after day**.

Farmers say damage reduces when effort is focused on the **most vulnerable days and hours**, instead of trying to guard continuously through the entire season.

Section 2: How these observations shape what farmers actually do

Because damage follows timing and habit, farmers say responses are not about stopping animals completely. They are about **being present at the right time**, in the right way.

Farmers explain that guarding and other field responses begin only after they understand **when loss is happening**, not just that it is happening. Instead of trying to protect fields all day, they focus effort on the hours and crop stages when animals return most often.

Over time, farmers say this changes how they respond. Effort shifts from constant watching to **short, targeted action** — guarding during peak hours, reacting quickly when animals enter, and combining presence with simple disturbances. These field responses are shaped by daily routines, available labour, and how long effort can be sustained without exhaustion.

It is from this understanding that farmers turn first to **daytime guarding and human presence**, before trying other methods.

Disclaimer:

Farmers say that animals do not follow a fixed calendar or fixed hours. The times mentioned in this chapter are based on patterns seen in some places, not rules that apply everywhere.

In different areas, risk can begin earlier or later depending on rainfall, crop stage, nearby land use, and how animals move locally. Because of this, farmers advise watching the field closely and responding to the first signs of entry, repeat paths, and quiet hours, rather than following dates or clock time exactly.

Deterrents work best when they are used at the right moment for the local situation, not when they are applied mechanically.

What Methods Should a Farmer Choose Based on Cost and Effort

Listed below are several methods, some long term and cost heavy methods and others short term and less capital intensive.

Farmers say the first step is to understand what kind of cost a method involves. Some measures need a high one-time investment, such as netting or fencing, but require less daily effort once in place.

Other measures cost little at the start but must be repeated many times through the season — guarding, lights, repairs, fuel, or hired labour.

Farmers advise first estimating how long the crop will be at risk and how often each method will need to be repeated.

This helps compare long-term investment against repeated short-term effort. The choice of method then becomes clearer when this cost and effort is matched with how often animals are entering, how much damage they are causing, and whether the response can be sustained safely over time.

Method A: Daytime Guarding and Human Presence

Why farmers rely on guarding first

Farmers say guarding is the first response they turn to when monkeys, peacocks, and birds begin damaging crops. It does not require money, permissions, or special equipment. It can start the same day damage is noticed.

Across regions, farmers describe guarding as **necessary but exhausting**. It works for short periods, then weakens as animals learn routines and people tire.

How farmers actually guard fields

Farmers guard fields in simple ways. People sit on bunds, under trees, or on small raised platforms. They walk through fields, clap, shout, throw stones, wave cloth, or chase animals away by running toward them.

Farmers said guarding often happens during **specific hours**, not all day. People guard early mornings and late afternoons for birds and peacocks, and midday for monkeys, when animals are most active.

Some farmers take turns within the family. Others move between fields, especially when plots are close together. Guarding is often combined with other work — weeding, irrigation, or watching livestock — rather than done as a separate activity.

How guarding works in the beginning

Farmers say guarding works best **when it starts early**. When animals first enter a field and are chased immediately, they hesitate and leave. Repeated strong response in the first few days can delay further visits.

Monkeys, especially, respond to strong early resistance. Birds and peacocks move away temporarily when disturbance is frequent and unpredictable.

Farmers say early guarding is more effective than guarding later, after animals become confident.

Why guarding becomes difficult over time

Across regions, farmers say guarding becomes hard to sustain after days or weeks. People have other work, children to care for, and limited labour.

Animals learn patterns. Monkeys watch when people leave for meals. Birds return when fields are unattended for even short periods. Peacocks wait at field edges and enter as soon as people move away.

Farmers say guarding one field alone often fails. Animals simply move to the next plot or return later the same day.

Guarding by rotation and shared effort

Farmers say guarding works better when effort is shared. In several discussions with farmers, they revealed that rotating guarding duties within families and between neighbouring fields.

Some farmers guard together during peak hours and then return to other work. Others coordinate informally — one person watches several adjacent plots and alerts others when animals enter.

Shared guarding reduces exhaustion and keeps response stronger for longer.

Where guarding usually fails

Farmers say guarding fails when:

- effort drops after the first few days,
- guarding is done by one person alone,
- fields are left unattended during predictable hours,
- animals have already learned that disturbance is temporary.

Guarding also fails when fields are large or far from homes, making constant presence impossible.

Cost and effort

Guarding has no cash cost, but a high human cost. Farmers say it affects rest, health, and other farm work.

Because of this, farmers treat guarding as a **short-term and targeted response**, not something that can be sustained for an entire season.

What farmers learn over time

Farmers conclude that guarding is unavoidable, but it must be used carefully. It works best when:

- started early,
- focused on high-risk hours,
- shared among people,

- and combined with other methods.

Guarding alone does not stop monkeys, peacocks, or birds. It slows damage and buys time.

Method B Scarecrows

What farmers do

Farmers make scarecrows using old clothes, sacks, or plastic sheets tied to bamboo poles or wooden frames. These are placed inside fields or along boundaries so that they resemble a standing person.

How it is used

Scarecrows are usually put up when crops are young or close to harvest. Some farmers change clothes or position to make them look different. A few combine scarecrows with hanging tins or cloth so there is some movement.

Where it helps

Farmers say scarecrows can reduce bird damage for a short time, especially when they are newly placed. Birds hesitate initially, and damage may reduce for a few days.

Where it fails

Farmers are clear that scarecrows stop working quickly. Birds realise there is no movement. Monkeys are not deterred at all and often climb on scarecrows or pull them down.

If scarecrows are left in the same place, animals completely ignore them.

What farmers learn over time

Farmers treat scarecrows as a **temporary and symbolic measure**, not real protection. They may help briefly when combined with other disturbance, but on their own they do not prevent damage.

Method C: Use of pellet guns or air guns

Pellet guns and air guns

Some farmers say they use pellet guns or air guns as a way to scare monkeys and birds. These are usually not used to kill animals, but to create a sudden sound and shock that makes animals run away.

Farmers say this works mainly when:

- animals are new to the field,
- shots are fired occasionally, not repeatedly,
- the person using the gun is visible and active.

Monkeys and birds react strongly at first and move away quickly. However, farmers also say animals learn fast. If pellet guns are used every day or from the same place, monkeys begin to judge the distance and return once the person leaves.

Farmers are careful to point out limits:

- pellet guns require constant human presence,
- misuse can injure animals and create legal trouble,
- effectiveness drops once animals get used to the sound.

Because of this, farmers treat pellet guns as a **short-term scare method**, not a solution on their own.

Method D: Recorded sounds and loud noise playback

Some farmers use recorded sounds such as:

- dogs barking,
- firecrackers,
- shouting or alarm sounds that are played through mobile phones or small speakers kept near fields.

These sounds are usually played:

- during peak activity hours,
- for short periods,
- and often combined with human movement.

Farmers say these sounds can delay entry and create hesitation, especially for birds and monkeys during early visits. However, if the same sound plays repeatedly from the same spot, animals quickly realize there is no real threat.

Farmers say recorded sounds work best when:

- used irregularly,
- shifted between locations,
- combined with someone being nearby.

Used alone and continuously, they stop working.

Method E: Keeping dogs for guarding

Many farmers keep dogs to help with guarding fields. Dogs increase noise, movement, and early warning. Farmers say dogs are especially useful for:

- alerting people when monkeys enter,
- chasing birds and peacocks,
- supporting daytime guarding.

Dogs help most when they are:

- active and healthy,
- trained to stay near fields,
- used along with human presence.

Farmers also point out limits:

- monkeys learn to avoid dogs over time,
- dogs get tired quickly in heat,
- dogs cannot guard large fields alone.

Some farmers also say uncontrolled dogs can push animals into neighbouring fields, shifting the problem rather than reducing it.

Method F: Visual Deterrents and Crop Covering

Farmers say visual deterrents and crop covering are used mainly to **protect small areas or early crop stages**. These methods are labour-intensive and rarely suitable for large fields, but they can reduce losses when used carefully.

