



FIELD MANUAL FOR MANAGING HUMAN-ELEPHANT CONFLICT



Contributors:

Project Elephant team:

Primary contributors:

1. Dr. S.P Yadav, ADG (PT), MOEFCC and Director, Wildlife Institute of India
2. Shri. Ramesh Kumar Pandey, IGF & Director, Project Elephant, MOEFCC

Other Contributors:

1. Dr. Parag Nigam
2. Dr. Bilal Habib
3. Dr. K.M. Selvan
4. Dr. Prajna P Panda
5. Dr. N. Lakshminarayanan

WWF-India team:

Primary contributors:

1. Nitin Sekar
2. Durairaj Boominathan
3. Hiten Kumar Baishya
4. Tejaswini Nagesh
5. David Smith
6. Dipankar Ghose

Other contributors :

- | | |
|-------------------------|------------------------|
| 1. Aniruddha Dhamorikar | 11. Mudit Gupta |
| 2. N. Mohanraj | 12. Nilanga Jayasinghe |
| 3. Prachi Thatte | 13. Parikshit Kakati |
| 4. Sanchaya Sharma | 14. Pijush Dutta |
| 5. Anil Singh | 15. Rajkiran R. |
| 6. Anupam Sarma | 16. Ravi Singh |
| 7. Arjun Kamdar | 17. Sejal Worah |
| 8. Dabeer Hasan | 18. Soumen Dey |
| 9. Divya Ramesh | 19. Vishaish Uppal |
| 10. Meraj Anwar | 20. Yash Shethia |

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Message

by Hon'ble MEF

मंत्री
पर्यावरण, वन एवं जलवायु परिवर्तन
और
श्रम एवं रोज़गार
भारत सरकार



MINISTER
ENVIRONMENT, FOREST AND CLIMATE CHANGE
AND
LABOUR AND EMPLOYMENT
GOVERNMENT OF INDIA

भूपेन्द्र यादव
BHUPENDER YADAV



75
आज़ादी का
अमृत महोत्सव

MESSAGE

India is one of the biodiversity hotspots in the world and supports the largest population of Asian elephants and tigers. As nature conservation is intertwined in our heritage, culture, mythology and folklore, the country is committed to conserve its rich biological diversity. More than any country in the world, tolerance and acceptance of wildlife among the communities is epitomized in India. As human-wildlife conflict can sometimes potentially create negative perceptions; its timely resolution is admittedly one of the important conservation priorities in the country. As elephants are large bodied social animals, their wide-ranging behaviour can bring them into conflict with people. Addressing human-elephant conflict is a complex challenge. India has been facing the challenge with renewed energy, scientific acumen, innovation, and empathy by actively engaging with different stakeholders. Empowering the frontline force of the forest department who are at the helm of managing conflict is a crucial long-term mitigation strategy. In addressing human-elephant conflict, several direct and indirect approaches have been experimented across multiple different sites in India in collaborative manner involving the Ministry of Environment, Forests & Climate Change, State Forest Departments, scientific institutions, local communities, and other line agencies. Drawn from such a rich field experience, a state-of-the art, easy to use pictorial document elaborating approaches to resolve human-elephant conflict is brought out by the Project Elephant Division with technical support from WWF-India and Wildlife Institute of India. This document will go a long way as a quick reference material along that frontline staff of the Forest Department can use in a regular basis. I wholeheartedly congratulate the Project Elephant Division for this excellent contribution towards elephant conservation and I also wholeheartedly appreciate the authors for putting in their efforts to give shape to this useful document.

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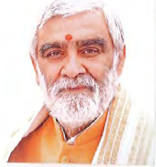

(Bhupender Yadav)

Message

by Hon'ble MoS



आश्विनी कुमार चौबे
Ashwini Kumar Choubey



सत्यमेव जयते
आहारशुद्धी सत्त्वशुद्धिः
एकं कदम स्वच्छता की ओर

राज्य मंत्री
पर्यावरण, वन एवं जलवायु परिवर्तन
उपभोक्ता मामले, खाद्य और सार्वजनिक वितरण
भारत सरकार
MINISTER OF STATE
ENVIRONMENT, FOREST AND CLIMATE CHANGE
CONSUMER AFFAIRS, FOOD & PUBLIC DISTRIBUTION
GOVERNMENT OF INDIA