F.1 Covering nursery beds with nets or cloth

What farmers do

Farmers cover nursery beds using fishing nets, shade nets, old sarees, cloth sheets, or plastic mesh.

How it is used

Covering is done tightly and close to the ground so birds cannot enter from the sides. Farmers secure edges with stones or soil.

Where it helps

This works well during the first few weeks after sowing, especially for vegetables, paddy nurseries, and small plots. Farmers say it is one of the few methods that reliably reduces bird damage at this stage.

Where it fails

It becomes impractical for large areas. Nets tear easily and need repair. If edges are loose, birds enter quickly.

F. 2 Individual plant protection

What farmers do

Farmers cover young plants using inverted baskets, thorn branches, or locally available materials.

How it is used

Used only for high-value plants or very small areas.

Where it helps

Protects seedlings from peacocks and birds during early growth.

Where it fails

Labour requirement is very high. Not practical for field crops.

F.3 Boundary cloth screens

What farmers do

Farmers tie old cloth, sarees, or plastic sheets along field boundaries to block visual entry.

How it is used

Cloth is tied at low height along edges where birds and peacocks usually enter.

Where it helps

Reduces bird entry for short periods, especially when combined with guarding.

Where it fails

Cloth loses effect once animals get used to it. Wind damage and tearing are common.

F.4 Shade nets or fencing with mesh

What farmers do

Some farmers use shade nets or wire mesh fencing around small plots or nurseries.

How it is used

Installed around the perimeter, with the bottom secured tightly.

Where it helps

Effective for vegetable patches, seed production plots, or high-value crops.

Where it fails

High cost and maintenance. Not feasible for large farms.

F.5 Tying ribbons, flags, or cloth strips above crops

What farmers do

Farmers tie ribbons, cloth strips, or plastic tape above crop height.

How it is used

Movement in wind is meant to deter birds.

Where it helps

Works briefly in the early stage of bird visits.

Where it fails

Birds habituate quickly. Effectiveness drops within days.

What farmers learn over time

Farmers say visual deterrents and covering work **only when the area is small and effort is high**. These methods are useful for protecting nurseries, seed plots, and small vegetable areas.

They do not scale to large fields. Over time, farmers use them selectively, not as general solutions.

Method G: Crop Choices, Timing, and Field Layout

Farmers say crop and field decisions are usually changed **after one or two bad seasons**. These choices are not quick fixes. They are ways to reduce pressure, not stop damage completely.

G.1 Planting less-preferred crops along field boundaries

What farmers do

Farmers plant crops that monkeys and birds show less interest in along the outer edges of fields, while keeping more attractive crops further inside.

Common boundary crops mentioned by farmers include castor, chilli, turmeric, lemongrass, and in some places marigold.

What this method is actually trying to do

Farmers say this method is **not meant to stop animals physically**. Birds can fly over it, and monkeys can jump across it.

The purpose is to make the **first contact with the field less rewarding**. When animals enter from the edge and do not immediately find preferred food, they are less likely to linger, feed heavily, or return repeatedly.

How it is used

Boundary crops are planted as a strip along field edges, especially near:

- trees used as perches,
- village paths,
- scrubland or open areas from where animals usually enter.

This method is usually planned before the season and works only as part of a larger strategy.

Where it helps

Farmers say this method helps most with **birds and peacocks**, especially during early crop stages. It slows early entry, reduces repeated pecking along edges, and buys time before damage spreads inward.

Some farmers say monkey movement reduces slightly when the field edge does not offer immediate food, though monkeys are more persistent.

Where it fails

Farmers are clear that boundary crops **do not stop monkeys** once they decide to enter. Monkeys will cross boundaries if attractive crops lie inside.

Farmers also point out that income from boundary crops is often lower, and the method does not work when neighbouring fields grow highly attractive crops right up to the edge.

What farmers learn over time

Farmers treat this as a **pressure-reduction method**, not protection. It works only when expectations are realistic and when combined with guarding or other deterrents.

G.2 Avoiding early or isolated sowing

What farmers do

Farmers delay sowing so their fields do not mature earlier than neighbouring plots.

How it is used

Planting is timed to match nearby fields, especially for cereals and pulses.

Where it helps

Bird and peacock pressure reduces when food is spread across many fields.

Where it fails

Delays can affect yield or irrigation schedules. Not always possible.

G.3 Staggering sowing within the field

What farmers do

Some farmers stagger sowing dates within the same field or across plots.

How it is used

Crops do not reach vulnerable stages at the same time.

Where it helps

Reduces peak damage on any single day.

Where it fails

Labour-intensive and complicates management.

G.4 Changing crop type after repeated losses

What farmers do

After heavy losses, some farmers shift temporarily to crops less preferred by monkeys and birds.

How it is used

High-risk crops are avoided for one or two seasons.

Where it helps

Reduces repeated visits when animals associate fields with food.

Where it fails

Income loss is common. Animals adapt over time.

G.5 Clearing perches and access points

What farmers do

Farmers cut branches, remove perches, and reduce tree cover near field edges.

How it is used

Trees near boundaries or bunds are pruned.

Where it helps

Bird pressure reduces when resting points are removed.

Where it fails

Tree removal is not always allowed or socially acceptable.

What farmers learn over time

Farmers say crop and layout changes help **spread risk**, not eliminate it. These methods work best when neighbours coordinate and when expectations are realistic.

They are long-term adjustments, not immediate solutions.

G.6 Planting crops that farmers say monkeys avoid

What farmers do

During discussions, some farmers mentioned planting **sitaphal (custard apple)** along field edges or near homesteads, saying that monkeys tend to avoid these trees.

How it is used

Sitaphal is planted as a boundary or mixed tree crop, not as a main field crop. Farmers say they rely on it more as a long-term landscape choice than a seasonal deterrent.

Where it helps

Farmers who mentioned this said monkey movement reduced near these trees, especially compared to areas with fruit trees that monkeys prefer. They see it as a way to make boundaries less attractive over time.

Where it fails / limits

Farmers are also clear that this does not stop monkeys completely. Monkeys may still cross these areas to reach food elsewhere. The effect, if any, is gradual and depends on what other crops are nearby.

Method H: Community Coordination and Shared Action

Farmers say that damage from monkeys and birds becomes hardest to manage when each household acts alone. Individual effort is intense but short-lived. When farmers coordinate, even loosely, outcomes change.

Community action does not stop animals permanently. What it does is reduce exhaustion, spread effort, and prevent damage from shifting endlessly from one field to the next.

H.1 Coordinated watching and response

What farmers do

Farmers take turns watching fields during peak risk periods. Instead of each person guarding their own plot, neighbours cover adjacent fields together.

How it is used

Watching is done during early morning and evening hours when monkeys are most active. Shouting, running toward animals, and coordinated noise push animals away from a wider area.

Where it helps

Animals retreat more quickly when multiple people respond at once. Fields are less likely to be singled out repeatedly.

Where it fails

Coordination breaks down when effort is uneven or when only a few households participate.

H.2 Sharing scare devices across fields

What farmers do

Instead of each farmer installing separate scare devices, communities share and rotate tins, flags, cloth strips, and noise-making materials.

How it is used

Devices are moved across fields every few days so animals do not learn fixed locations.

Where it helps

Rotation extends effectiveness and reduces individual labour.

Where it fails

Requires trust and communication. Without movement, devices lose effect.

H.3 Aligning crop choices at the boundary level

What farmers do

Neighbouring farmers discuss boundary crops and try to avoid planting highly attractive crops in isolated patches.

How it is used

Boundary decisions are informal and based on past damage.

Where it helps

Reduces edge pressure and slows entry.

Where it fails

Market prices often override coordination.

H.4 Changing daily routines together

What farmers do

Farmers share information about animal movement and adjust work timing collectively — avoiding early morning or late evening activity when animals are active.

How it is used

Information is shared verbally or through phone calls.

Where it helps

Reduces surprise encounters and panic.

Where it fails

Relies on constant communication.

What farmers learn over time

Farmers say community action makes effort feel worthwhile. Losses become more predictable. Exhaustion reduces.

No single field can solve the problem alone. Acting together does not remove animals, but it changes how much damage they cause and how much effort farmers must spend.

Farmers say there is no single method that works on its own or forever. Animals learn. Fields change. Seasons shift. What works one year may fail the next.

Over time, farmers stop looking for a perfect solution. Instead, they combine methods — some noise, some covering, some crop changes, and some shared effort. They focus more on **when damage starts**, not just on how to stop it.

Farmers also say working together matters as much as the method itself. When neighbours act at the same time, effort lasts longer and losses feel more manageable. Acting alone makes people tired quickly.

In the end, farmers say living with these animals is about **reducing surprise, sharing effort, and choosing where to spend energy**. The goal is not to stop animals completely, but to protect crops and families without exhausting themselves season after season.

Section 3: Harmful Practices That Farmers Do Not Recommend

Farmers say that when crop loss becomes frequent and exhausting, people sometimes turn to methods that feel strong or immediate. Over time, many farmers have learned that some of these practices either stop working quickly or make the situation worse by increasing effort, conflict, or risk. These methods are therefore not recommended.

Note: Under the Wildlife (Protection) Act, wild animals are protected by law. Farmers are allowed to defend human life and prevent immediate danger, but harming, killing, trapping, or poisoning wild animals is prohibited, even when crops or livestock are damaged.

Methods such as illegal electric fencing, poisoning, shooting, or setting lethal traps can lead to legal action and often result in compensation being denied. Farmers say it is important to know these limits, because actions taken in desperation can create long-term problems.

Compensation is usually considered only when damage occurs despite lawful and non-lethal measures, and when incidents are reported through the proper process.

3.1 Excessive or Aggressive Chasing

What people sometimes do
People run repeatedly through fields, throw stones aggressively, shout continuously, or chase animals far beyond field boundaries.

Why farmers do not recommend this
Farmers say aggressive chasing quickly exhausts people but does not stop animals. Monkeys often retreat briefly and return as soon as people leave. Birds and peacocks simply shift to the next unattended area. Continuous chasing also disrupts farm work and increases fatigue, making guarding harder to sustain.

What farmers advise instead
Short, strong response during peak hours works better than constant chasing throughout the day.

3.2 Poisoning Seeds, Grain, or Bait

What people sometimes do
Poisoned grain, pesticide-coated seeds, or toxic substances are left in fields to kill birds or monkeys.

Why farmers do not recommend this
Farmers strongly caution against poisoning. It kills non-target birds, livestock, and sometimes pets. Poison spreads through the environment and creates long-term problems. Legal consequences are severe, and poisoning rarely stops repeat damage.

What farmers advise instead
Avoid poison completely. It increases harm without solving the problem.

3.3 Fixed Scare Devices Left Unchanged

What people sometimes do
Scarecrows, flags, tins, or sound devices are installed once and left in the same place for long periods.

Why farmers do not recommend this
Farmers say monkeys, birds, and peacocks learn very quickly. Once they realise a device does not move or change, they ignore it completely. Fixed deterrents give a false sense of protection and delay stronger responses.

What farmers advise instead
If scare devices are used, they must be moved, changed, or combined with human presence.

3.4 Playing Loud Sounds Continuously

What people sometimes do
Recorded sounds, alarms, or radios are left playing all day or night from the same location.

Why farmers do not recommend this
Farmers say constant noise loses effect quickly. Animals learn there is no real threat. Continuous sound also disturbs people, creates tension with neighbours, and increases fatigue.

What farmers advise instead
Use sound briefly, irregularly, and only during peak activity hours, preferably with someone nearby.

3.5 Keeping Dogs Alone as a Primary Deterrent

What people sometimes do
Dogs are left to guard fields without regular human presence.

Why farmers do not recommend this
Farmers say dogs get tired quickly, especially in heat. Monkeys learn to avoid or harass dogs. Birds and peacocks ignore them. Dogs may also chase animals into neighbouring fields, shifting the problem rather than reducing it.

What farmers advise instead
Dogs work only as support to human presence, not as a stand-alone solution.

3.6 Expecting One Method to Work for the Whole Season

What people sometimes do
Farmers rely on a single method—guarding, scarecrows, sound, or nets—expecting it to work continuously.

Why farmers do not recommend this
Farmers say monkeys and birds adapt quickly. What works for a few days or weeks stops working if effort is not changed. Relying on one method leads to disappointment and exhaustion.

What farmers advise instead
Combine methods, change tactics, and focus effort on the most vulnerable crop stages and hours.

What Farmers Learn Over Time

Because of this, farmers emphasise that the goal is **not to fight animals**, but to reduce daily loss without exhausting families. Safer methods focus on timing, movement, and shared effort rather than force.

The next sections describe approaches that farmers say reduce damage **without increasing risk or long-term burden**.

Farmers say harmful practices share common problems:

- animals learn and adapt quickly,
- effort becomes exhausting,
- damage shifts rather than stops,
- legal and social risks increase.

5.5 Compensations

Section 1. Why compensation matters — and why farmers struggle to get it

Farmers say compensation becomes important only after something has already gone wrong. A person has been injured or killed. A cow or goat has been taken. A crop has been damaged after months of work. By then, the loss is already heavy.

Compensation does not remove the pain or the fear. But it helps families manage immediate costs — hospital bills, funeral expenses, buying another animal, or surviving a bad season. For many families, even a small amount makes a difference.

At the same time, farmers say getting compensation is not easy. Many people do not know **what can be claimed**, **who to approach**, or **how fast they need to act**. Some are afraid of police or paperwork. Others are not confident about visiting offices far from their village.

Farmers also say the process feels confusing. Different officers say different things. One office sends them to another. Papers are asked for again and again. Because of this, some families do not apply at all, or they apply too late and lose the chance.

Over time, farmers say compensation starts to feel uncertain. Some people get it, others do not, even when the loss looks similar. This creates frustration and distrust.

That is why farmers say clear information matters. Knowing what is possible, what to do first, and where problems usually happen can save time, effort, and stress during an already difficult period.

Section 1.A LEGAL RIGHTS & RESPONSIBILITIES IN WILDLIFE CONFLICT

Before discussing compensation for various kinds of losses we need to understand the legal rights and responsibilities of the farmer. This is critical as it is important for the farmer to know what is allowed by the law and what is prohibited. This knowledge becomes crucial while claiming compensation.

1. What the law protects

Under Indian law, wild animals are protected. This applies even when animals damage crops, livestock, or property. The purpose of the law is to prevent harm to wildlife while allowing people to protect human life and safety.

2. What farmers are legally allowed to do

Farmers are allowed to:

- Protect **human life** and prevent immediate danger.
- Use **non-lethal, lawful methods** to reduce damage, such as fencing, guarding, lights, noise, chilli ropes, and community vigilance.
- Report damage, injury, or loss to the **Forest Department, Revenue officials, or local authorities**.
- Apply for compensation through prescribed procedures.
- Seek help from local officials, NGOs, or village institutions for lawful mitigation measures.

3. What farmers are not allowed to do

Farmers are **not allowed** to:

- Kill, poison, trap, or injure wild animals.
- Use illegal electric fencing connected to live power lines.
- Set lethal traps, snares, or poison baits.

- Shoot animals without legal permission.
- Take revenge actions after damage has occurred.

Such actions can lead to **legal cases**, fines, or imprisonment, and often result in **denial of compensation**.

4. How legality affects compensation

Compensation is usually considered when:

- Damage or loss occurs despite **lawful and non-lethal efforts**.
- The incident is **reported promptly** to authorities.
- Verification is done by authorised officials.

Compensation may be delayed or rejected when:

- Incidents are not reported in time.
- Illegal methods are used.
- Damage details are unclear or unverifiable.

5. What to do after an incident

Farmers advise the following steps:

1. Ensure safety of people first.
2. Inform local Forest or Revenue officials as soon as possible.
3. Do not disturb evidence (tracks, carcass, damaged area) until inspection.
4. Cooperate during verification and documentation.
5. Keep copies or records of all submissions.