Message

By being a global leader in Asian elephant and tiger conservation, India demonstrates exemplary conservation commitment. Our cultural and religious belief system, along with a strong democratic foundation had not only contributed in economic and social well being, but was instrumental in achieving conservation priorities. Vast amounts of first-hand experience and knowledge have been gained in the country in the fields of wildlife conservation and human-wildlife conflict management. Application of this knowledge will only further fine-tune the ongoing efforts to mitigate human-wildlife conflict, particularly with that of charismatic large mammals like elephants. Recognizing the importance of knowledge sharing, the Project Elephant Division of the Ministry of Environment, Forests and Climate Change, has partnered with scientific research Institutions like the Wildlife Institute of India of the Ministry and WWF-India in preparing an excellent field guide that elaborate on multitude of approaches to mitigate human-elephant conflict in the Indian context. The contents of the document are well illustrated and optimally designed for ready-use in the field by all those who are in the forefront of managing elephants and their habitats. My sincere appreciation is due to the Project Elephant Division and partner organizations and also to the authors of the manual for their painstaking efforts.

(Ashwini Kumar Choubey)

कार्यालय : 5वां तल, आकाश विंग, इंदिरा पर्यावरण भवन, जोर बाग रोड, नई दिल्ली-110003, दूरभाष: 011-20819418, 011-20819421, फ़ैक्स: 011-20819207, ई-मेल: mos.akc@gov.in
Office : 5th Floor, Aakash Wing, Indira Parivaran Bhawan, Jor Bagh Road, New Delhi-110003, Tel.: 011-20819418, 011-20819421, Fax : 011-20819207, E-mail : mos.akc@gov.in
कार्यालय : कमरा नं.173, कृषि भवन, नई दिल्ली-110001, दूरभाष: 011-23380630, फ़ैक्स: 011-23380632
Office : Room No. 173, Krishi Bhawan, New Delhi-110001, Tel.: 011-23380630, Fax: 011-23380632
निवास : 30, डॉ. ए.पी.जे. अब्दुल कलाम रोड, नई दिल्ली-110003, दूरभाष: 011-23794971, 23017049
Residence : 30, Dr. APJ Kalam Road, New Delhi-110003, Tel.: 011-23794971, 23017049

Foreword

by Secretary, MoEF&CC

लीना नन्दन
LEENA NANDAN



FOREWORD

सचिव
भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
SECRETARY
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND
CLIMATE CHANGE

Globally recognised as a mega-diverse country rich in biodiversity, India has an equally rich cultural heritage spanning centuries. Much of the Indian biodiversity is intricately related to the abundance of flora and fauna and the socio-cultural practices of the land.

India accounts for the largest number of Asian elephants. The people of the country have played a leading role in conserving the country's heritage animal. However, the limitations in integrating environmental concerns into development planning need to be addressed. Human-Elephant Conflict (HEC) is a growing challenge with adverse effects, for both the local people and the elephants. Understanding the relationship between HEC, and local perceptions regarding elephants, is crucial. Forest fringe dwellers are highly dependent on natural resources, and such conflicts undermine their well-being. Comprehending the complexity of HEC and the effects of conservation activities thus requires an inter-disciplinary approach.

The Project Elephant Division has, therefore, partnered with WWF-India and Wildlife Institute of India to bring out this document that elaborates specific actions, instruments and guidelines, for mitigation of human-elephant conflict. I am certain that the document would go a long way in establishment of a governance and networking mechanism between communities and Forest Departments, thereby leading to effective human – elephant conflict mitigation.

[Leena Nandan]

New Delhi, the 25th April, 2022



इंदिरा पर्यावरण भवन, जोर बाग रोड, नई दिल्ली-110 003 फ़ोन : (011)-2081-9408, 2081-9308, फ़ैक्स : (011)-2081-9238
INDIRA PARYAVARAN BHAWAN, JOR BAGH ROAD, NEW DELHI-110 003, PH. : 011-2081-9408, 2081-9308, FAX : 011-2081-9238
E-mail : secy-moef@nic.in, Website : moef.gov.in

Preface

by DGF &SS

चन्द्र प्रकाश गोयल
CHANDRA PRAKASH GOYAL



वन महानिदेशक एवं विशेष सचिव
भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
DIRECTOR GENERAL OF FOREST & SPL. SECY.
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND
CLIMATE CHANGE



PREFACE

Elephants are among the charismatic megafauna that hold a special place in the cultural tradition of people in India for millennia. Human-elephant conflict (HEC) can be found all over the world and has been a growing problem even in India for a long time. Elephants are particularly predisposed to conflicts with humans because of their large home range and dietary requirements. Human-elephant conflict is of special concern because of the potentially catastrophic consequences for both people and elephants. Understanding the local sentiments towards elephants and coexistence with respect to people's socio-economic context and to come up with adaptive management strategies is the sustainable solution that addresses both the facets of elephant conservation. Effective long-term management of HEC needs to take a holistic approach that involves a diverse set of actors at all levels from the affected community up to the relevant policymakers and donors at local, national, and even global levels. Highlighting these nuances, the document has been drawn up by the Project Elephant Division along with WWF-India and Wildlife Institute of India as a ready reckoner for the frontline staff to address human-elephant conflict with granularity.