6. A practical reminder from farmers

Farmers say that acting in panic can create bigger problems later. Knowing what the law allows — and what it does not — helps protect both livelihoods and legal rights. When in doubt, it is safer to report and seek help than to take risky action alone.

Section 2: Compensation for Loss of Human Life and Injury

What compensation is usually given

Farmers say that compensation for human loss is more clearly defined than for crop or livestock loss, though it still depends on the state. When a person dies due to a wild animal encounter, most states provide compensation in the range of **Rs,8,00,000 – Rs. 10,00,000 (eight to ten lakh rupees**.) This amount is paid to the family of the deceased person and does not depend on land ownership or income.

In cases of very serious injury or permanent disability, compensation is lower. Farmers say the amount usually ranges from **Rs.50,000 – Rs. 2,00,000** (**fifty thousand to two lakh rupees**) , depending on how severe the injury is and whether the person can return to work. For minor injuries, some states reimburse part of the medical cost, while others do not give compensation at all. Families often learn this only after applying.

Farmers say these amounts are meant to help with immediate expenses such as hospital bills, funeral costs, or loss of income. They do not make up for the loss, but they reduce financial pressure during a difficult time.

Which department families usually deal with

Farmers say compensation for human loss does not come from one single office. Most cases involve more than one department.

The **Forest Department** plays the main role. They confirm that the incident involved a wild animal and prepare the official incident report. Without this confirmation, compensation does not move forward.

For death cases, the **police** are also involved. A post-mortem and an official death record are required. Families say this step is emotionally hard but unavoidable.

In some states, the final approval or payment comes through the **Revenue Department or disaster relief authorities**, even though the Forest Department handles the case initially. This is why families are often asked to visit more than one office.

What families are expected to do first

Farmers say the most important thing is to inform the right people as soon as possible. After an incident, families usually contact the local forest guard or forester. In death cases, they also inform the police.

Farmers say it is important not to disturb the site until officials arrive. This includes not moving the body or cleaning the area, even though it is distressing. Officers need to see the location and record details before preparing their report.

Delays create problems. If reporting happens late, officials may say they cannot confirm the cause, and compensation may be delayed or denied. Farmers say early reporting does not guarantee compensation, but late reporting almost always causes trouble.

Documents families are asked to submit

Documents families are asked for

For **death cases**, families are usually asked for:

- post-mortem report,
- police record,
- Forest Department incident report,
- identity proof of the deceased,
- bank details of the family member receiving compensation,
- proof of relationship.

For **injury cases**, documents usually include:

- medical certificate or hospital records,
- Forest Department report,
- identity proof and bank details.

Families say that even when the loss is clear, missing one document can stop the file from moving. Many people make repeated trips to offices because they were not told all requirements at the beginning.

Inspection and verification

After reporting, officials from the Forest Department visit the site. They check signs of animal movement, speak to people nearby, and prepare a report confirming wildlife involvement. This report forms the base of the compensation file.

Medical officers and police complete their own verification separately. Farmers say inspections usually happen quickly in death cases, but paperwork and approvals take much longer.

How payment is processed

Once all documents are submitted, the file moves through different levels of approval. This may include the Range Office, Divisional Office, and district authorities. After approval, the money is sent directly to the bank account of the family member named in the file.

Farmers say payment can take a few weeks in some cases, and several months in others. Regular follow-up often makes a difference, but not all families are able to do this.

Where families face difficulties

Farmers say problems usually arise because of late reporting, incomplete documents, or unclear instructions from offices. Some families are afraid of police procedures and avoid applying altogether. Others give up after repeated visits without clear answers.

There is also confusion because rules differ from state to state. What worked for one family may not work for another, even in a nearby village.

What families learn over time

Families who manage to receive compensation say a few things help. Informing the Forest Department first, keeping copies of all papers, and asking clearly what is required at each step reduces delays. Patience and persistence matter.

Farmers say compensation does not reduce the pain of losing a family member, but clear information and early action reduce uncertainty during an already difficult period.

SAMPLE FORM FOR CLAIMING COMPENSATION

Compensation procedures, formats, and authorities differ by state and by type of damage. The forms shown below are sample templates, prepared only to help farmers understand what information is usually required and how applications are commonly filled.

These are not official government forms. Farmers must submit claims using the formats prescribed by their local Forest or Revenue Department, while using these samples as guidance to avoid missing details that often lead to rejection or delay.

The information filled in below is indicative only – to be used as reference – change the details as per the actual events, date, time and place

Human Injury / Death Compensation Application (Illustrative)

(For injury or death due to wildlife conflict)

Applicant / Claimant Details

1. Name of Injured Person / Deceased: Shankar
2. Age: 46 years
3. Gender: Male
4. Village: Kottur
5. Taluk / Block: Alur
6. District: Hassan

Claimant Details (if different)

7. Name of Claimant: Saroja
8. Relationship to Injured / Deceased: Wife
9. Mobile Number: 9XXXXXXXXX

Incident Details

10. Date of Incident: 21 July 2025
11. Time of Incident: Around 6:15 am
12. Location: Footpath near sugarcane field
13. Animal Involved: Elephant
14. Nature of Incident:

Sudden encounter while returning from field. Victim fell and sustained injuries during escape.

Injury / Death Details

15. Nature of Injury: Fracture to leg and chest injury

(OR in case of death: Fatal injuries leading to death)

16. Hospital Treated: Government Hospital, Alur
17. FIR / Police Report Filed: Yes
18. Post-mortem Conducted (if death): Yes

Documents Attached (as applicable)

19. Medical Report / Death Certificate
20. FIR Copy
21. Identity Proof
22. Bank Details for Compensation Transfer

Declaration by Claimant

I declare that the information provided above is correct. The incident occurred due to wildlife movement, and the case has been reported to the appropriate authorities. I request compensation as per government norms.

Signature / Thumb Impression of Claimant
Date: 23 July 2025

Section 3: Compensation for Livestock and Cattle Loss

What compensation is usually given

Farmers say compensation for livestock loss is meant to help them replace animals that were killed by wild animals. This usually includes cows, buffaloes, goats, sheep, and calves. Poultry is covered in some states but not in others.

The amount paid depends on the animal and the state. Farmers commonly report that compensation for an adult cow or buffalo ranges from **thirty thousand to seventy-five thousand rupees**. Goats and sheep usually receive a smaller amount, often **three thousand to ten thousand rupees** per animal. Calves are compensated at lower rates than adult animals.

Farmers say these amounts rarely cover the full value of the animal, especially for high-yielding cattle, but they help reduce the immediate financial shock.

Which department handles livestock loss

For livestock loss due to wild animals, the **Forest Department** is the main department involved. They confirm that the animal was killed by a wild animal and prepare the official incident report.

The **Veterinary Department** is also involved in almost every case. A veterinary officer examines the animal and issues a certificate stating the cause of death. Without this certificate, compensation is usually not processed.

Farmers say this means coordination between forest staff and veterinary staff is necessary, and delays happen when one department is unavailable.

What farmers must do immediately after losing an animal

Farmers say quick action makes a big difference. As soon as an animal is found dead or injured, the farmer should inform the local forest guard or forester. The veterinary officer should also be informed as early as possible.

Farmers stress that the animal **should not be buried, skinned, or removed** before officials inspect it. Even though this is difficult, especially in hot weather, inspection is necessary to confirm wildlife involvement.

If the carcass is removed before inspection, officers may say they cannot verify the cause, and compensation may be denied.

Documents farmers are asked to submit

Farmers say livestock claims usually require fewer documents than human loss cases, but missing any one document can still delay payment.

Typically, farmers are asked for:

- a veterinary certificate or post-mortem report,
- a Forest Department inspection report,
- photographs of the carcass before disposal,

- identity proof and bank account details,
- and sometimes proof that the animal belonged to the farmer.

Farmers say requirements vary by state and district, so asking clearly at the start helps avoid repeat visits.

Inspection and confirmation

After reporting, forest staff visit the site to inspect the carcass and look for signs of wildlife attack. The veterinary officer examines wounds and confirms the cause of death.

Farmers say problems arise when:

- scavengers damage the carcass before inspection,
- the animal died far from the village,
- or there is disagreement about the cause of death.

In such cases, compensation may be reduced or rejected.

How payment is processed

Once inspection reports and documents are complete, the file moves through the Forest Department for approval. After sanction, the amount is transferred directly to the farmer's bank account.

Farmers say payment may take several weeks or months. Regular follow-up sometimes speeds up the process, but not all farmers are able to do this.

Where farmers face difficulties

Farmers say common problems include delays in veterinary visits, confusion about documents, and long waits for approval. Some farmers are discouraged by repeated visits to offices and stop following up.

Farmers with animals grazing far from villages or near forest edges say it is harder to prove wildlife involvement.

What farmers learn over time

Farmers who manage to get compensation say early reporting, keeping the carcass for inspection, and staying in touch with forest staff help the most. They also say community support matters, especially when officials need to be called quickly.

Farmers accept that compensation does not replace the animal fully, but they say a clear and fair process reduces hardship after a loss.

SAMPLE FORM FOR CLAIMING COMPENSATION

Compensation procedures, formats, and authorities differ by state and by type of damage. The forms shown below are sample templates, prepared only to help farmers understand what information is usually required and how applications are commonly filled.

These are not official government forms. Farmers must submit claims using the formats prescribed by their local Forest or Revenue Department, while using these samples as guidance to avoid missing details that often lead to rejection or delay.

The information filled in below is indicative only – to be used as reference – change the details as per the actual events, date, time and place

Livestock Loss Compensation Application (Illustrative)

(For loss of cattle, goats, sheep, calves due to leopard, tiger, elephant, etc.)

Applicant Details

1. Name of Farmer: Lakshmi Devi
2. Husband's Name: Raju
3. Village: Chikkur
4. Gram Panchayat: Chikkur GP
5. Taluk / Block: Gundlupet
6. District: Chamarajanagar
7. Mobile Number: 9XXXXXXXXX

Livestock Details

8. Type of Animal Lost: Cow
9. Breed (if known): Local
10. Age of Animal: 4 years
11. Colour / Identification Marks: Brown with white patch on forehead
12. Ear Tag Number (if any): Not available

Incident Details

13. Date of Incident: 4 August 2025
14. Approximate Time: Early morning (around 5:30 am)
15. Location of Incident: Near cattle shed behind house
16. Animal Responsible (as identified): Leopard
17. Description of Incident:

Cow was taken from the cattle shed during early morning hours. Carcass found 200 metres away with clear bite marks.

Reporting and Verification

18. Date Reported to Authorities: 4 August 2025
19. Authority Informed: Forest Department / Range Office
20. Post-mortem Conducted: Yes
21. Officer Present During Inspection: Forest Guard

Declaration by Farmer

I confirm that the livestock loss occurred due to wild animal attack and was reported immediately. I request compensation as per applicable rules.

Signature / Thumb Impression of Farmer
Date: 5 August 2025

Section 4: Compensation for Crop Loss

Why crop compensation is the most difficult

Farmers say crop loss is the hardest loss to get compensation for. Unlike death or livestock loss, crop damage often happens slowly, in parts, and over many nights. By the time damage is clearly visible, it may already be too late to report.

Farmers also say crop damage is treated differently across states. In some places it is compensated, in others it is limited, capped, or not recognised at all for certain animals. Because of this, many farmers are unsure whether applying is even worth the effort.

What crop losses are usually considered

Farmers say crop compensation usually applies only when damage is **clearly visible and significant**. Partial damage, scattered damage, or repeated small losses are harder to claim.

Which crops are considered depends on the state. Some states compensate for damage by elephants, wild boar, or deer. Damage by nilgai, monkeys, peacocks, or birds may be excluded or treated differently. Farmers often learn this only after applying.

Farmers say it is risky to assume that all crop loss will be compensated just because the damage was caused by a wild animal.

How crop compensation is usually calculated

Farmers say crop compensation is not based on how much income they lost, but on official assessment.

Assessment is usually done by:

- estimating the area affected,
- judging the stage of the crop,
- and calculating the percentage of damage.

The amount is often fixed per acre or hectare, with a maximum limit. Even when damage is severe, compensation may be capped at a certain amount.

Farmers say this means the payment often covers only a part of the real loss.

Which departments are involved

Crop compensation usually involves more departments than other losses.

The **Forest Department** confirms that damage was caused by wildlife.
The **Agriculture Department or Revenue staff** assess the crop damage and prepare the loss estimate.

Because more than one department is involved, farmers say crop cases move slowly and files often go back and forth.

Reporting crop damage

Farmers say reporting crop damage quickly is critical. In many states, there is a short time window to inform officials after damage is noticed. If reporting is delayed, officials may say the crop stage has changed or damage cannot be verified.

Farmers usually inform the local forest staff first. Some states also require intimation to the agriculture or revenue office.

Farmers say one common mistake is waiting until harvest to report damage. By then, it is often too late.

Inspection and assessment

After reporting, officials visit the field to inspect damage. They look at:

- the extent of damage,
- whether damage is recent,
- and whether signs match wildlife activity.

Farmers say assessment varies depending on who comes to the field. Two farmers with similar damage may receive different estimates.

Weather, regrowth, and delay in inspection often reduce the assessed damage.

Documents farmers are asked to submit

Farmers say crop compensation requires more paperwork than livestock loss.

Documents usually include:

- application forms,
- identity proof and bank details,
- land records or tenancy proof (varies by state),
- inspection and assessment reports,
- and sometimes photographs.

Tenant farmers and sharecroppers say they face more difficulty because land records are often in someone else's name.

Why many crop claims fail

Farmers say crop compensation claims are rejected or reduced mainly because:

- damage was reported late,
- damage was partial or spread out,
- the animal involved is not covered under state rules,
- documents are incomplete,
- or assessment records underestimate the loss.

Because of repeated rejection, some farmers stop applying altogether.

SAMPLE FORM FOR CLAIMING COMPENSATION

Compensation procedures, formats, and authorities differ by state and by type of damage. The forms shown below are sample templates, prepared only to help farmers understand what information is usually required and how applications are commonly filled.

These are not official government forms. Farmers must submit claims using the formats prescribed by their local Forest or Revenue Department, while using these samples as guidance to avoid missing details that often lead to rejection or delay.

The information filled in below is indicative only – to be used as reference – change the details as per the actual events, date, time and place

Crop Damage Compensation Application (Placeholder Data – Change according to your needs)

(For damage caused by elephant, wild boar, nilgai, monkeys, peacocks, birds, etc.)

Applicant Details

1. Name of Farmer: Ramesh Kumar
2. Father's / Husband's Name: S. Narayanappa
3. Village: Hosahalli
4. Gram Panchayat: Hosahalli GP
5. Taluk / Block: Sakaleshpur
6. District: Hassan
7. Mobile Number: 9XXXXXXXXX

Land and Crop Details

8. Survey Number / Plot Number: Sy. No. 112/3
9. Total Land Holding (acres/hectares): 2 acres
10. Area Affected (approx.): 0.75 acres
11. Crop Grown: Paddy
12. Crop Stage at Time of Damage: Flowering stage

Incident Details

13. Date of Damage: 12 September 2025
14. Approximate Time of Damage: Night (between 10 pm – 3 am)
15. Animal Responsible (if known): Elephant
16. Description of Damage:

Standing paddy crop trampled and eaten in patches across the field. Bunds broken. Damage noticed the next morning.

Reporting Details

17. Date of First Intimation to Authorities: 13 September 2025
18. Authority Informed: Forest Beat Office / Village Revenue Officer
19. Mode of Intimation: Phone call followed by visit

Declaration by Farmer

I declare that the above information is true to the best of my knowledge. The damage occurred despite lawful and non-lethal measures. I request inspection and compensation as per applicable rules.