I appreciate the efforts of the team to have developed an approach that incorporates shared responsibility, human-human conflict resolution, and a set of holistic and innovative mitigation techniques.

(Chandra Prakash Goyal)



इंदिरा पर्यावरण भवन, जोर बाग रोड, नई दिल्ली-110 003
फोन: (011) 20819239, 20819209 फैक्स: (011) 20819195

INDIRA PARYAVARAN BHAWAN, JOR BAGH ROAD, NEW DELHI-110 003
Ph.: 011-20819239, 20819209, Fax: 011-20819195, E-mail : dgfindia@nic.in



Preface

by SG & CEO WWF-India



Over the years, WWF-India has collaborated with Project Elephant, Ministry of Environment, Forest and Climate Change (MoEFCC), Govt. of India and state forest departments in Uttarakhand, Uttar Pradesh, Bihar, West Bengal, Assam, Madhya Pradesh, Tamil Nadu, Karnataka, and Kerala to mitigate human-elephant conflict and its effect on humans and elephants. Our teams have used various tools and interventions that have proven effective in addressing human-elephant conflict on the ground.

WWF-India and Project Elephant have put together this "Field Manual for Managing Human-Elephant Conflict" with the details of what we believe to be best practices for minimizing human-elephant conflict. This document is drafted with the aim of providing forest officials/ departments and other stakeholders with clear instructions for the use of necessary tools and interventions to help mitigate human-elephant conflict, both in emergencies and when conflict poses a recurring challenge. The field manual specifies the conditions under which forest officials/ departments should consider various interventions. This manual is a result of years of field experience and efforts that our teams have put in to help both affected communities and elephants.

I would like to thank Project Elephant, MoEFCC, Govt. of India for collaborating with WWF-India to bring out this useful field manual. I would like to congratulate and thank all my colleagues who have worked on this document and provided their inputs. I would also like to extend my gratitude to all the experts outside of WWF-India who have contributed to the making of this document. This manual is a working one and we will endeavour to update this from time to time based on field understanding. We hope this manual will be carefully implemented, and, as we learn on how we can improve our interventions, we will come out with revised versions of the manual.

(Mr. Ravi Singh)

Mr. Ravi Singh
SG & CEO, WWF-India

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Introduction

Human-elephant conflict (HEC) describes the various direct and indirect negative effects that come from humans and elephants competing over resources. HEC manifests in a range of ways. Sometimes, conflict escalates and results in the death of people and elephants - around 500 people are believed to be killed by elephants every year in India, and around 100 elephants are estimated to be killed by electrocutions, poisoning, train accidents, and poaching for ivory or other elephant parts. Crop and property damage by elephants is another visible manifestation of conflict. HEC also has more hidden repercussions. People who have to spend their nights guarding crops and property from elephants suffer from the ill effects of loss of sleep. The perpetual threat of elephants lurking in or near the village, or even breaking into a person's home, can also cause chronic fear and stress in communities especially beset by HEC. Research suggests that elephants, also, become more stressed due to constantly being chased by people. For humans and elephants alike, conflict is a serious issue. To make elephant conservation more effective and socially just, human-elephant conflict must be minimized.

This "Field Manual for Managing Human-Elephant Conflict" (referred to as the Field Manual from here on) is based on the

collective experience of WWF-India and Forest Department officials across several states, working to reduce HEC over decades. The document is intended to provide a coherent, systematic approach to dealing with HEC. The Field Manual is aimed to provide Forest Department officials with a set of best practices to reduce human-elephant conflict, promoting both human well-being and elephant conservation. While there are many tools that might help reduce conflict in the short-term, and many other necessary interventions (like habitat restoration) that could help reduce HEC in the long-term, this guideline focuses on the following:

- **Providing immediate, short-term, and medium-term actions to address HEC;**
- **Tested interventions that aim to minimize harm towards people or property due to HEC in human-dominated areas. Broadly speaking, the Field Manual does not deal with conflict that might occur in forests or outside human-dominated areas;**
- **The most context-appropriate and affordable intervention in each case, recommending more expensive or resource-intensive**

interventions only when less expensive alternatives are exhausted;

- **Standardized and systematized data collection, allowing for more sophisticated data-driven solutions to HEC in the future.**

If properly applied, this Field Manual could ultimately lead to a database that can help Forest Department officials find and address patterns in the incidence of conflict. Systematically collected data could help officials identify hotspots of conflict, understand if specific individual elephants are responsible for most conflict, assess whether a population of elephants has learned to surmount a type of barrier, and detect long-term trends in human death due to conflict and in the illegal killing of elephants.