Signature / Thumb Impression of Farmer
Date: 14 September 2025

What farmers do when compensation does not come

Farmers say when crop compensation does not come, they rely on other ways to manage loss — changing crops, guarding more, sharing effort with neighbours, or reducing cultivated area near forests.

Many farmers say they continue farming not because losses are compensated, but because they have no alternative.

What farmers learn over time

Farmers say crop compensation should be seen as **support, not protection**. It is uncertain, slow, and often incomplete.

Those who manage better are farmers who:

- report damage early,
- keep records,
- coordinate with neighbours,
- and do not depend on compensation alone.

Farmers say clear rules and timely information would help more than higher amounts.

A note on timelines and deadlines

Farmers say that time limits for reporting and applying for compensation are **not the same across states**. Some states require intimation within a few hours or days, while others allow longer periods. Deadlines can also differ by type of loss — human injury or death, livestock loss, or crop damage. Because of this, farmers advise **not assuming a fixed time limit**. The safest approach is to inform the local Forest Department or concerned authority **as soon as possible after the incident**, even if all documents are not ready. Early intimation keeps the case open, while delays often create problems that cannot be corrected later.

A note on PMFBY and wildlife crop damage

Farmers say crop insurance under the Pradhan Mantri Fasal Bima Yojana (PMFBY) is often confused with wildlife compensation, but the two are not the same. PMFBY mainly covers losses due to weather events such as drought, excess rain, floods, pests, or disease, and is usually assessed at the area level rather than for individual fields. In many states, damage caused specifically by wild animals is **not clearly covered** under PMFBY, or is excluded in practice. Because of this, farmers say PMFBY should not be relied on for wildlife crop damage unless the local rules explicitly allow it. Farmers advise checking crop insurance terms separately and continuing to report wildlife damage to the Forest or Revenue Department, even when insurance is in place.

What Farmers Say Can Be Done at the Panchayat Level

Farmers say that while compensation rules are set at the state level, many of the problems they face happen much earlier, at the village level. Over time, farmers have identified a few practical steps that panchayats can take to make compensation easier, faster, and fairer for everyone.

First, farmers say panchayats can play an important role in **early reporting and information sharing**. When incidents happen, families are often distressed and unsure whom to contact. Panchayat members who know the local forest staff, veterinary officers, and revenue officials can help ensure that incidents are reported quickly and correctly. Even simple actions—such as calling the forest guard, informing the veterinary officer, or guiding families on what not to disturb—can prevent delays later.

Second, farmers say panchayats can help by **keeping basic local records**. A simple register noting wildlife incidents in the village—crop damage, livestock loss, injuries, or deaths—helps establish patterns over time. Farmers say such records strengthen compensation claims, reduce disputes, and make it easier to explain recurring problems to officials during inspections or meetings.

Third, farmers suggest that panchayats can support **collective follow-up**, especially for crop and livestock compensation. Individual farmers often give up after repeated visits to offices. When panchayat representatives raise pending cases together, officials are more likely to respond. Collective follow-up also reduces fear and confusion for families unfamiliar with paperwork or office procedures.

Fourth, farmers say panchayats can help by **sharing clear information in advance**, not only after a loss. Knowing which animals are covered, what documents are usually required, and how quickly incidents must be reported helps families act in time. Panchayat meetings, notice boards, or simple announcements can prevent missed deadlines and rejected claims.

Finally, farmers say panchayats can act as a bridge between departments. Many delays happen because forest, veterinary, agriculture, and revenue offices work separately. Panchayats that facilitate coordination—by informing one department when another has visited—help reduce repeated inspections and confusion.

Farmers are clear that these steps do not guarantee compensation. But they say villages where panchayats are active face fewer delays, less confusion, and lower stress after a loss. In the end, farmers say compensation works best not when amounts are high, but when processes are clear, timely, and supported locally.

Human-Animal Conflict in Agriculture – A Complex Struggle on the Ground, and the Pathways Ahead

An ASHA - Kisan Swaraj Position Note (Revised, 2026)

1. Living with Conflict: An Agrarian Reality

Human-Animal Conflict (HAC) has emerged as one of the most serious problems for farmers and other people who live in rural areas in India. Across forest-fringed, hilly, plantation, tribal, and rainfed regions, people face repeated crop losses, livestock depredation, damage to homes and farm assets, and an unacceptable loss of human life or serious harm. For many families, this kind of conflict is **no longer an occasional risk but a chronic condition** that affects their daily choices about what to grow, when to work, how to move, and even if it's safe to step into their fields.

Wildlife, too, is under growing stress. Animals are getting closer to human settlements because of habitat loss and fragmentation, broken corridors, monoculture plantations, invasive species, linear infrastructure, less water availability, extreme weather and even acclimatisation to newer habitats of birth and living like sugarcane fields or coffee plantations. Retaliatory killings, electrocution, poisoning, poaching and collisions are increasing across regions.

The issue is **not a conflict between farmers and animals**. This situation results from the way "development" has been envisaged and executed - how land, forests, farming, and conservation have been planned and managed over time. Treating HAC as isolated incidents, typically responded to only after deaths or damage, has repeatedly failed because the causes are structural and the impacts cumulative.

This note revisits the question repeatedly posed by platforms like ASHA: *Human-Animal Conflict in Agriculture: Are there win-win solutions to human-animal conflict?* It argues that coexistence is possible only if it is understood not as a moral appeal to farmers (including landless workers) but as a **negotiated social contract between different human institutions,** backed by strong public policy, fair and timely compensation and insurance, landscape-level planning, and meaningful community stewardship.

2. What Constitutes Human-Animal Conflict in Agriculture

Human-animal conflict happens when people and animals, especially the wildlife, interact in ways that result in crop loss, livestock depredation, damage to property and livelihoods, injury or loss of human life, and retaliatory harm to animals, emerging from, or in turn causing **long-term ecological disruption**.

In India, HAC manifests in multiple, distinct forms in different regions. They are:

- **Crop damage**: By wild boar, nilgai, deer, monkeys, elephants, porcupines, rodents, giant squirrels and birds such as parakeets, munias and peafowl, leading to repeated and cumulative agrarian losses.
- **Damage to homes and farms:** Including houses, grain stores, cattle sheds, fencing and farm assets, particularly in elephant and wild boar landscapes.
- **Human injury and death**: Most prominently involving elephants, but also leopards, bears, tigers (in specific landscapes), wild boars, and snakes.
- **Livestock and poultry depredation**: By leopards, tigers, wolves, bears, jackals, wild dogs and snakes, resulting in loss, especially for pastoral communities.

It also manifests as:

- **Animal injury and death linked to conflict and retaliation:** Through electrocution (from power lines and illegal fencing), poisoning, snaring, shooting and capture-related stress.
- **Infrastructure-related mortality and injury:** Train and road collisions in corridors, canal drownings, and power-line electrocution – reflecting planning and design failures rather than chance encounters.

Meanwhile, **feral and stray cattle conflict** is also on the rise, and is a rapidly growing agrarian crisis, driven by failures in livestock governance, not wildlife conservation.

HAC is **neither a single-species problem nor a rare event**. Each form needs its localised strategies for prevention, response, compensation, and insurance.

3. High-Frequency Conflict Species: The Everyday Face of Agrarian Loss

High-profile species that are linked to human deaths often attract a lot of public and policy attention. In reality, most of the problems with agriculture come from **high-frequency conflict species –** animals like wild boar, monkeys, deer (including nilgai and spotted deer), porcupines, giant squirrels, and birds that damage crops, like peacocks, parrots, munia, fruit-bats and barbets.

These species cause **frequent and cumulative damage** to crops, infrastructure and household assets across vast agricultural landscapes. Incidents may seem small at first, but they can hurt the viability of farms, food security, and the resilience of households over time. For many farmers, this is the most real and ongoing kind of conflict.

The contemporary reasons for conflicts on the rise and impacts of these species are still not thoroughly documented, fairly compensated, or effectively managed. The Government of India has admitted that there is no national data on deaths and injuries caused by these species. This **data invisibility translates into neglect** and misaligned responses.

4. The Scale and Gravity of the Crisis

Official data presented to Parliament shows how serious the crisis is. Elephant attacks alone reported 2,869 human deaths between 2019-20 and 2023-24. Tiger attacks, concentrated in a few states, were responsible for 378 human deaths between 2020 and 2024.

At the same time, it's clear that official data has its limits. National-level data on deaths and injuries caused by wild boar and other species is not collated at all. High-frequency conflict species are totally ignored.

On the wildlife side, 81 elephants were killed in train collisions between 2019-20 and 2023-24. This shows that infrastructure planning and corridor disruption are not taking into account wildlife movement around such development projects. Comparable national data on other conflict-related wildlife mortality is unavailable, reinforcing **structural invisibility**.

Crop loss remains the **largest blind spot**. This blind spot is overwhelmed with high-frequency conflict species. Despite widespread acknowledgement that wildlife-related crop damage exceeds thousands of crores annually, there is no consolidated national estimate available. Entire farming systems – paddy, bananas, maize, sugarcane, tubers and horticulture near forests and on the hills – are becoming economically unviable. State-level assessment and compensation remain fragmented, leading to under-reporting and invisibility of the crisis.

Even available data consistently underestimates reality. Injuries, near-miss encounters, trauma, school dropouts, labour losses, indebtedness, and farm abandonment seldom feature in statistics, yet this is how everyday life is in conflicted landscapes.

HAC also has public health impacts – snake bites, untreated injuries, and mental stress – that burden rural health systems, but they are poorly integrated into governance and response planning. The mental dimension to the conflict, apart from the material dimension, is completely missing from any acknowledgement or systems built.

The absence of a comprehensive, transparent data architecture is **not just a technical gap but a governance failure** that undermines accountability and justifies the distrust and anger among affected communities.

5. Why the Conflict Persists

Human-animal conflict persists due to multiple interacting factors, making the problem inherently complex and difficult to resolve with simple solutions.

- **Habitat loss and fragmentation:** roads, railways, power lines, canals, mining, tourism, monoculture plantations and urban expansion. Shrinking and fragmented habitats are forcing animals to move through human landscapes and become acclimatised to these new scapes, wherein capturing and shifting to forest-based habitats is no longer working.
- **Disrupted wildlife corridors:** forcing wide-ranging species like elephants into farms and settlements.
- **Cropping patterns:** high-calorie, water-rich crops and poor storage practices attract animals to farmland. Meanwhile, crops like sugarcane also provide good shelter.
- **Degraded forests and invasive species:** Reducing food and water availability inside forests.
- **Increased forest dependence:** For livelihoods and daily movement.
- **Labour shortages:** Reducing night guarding and collective vigilance.
- **Climate extremes:** Droughts, floods, and fires create climate stress, altering animal behaviour, movement, and forage availability. However, climate impacts must be studied carefully and should not be used to absolve governance responsibility.
- **Institutional failures:** delayed and inadequate compensation, poorly maintained deterrents, weak coordination, the absence of clear protocols, and insufficient frontline preparedness, including police and local emergency response systems. Institutional failure at societal level also leads to lack of collective, community-level action in some cases.

6. Human-Animal Conflict: A Complex Struggle on the Ground

Human-animal conflict is a complex struggle on the ground: multiple interacting causes, no single solution, strong equity dimensions, regional variation, and unavoidable trade-offs between safety, livelihoods and conservation. Solutions that work in one place may fail elsewhere or at another time – even for the same species. Command-and-control approaches and compensation-only responses are therefore inadequate.

Recognising complexity does not mean accepting inevitability. It means solutions must be **adaptive, participatory and grounded in local realities**, not imposed through uniform or purely technocratic fixes.

7. Who Bears the Cost – and Why This is an Equity Issue

For farming communities, HAC brings injury and loss of life; repeated crop and livestock losses; damage to homes; food insecurity; debt; trauma; and, in hotspots, withdrawal from farming itself. Those most affected are smallholders, tenants, Adivasis and land-poor families with limited safety nets. Landless who depend on forest-foraging or on other commons/grazing lands for their livelihoods are more vulnerable. Women, children, and the elderly are at greater risk, especially when they move around every day. Repeated exposure makes people less tolerant of wildlife and less trusting of institutions.

Women face heightened everyday risks due to responsibilities such as fuelwood and water collection, fodder gathering, night-time vigilance, and care work. Conflict deepens nutrition stress, disrupts schooling and increases unpaid labour; yet these impacts remain largely invisible in official assessments.

Wildlife also pays a heavy price from retaliation, electrocution, poisoning and collisions, undermining conservation and ecosystem stability.

While conservation benefits society at large, its costs are borne **disproportionately by marginalised rural communities**. This inequity lies at the heart of the conflict. The ones bearing the brunt of wildlife-related conflict also carry a cultural ethos of tolerance and co-existence. They should be the ones who should have the powers and rights over decisions taken about their lives and livelihood. **Conservation without justice is neither ethical nor sustainable**.

8. What Actions Have Been Taken So Far – and What Are Their Limits?

Governments have taken several steps, some marking progress, but most remain **reactive and inadequate**.

- **Advisories and SOPs:** Issued by MoEFCC and NBWL, including Panchayat roles, but implementation remains uneven and generic.
- **Compensation and ex-gratia relief:** Minimum ₹10 lakh for death or permanent incapacitation, with state top-ups. Delays, complex procedures and underassessment continue to erode trust.
- **Crop insurance:** Wildlife damage is recognised under PMFBY's localised risk cover, but strict timelines, digital dependence and uneven implementation exclude many small farmers and ignore cumulative losses from high-frequency species.
- **Physical barriers and early warnings: solar fencing, trenches, patrols, and alerts show local success but often fail due to poor design, weak maintenance, and a** lack of community ownership. Technology-based solutions are needed, but they cannot replace governance, community participation and accountability.
- **State-level innovations:** SDRF inclusion, community watchers, corridor protection, habitat enrichment and Rapid Response Teams exist but remain fragmented and underfunded.
- **Core Limitation:**
  Most measures respond after damage occurs and do not address repeated losses or prevention. Without local governance and landscape planning, effective protection remains elusive. A big limitation is the lack of systems thinking, lack of institutional convergence, and disempowerment of the affected.

9. Coexistence: From Concept to Social Contract

Coexistence does not mean the absence of conflict. It refers to the ability of people, farms, and wildlife to share landscapes in ways that minimise risk, prevent avoidable losses, and protect human livelihoods and ecological systems. In a densely populated country with shrinking habitats, expanding infrastructure, and intensifying agriculture, such interactions are unavoidable. Therefore, the challenge lies not in whether coexistence is desirable, but in establishing safe, just, and workable conditions for it.

Coexistence **cannot be a moral burden placed on farmers** and forest-fringe communities. Tolerance collapses when risks are repeated, losses are cumulative; and compensation is delayed or denied. Without institutional backing, coexistence may mean communities absorb public costs privately – sometimes with their lives.

For coexistence to be meaningful, it must function as a social contract based on **non-negotiable principles**:

1. Human safety is paramount. No framework is credible if it normalises injury or death. Prevention, preparedness and rapid responses must be treated as core governance responsibilities.

2. Costs must be shared fairly. The burden of the economic and social costs of living with wildlife should not rest on just a few communities. It must require public compensation and investment.

3. Prevention must come before relief. Compensation alone cannot protect livelihoods. Repeated crop, livestock and property losses erode livelihoods long before relief arrives, making prevention and risk reduction essential.

4. Communities must have real decision-making power. Local knowledge, seasonal awareness and collective vigilance are central to conflict management. Panchayats, Biodiversity Management Committees (BMCs) and other community institutions must be empowered with authority, resources and accountability, with their knowledge also counting as a major input into any planning/decision-making.

5. Coexistence must be grounded in landscape planning. Protecting corridors, regulating infrastructure and aligning land use with local ecology and ecosystems is essential. Reactive firefighting cannot replace planned, landscape-level governance. Such landscape level governance requires state governments to work in convergence in some locations, district administrations across districts in some others, and importantly, agriculture and horticulture departments also being empowered to work along with forest departments.