This field manual is organized as follows. On page 4, readers will find a condensed version of Project Elephant's **Recommended Operating Procedure (ROP)**. This section serves as a quick-start guide with the most fundamental instructions for dealing with HEC emergencies all in one place. The ROP will also direct readers to other sections of the Field Manual that will provide more detailed guidance.

On page 12, one can find the **"What should we do?"** section, which can help users identify the intervention(s) that will be the most helpful for them in a given situation.

Next is the **"Who can help us"** section (page 14), which will aid users in understanding the roles played by Forest Department officials, other

government departments, civil society actors, and community institutions in various HEC-related actions.

The ensuing **"How to"** (page 27) section provides specific best practices for dealing with emergencies, developing relevant community institutions, building barriers, managing conflict-prone individual elephants, and data collection. Each section includes the partner(s) a user will need, the tools/materials needed, and basic instructions. Finally, we provide datasheets that could be standard default formats for the collection of HEC-related data.

Because elephants are an intelligent species which will learn to overcome many interventions, there is no simple or permanent solution to HEC. For that reason, this Field Manual is to be a ready reference document that will be updated every three years. While completely eliminating human-elephant conflict might not be possible in the foreseeable future, this guideline is aimed to foster an organized and effective response that minimizes losses to conflict.

Recommended Operating Procedure (ROP) for Dealing with Emergency Human-Elephant Conflict Situations

This Recommended Operating Procedure (ROP) provides the basic steps that are required to be taken at the field level to minimise human-elephant conflict (HEC). In essence, it serves as a **“Quick Start”** guide for the more detailed instructions given through the rest of this Field Manual.

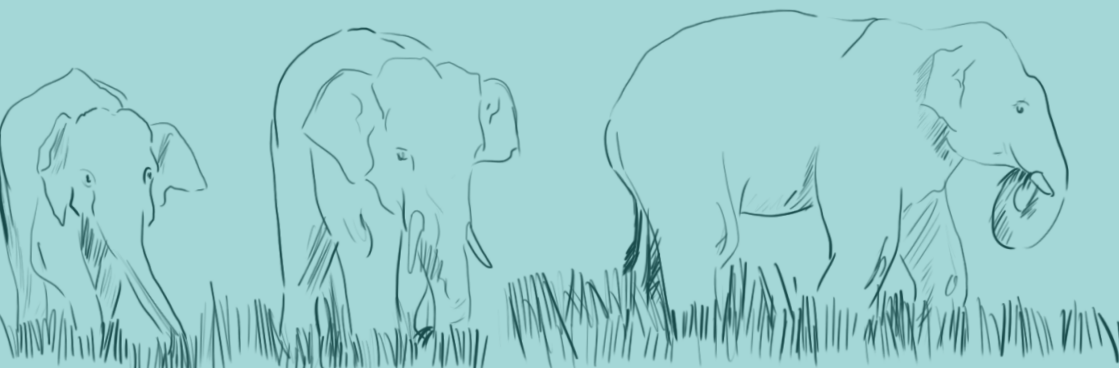
The Recommended Operating Procedure (ROP) applies to all forest areas including Protected Areas and Elephant Reserves, as well as other areas where conflict occurs.

Note that, unlike in intact forest habitats where management of elephants is primarily the concern of the Forest Department, in fragmented habitats, conflict management of elephants requires support and contribution from different line agencies. Thus, coordinated efforts between different departments is essential (see, **“Who can help us”** section on page 14).

ROP Section 1: Driving elephants away from agricultural areas, human settlements, and towns

(for more details, see **Emergency Situation 1**, page 33 and **Emergency Situation 2**, page 39)

1. Upon elephants entering human settlements, villagers should immediately inform the Forest Department. Anti-Depredation Squads composed of trained villagers (**ADS**, see page 68) should keep people away from elephants and keep an eye on elephants until the Forest Department arrives.
2. The Range Officer/Deputy Range Officer should inform all the concerned officers in the Forest Department, the Rapid Response Team (see Part 1, page 30), Gram Panchayat/Gram Pradhan/sarpanch/village leader, and villagers through SMS or Whatsapp or any other available means of the entry of elephants into the villages. A Range Officer may mobilize on-duty range staff for deployment to the conflict site.
3. The Rapid Response Team (RRT) should arrive with a vehicle ready for an elephant driving operation. The vehicle should be in good condition and fitted with gadgets like a high-mast light, public address (PA) system, and siren.
4. The RRT and Forest Department Officer-in-Charge (the Range Officer for the area of the operation at hand unless otherwise specified) may:
 - a. Ascertain the number of elephants in the area;
 - b. Look for known/identified problematic elephants;
 - c. Locate the direction from which elephants have come.
5. There should be different teams formed
 - a. To monitor the elephants (preferably under a Range Officer);
 - b. To talk to the public and keep them assured (preferably under the leadership of a patient individual known to local people);
 - c. To talk to the media (preferably Assistant Conservator of Forest (ACF), Deputy Conservator of Forest (DCF), or other senior officers).
6. The Forest Officer-in-Charge should mobilise the trained drive team/Rapid Response Teams (RRT) to assist the Forest Department and police in driving away the elephant(s) from human settlements. The sarpanch/Gram Pradhan/village leader of the community should be kept informed during the operation.
7. The Forest Officer-in-Charge should



engage the RRT and ADS in moving villagers to a safe distance (ideally at least 250m away) from the elephants to avoid any mishap. In cases where elephants exhibit the tendency to approach buildings to seek stored grains, salt, or fermented local brew, it may be best to quickly move people towards safer places and not take any undue risk.

8. If elephants are in an urban area, the area around them should be cordoned off until further action can be taken, as elephant drives in urban areas are difficult to conduct during the day.

9. If the crowd is too big and shows signs of mayhem, it may be necessary to seek the help of the police and civil administration. For this, the Forest Officer-in-Charge may inform in advance the Tahsildar and Inspector or Station

House Officer (SHO) of Police to mobilize their staff on a priority basis and ensure their presence for crowd management.

10. The Forest Officer-in-Charge should ensure the availability of ambulance services in case any medical emergency arises during the driving operation.

11. Driving elephants is usually done in areas where elephant movement patterns are clearly known and where authorities and locals have a clear sense of which direction the group has come from. Haphazard driving of elephants can be dangerous as elephants can resist such drives and counter-attack with lethal consequences. Such drives can also result in elephants exploring new areas and thus cause conflict to spill into newer areas. Thus, management practices such as drives are possible only

after thoroughly understanding where the elephants have come from and the geography of the area. Further, such operations shall be carried out only under the supervision of officers in the rank of SDO/DCF and above. If a driving operation is not advisable, tranquilizing and moving the elephant(s) might be necessary (see [“Part 4: Managing individual elephants engaged in repeated human-elephant conflict” on page 90 of Field Manual](#)).

12. The Forest Officer-in-Charge should note that persons under the influence of alcohol or drugs are vulnerable to attack by elephants as they don't always heed instructions and often have slow reaction times. As such, the Officer-in-Charge might wish to try to exclude such individuals from driving operations.

13. Use of horns and sirens and advancing towards elephants can sometimes turn dangerous, especially if individuals like musth bulls are around. During musth (a period of heightened sexual activity), elephant bulls do not readily accept the dominance of humans, and this should be kept in mind while approaching them with vehicles. If elephants exhibit aggressive behavior, it is important to immediately get into the vehicle and get to a safe distance from the animal.