Only then does coexistence become just and workable.

10. Pathways Ahead: Governing the Conflict Landscape

HAC must be managed as a **structural, landscape-level challenge but with decentralisation as the principle governing decision-making** – not through post-damage relief alone.

India needs a **National Human-Animal Conflict Mission**, with a clear, up-to-date data system that records species (including high-frequency ones), location, seasonality, crop phases, frequency, types of incidents, losses - extent and types, and causes. This information needs to be used to make SOPs that are specific to each species and situation, and it needs to be included in plans for infrastructure, corridor protection, and environmental clearances.

Governance in chronic hotspots must be devolved. Panchayats should have authority, resources and responsibility to lead mitigation, monitoring and first response – supported by trained local guards, alert systems and village-level records. Functional coordination between forestry, revenue, agriculture, police, and panchayats is essential. True partnerships and collaborations must be built with local communities.

Compensation must go beyond discretionary ex gratia relief. Alongside enhanced death and injury compensation, there needs to be a rights-based, time-bound compensation and insurance system for crops, livestock and property that is easily accessible to small farmers, with simple processes and grievance redress.

A landscape approach is critical. This means protecting corridors, integrating conflict risk into land-use planning, aligning cropping and storage, avoiding wildlife movement routes, and using community risk calendars and village-level conflict logs to guide advisories. Any crop shifts considered must ensure farmers do not suffer financial losses.

Infrastructure-related conflict should be regarded as a **failure of governance rather than an accident**. Projects that block corridors or intensify conflict must be redesigned or halted, with mitigation costs borne by proponents. Environmental clearance processes need to take into account the risks of long-term conflict for both people and animals.

Finally, damage caused by stray and feral cattle must be addressed as a distinct agricultural/livestock governance crisis, with clear institutional responsibility, dedicated funding, enforceable management systems and legal clarity, rather than being lumped in with wildlife conflict frameworks.

Ultimately, dealing with HAC is about managing the interface between farms, forests, and infrastructure. With reliable data and strong institutions, coexistence can go from being a slogan to something that really happens.

11. Pathways Ahead: Who Must Do What – Roles and Responsibilities

Human-animal conflict is a **multi-level governance challenge**. Clear roles, dedicated resources and accountability across institutions are essential to the transition from reactive relief to prevention and coexistence.

1. National Level (Government of India)

- Establish a **National Human–Animal Conflict Mission.**
- Create a **dynamic, transparent, public data system.**
- Develop **species- and context-specific SOPs and decision-making protocols with decentralisation and localisation as the main pivots.**
- Integrate HAC prevention into **infrastructure planning, EIAs, corridor protection and land-use policies**.
- Ensure **dedicated funding** for prevention and mitigation, not only post-damage relief.

2. State Governments

- Ensure **time-bound and fair compensation** for all losses.
- Shift to **rights-based compensation systems** with **insurance backing**.
- Use **CAMPA and allied funds** for prevention, corridor restoration and community mitigation infrastructure.
- Strengthen **forest departments' staffing, training, and frontline response capacity, even while ensuring that their powers do not supersede other stakeholders (panchayat, agriculture, horticulture and any other relevant line departments along with communities) who should be getting an equal place at the decision-making**.
- Treat **stray and feral cattle depredation** as a distinct agrarian governance issue.

3. Panchayats and Local Bodies

- Act as **nodal institutions in conflict hotspots**.
- Appoint, train and deploy **community guards/watchers**.
- Maintain **village-level conflict logs and seasonal risk calendars**.
- Operate **local alert and response systems**.
- Get adequate resources to execute the above.

4. Land Use, Infrastructure and Development Agencies

- Halt, redesign or mitigate **projects that block corridors or intensify conflicts**.
- Treat wildlife deaths linked to infrastructure as **planning failures**.

- Internalise the **mitigation costs**.
- Enforce **waste management and storage norms near forests.**

5. Communities and Civil Society

- Support **collective vigilance, monitoring and knowledge-sharing**.
- Document conflict patterns, failures and local practices.
- Revive and adapt relevant **indigenous mitigation practices**.
- Advocate for decentralised, rights-based reforms.
- Develop an ethos of co-existence, which includes practice of safe living.

12. Legal Reform - Priorities and Suggestions

HAC is a **rights, liability and governance issue that is** inadequately addressed in existing Indian laws and needs reform.

- **Clarify legal responsibility:** The Wildlife (Protection) Act, 1972, focuses on species protection, while Panchayat laws promote decentralisation without defining the respective governance roles. There must be legal or regulatory provisions to assign shared duties for prevention, response, and coordination across forest, revenue, agriculture, police, and panchayat institutions in hotspot areas.
- **Make compensation a legal entitlement:** Compensation remains largely discretionary under Indian laws and schemes; neither the Wildlife (Protection) Act nor allied laws make it a right. It must be a time-bound, enforceable entitlement for crop loss, livestock depredation, property damage, injury and death – beyond ex gratia relief and scheme-based insurance (including PMFBY).
- **Recognise livelihood and property loss:** damage to houses, cattle sheds, grain stores, fencing, and productive farm assets is unevenly recognised. Laws/rules must include livelihood and property loss as categories that can be compensated for losses.
- **Mandate comprehensive conflict data:** There is no legal obligation to record all conflict incidents, including crop loss and impacts from high-frequency conflict species. There must be regulatory provisions to ensure systematic reporting of all forms of human-animal conflict, including animal injury and mortality.
- **Reform culling and 'vermin' provisions:** Section 62 of the Wildlife (Protection) Act allows the declaration of Schedule II species as vermin. This provision has often been used through broad, politically driven notifications without transparent data or

ecological review. While emergency situations demand its use, it must be bound by strict safeguards: evidence-based justification, defined geographical boundaries, time limits, independent ecological reviews, and public disclosure.

- **Integrate conflict liability into infrastructure law:** Wildlife deaths linked to roads, railways, power lines, canals and fencing are predictable planning failures, not "accidents". Conflict risk, corridor disruption and mitigation responsibility must be explicitly built into environmental clearance conditions under the Environment (Protection) Act, 1986, the EIA Notification, 2006, and sectoral approval norms, with enforceable obligations for project proponents.
- **Enable proactive use of public funds:** clear legal and financial guidelines are needed to allow CAMPA, state forest budgets, SDRF, MGNREGA, and relevant agriculture and panchayat funds to be used proactively for prevention, mitigation infrastructure, community monitoring, and corridor protection—not only post-damage relief.
- **Separate stray cattle from wildlife law:** Stray and feral cattle depredation has its roots in livestock policy and governance failures. The issue must be handled under livestock management laws, State Cattle Preservation Acts and Panchayat/Municipal laws, with clear institutional responsibility and funding.
- **Strengthen the legal authority of the Panchayat and the BMCs:** The Panchayat needs clear legal powers to hire guards, set up deterrents, give advice, and coordinate departments in areas where there is a lot of conflict. They also need money and the power to enforce the law. The same applies to BMCs.

13. Conclusion

The conflict between humans and animals in agriculture is not the fault of either the wildlife or the farming communities. Poor governance has led to failures in the planning and management of land, forests, infrastructure, agriculture, and conservation. Farmers in conflict landscapes are bearing the costs of a public issue, often with their lives.

For them, this is not episodic. It is a daily battle that shapes what they grow, how they move, whether they stay in farming at all, and how safe their families feel. In conflict hotspots, there is no end to crop losses, farmers live in constant fear of farms and homes getting damaged, livestock being attacked, family members being injured or killed. Asking farmers to simply "coexist" without addressing these realities is neither fair nor sustainable.

Coexistence can happen only if there is trust. This can come from strong government commitment to reliable data, effective action for early warning and prevention, fair and timely compensation, and local governance that is accountable. Society must share conservation costs, not impose them on the most vulnerable.

By approaching the HAC issue from a farmer-centric, justice-orientated way, India will be able to move towards a more workable way of sharing landscapes – one that protects both farming and wildlife alike.