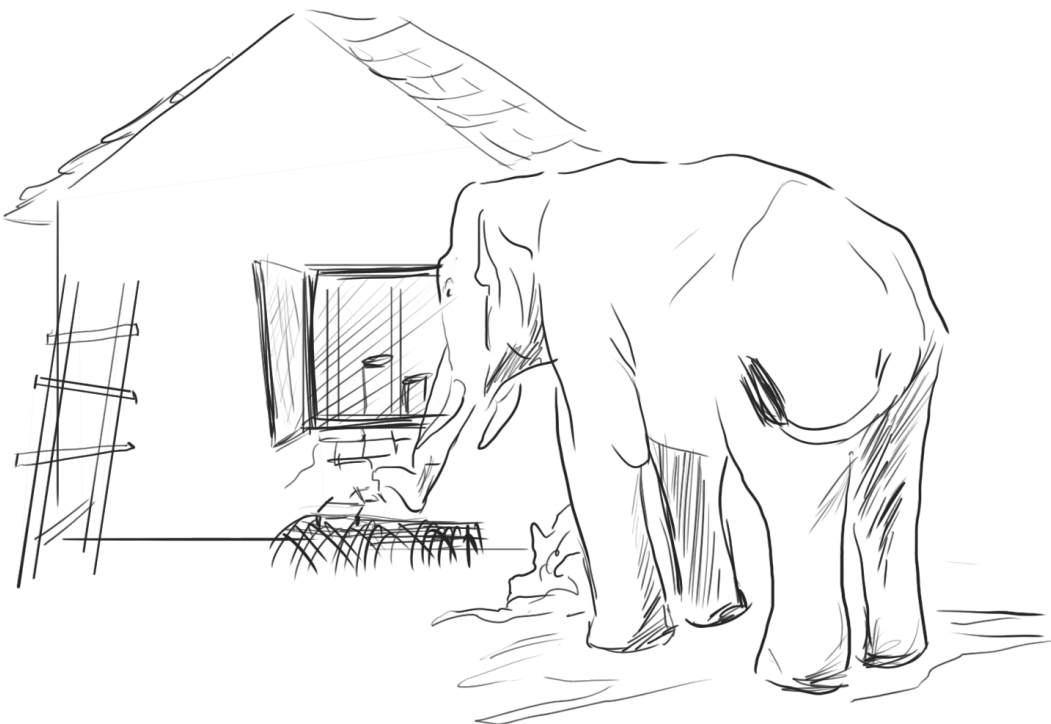
14. After elephants have been successfully driven away, the Forest Department field staff should gather as much information as possible regarding the locations of elephants within forest areas during the day so that movements during the night can be anticipated and mitigation measures planned accordingly. Details can be gathered by either visiting forest areas carefully during the day or by making inquiries of villagers who go into

forests for grazing and other purposes. Any damaged barriers should be quickly repaired.

15. In case of damages to crops or property by elephants, the Forest Officer-in-Charge should assess the damage caused and make arrangements for quick compensation for the crop and property lost to prevent retaliation and ensure well-being of the victims (see [“Collecting information for compensation/ex-gratia” on page 118](#) and [“Form to apply for compensation for elephant damages to crops and property” on page 135](#)).

16. The Forest Officer-in-Charge should send a report of the operation to the Chief Wildlife Warden (CWLW) within a day of completion of the operation.

17. Whenever media representatives are present during an HEC event, an authorized spokesperson of the Forest Department should periodically update the media to prevent dissemination of distorted information relating to the operation/incident.



ROP Section 2: Elephants have injured or killed people outside the forest

(for more details, see Emergency Situation 3 on page 45)

1. If elephants injure a human being, villagers should immediately call 108 for an ambulance and ensure the victim is rushed to a hospital and treated free of cost. If this has not been done by the time the RRT arrives, the RRT should ensure the victim is rushed to a hospital. The Forest Department and Police Department should be informed immediately.

2. The concerned Range Officer should intimate the concerned DCFs/ACF of the situation and reach the site as soon as possible. The Range Officer may mobilize staff (on-duty range staff, henceforth) for deployment to the conflict site.

3. In the case of a human death, the Police Department and Revenue Department may do the needful for completing legal requirements/ documentation and for moving the body for postmortem. Forest Department officials shall assist them as appropriate.

4. If any elephants remain in the village, town, or agricultural areas, officials should immediately act to ensure they are no longer a threat. This can be done through the actions described above in ROP Section 1 on page 5. However,

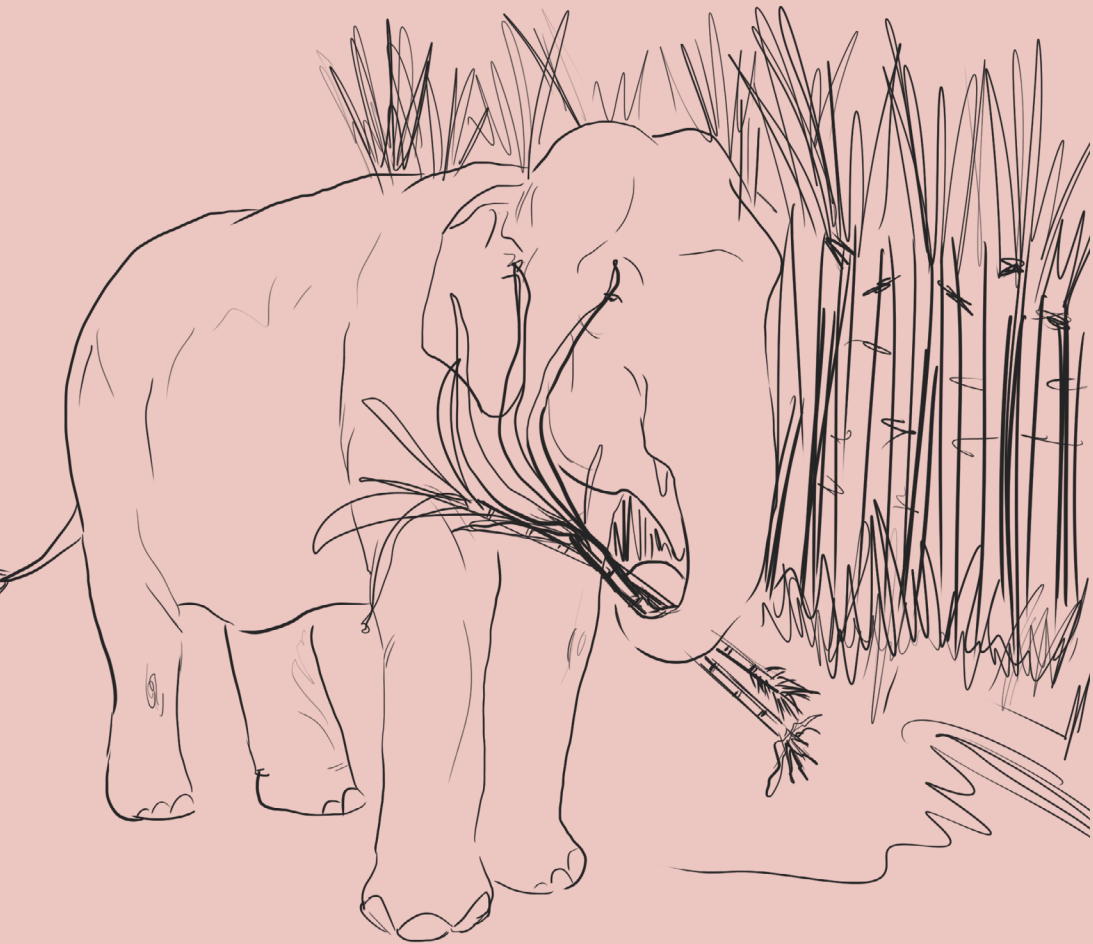
note that if witnesses know clearly which elephant killed the victims, extra efforts should be made to collect photographs and/or dung samples from the elephant so that it can be later identified (see “Identifying individual elephants” on page 124).

5. In cases where the perpetrating elephant is still in the area and may need to be captured, the area should be cordoned off and villagers should be prevented from entering the operation site.

6. The RRT and authorities should immediately collect key information on the circumstances of the human death using the “Form for documentation and verification for ex-gratia/compensation payment for human death/injury” on page 132 of Field Manual. The most important details are the identity of the deceased, date, time, location of incident, and any known circumstances of the incident. In particular, the authorities should ascertain the conditions under which the person was killed and whether the death was an accident or might have been due to unprovoked or disproportionate aggression by the elephant.

7. An emergency meeting of experts in elephant behavior, Forest/Revenue/Police officials, veterinarian(s) and public/local representatives must be convened to take stock of the situation and suggest appropriate actions to deal with the elephant that killed a human being, especially if the action was not an accident or the elephant is a repeat offender. The CWLW and other authorities should consider the recommendations from this meeting before taking action. The recommended action could include clearing the route for the elephant to move/return to its habitat, translocation, or removal (including placement in captivity). In instances where an elephant needs to be captured, the Forest Officer-in-Charge must seek permission from CWLW to capture the elephant. Guidance for this decision can be found in Field Manual “Part 4: Managing individual elephants engaged in repeated human-elephant conflict” on page 90. Specific guidance to consider with respect to the removal of an elephant from the wild is provided in the section on Captivity, page 107.

8. The Forest Department should use the data from the “Form for documentation and verification for ex-gratia/compensation payment for human death/injury” on page 132 of Field Manual to initiate action to pay ex-gratia to the bereaved family.



Detailed Operating Procedure

What should we do to deal with human-elephant conflict?

We are facing an HEC-related emergency situation

Part 1: Emergency field management of human-elephant conflict
page 28

We are working with communities facing chronic human-elephant conflict

Community members are not successfully working together to mitigate conflict.

Part 2: Developing community institutions to manage and reduce human-elephant conflict
page 56

The community(ies) have effective institutions to mobilize against conflict, but they don't have barriers to reduce HEC.

Part 3: Selecting and constructing legal and safe barriers to mitigate HEC
page 72

We are dealing with elephants that repeatedly break barriers, even if they are well-maintained

Part 4: Managing individual elephants engaged in repeated human-elephant conflict
page 90

We are not yet systematically collecting data for every HEC event

Part 5: Data collection for human-elephant conflict
page 115

Who can help us?

Dealing with human-elephant conflict requires a team effort spanning multiple government departments as well as community institutions, NGOs, and sometimes private individuals. This section should help identify the partners we should work with to implement various HEC management interventions.

Who can help us?

Purpose of section: To help Forest Department officials and conservation practitioners find the allies necessary to implement interventions to deal with human-elephant conflict.

Since human-elephant conflict involves human society beyond the jurisdiction of the Forest Department, intervening to reduce HEC often involves a variety of departments whose mandate may not be conservation or wildlife management. Fostering the necessary relationships in other agencies is thus key to being prepared for HEC. While the partners necessary for each intervention are also described in the “how-to” sections below, this section summarizes the information necessary to identify likely partners for dealing with HEC .

First, we describe the roles of officers within the Forest Department. Then we discuss other partners outside the Forest Department.

Who can help us? –Forest Department roles

Managing HEC is a collaborative effort for the Forest Department. The following describes key roles and responsibilities of key local actors in the Department.

Divisional Forest Officer at the rank of a Deputy Conservator of Forest (DCF)

1. Identifying and deputing dedicated, physically fit staff at the divisional level for managing human–elephant conflict on a rotational basis.
2. Ensuring that sufficient basic tools such as flash lights, fire crackers, whistles, GPS devices, binoculars, cameras, and consumables are available at the range level in all elephant range areas. DCFs should also ensure availability of stretchers for medical emergencies and liaise with the CWLW to ensure availability
3. Ensure that funds are available to be disbursed or spent during HEC management.
4. Coordinating between divisions to ensure landscape-level conflict management. This involves identifying bottlenecks for elephant movement, identifying areas of high human-elephant conflict, and interstate coordination where necessary.

5. Coordinating with other line departments such as the police, revenue, and civil administration.

In acute conflict situations and emergencies (such as elephants entering townships and other densely populated areas), the DCF may immediately inform the Chief Wildlife Warden and mobilize a veterinary team to tranquilize the elephant in conflict.

6. Arrange for timely disbursement of compensation/ex gratia payments for death/crop/property loss upon verification.

Assistant Conservator of Forests / Sub-Divisional Officers

1. Field coordination of day-to-day monitoring of conflict. This may involve coordinating with Range Officers to map the locations of elephants and conflict incidents when necessary.

2. Coordination between administrative ranges to ensure division-level conflict management.

3. Coordinating with other line departments such as police, revenue and civil administration.

Range Officers and Deputy Range Officers

1. Deploying staff for monitoring conflict on a rotational basis. The ROs/DROs

may ensure that staff engaged in conflict monitoring are physically fit.

2. Ensure that essential tools such as functioning flash lights, GPS devices, fire crackers, batteries, etc. are maintained in the range office.

3. Accompany on-duty range staff to conflict sites.

4. Ensure coordination between ranges for conflict management.

5. Closely coordinate with other line agencies such as the police, village leaders, the tahsildar and others.

Beat Guards

1. Coordination with rapid response teams and anti-depredation squads, other villagers, police, and Revenue Department officials to ensure safety of villagers during conflict situations. This includes duly alerting everyone concerned immediately about elephant presence in the locality.

2. Gather information on elephant movement during the day time and pass on the information to RO/DRO to help plan for potential HEC at night.

3. Visit crop/property loss sites and help villagers file for compensation.

4. Locate sites within the beat where elephants frequent. These may include elephant resting sites (during day-time) and water holes. Such details are crucial if drives, captures, or other major interventions become necessary.

Rapid Response Teams

RRTs are employed by the Forest Department to respond quickly to human-elephant conflict. The composition and roles of RRT are described in a separate section, "Formation of Rapid Response Teams to manage human-elephant conflict" on page 30, and include:

1. Establishing and maintaining contacts in all communities affected by HEC so they can respond quickly if needed;

2. Acting as first responders for the Forest Department when HEC occurs, including all emergency situations;

3. Helping detect and address threats to elephants such as lethal fences, sagging wires, and snares.

Who can help us? –Other stakeholders

Civil Administration

The civil administration includes the **district collector, magistrate, Revenue Department, and other departments.**

The civil administration is to be involved whenever people in their jurisdiction have been affected by HEC.

The civil administration also needs to remain aware of efforts being undertaken to help reduce HEC and can help secure funds from the state government for HEC management.

In times of HEC emergencies, the civil administration's responsibilities include the below. The district collector will often play a central role and may delegate duties to colleagues of the rank of sub-collector, RDO, or sub-divisional magistrate as needed:

1. Helping control crowds to ensure safety of both people and wildlife, including declaration of CrPC 144 to control crowds when necessary;
2. Helping find temporary shelter for villagers endangered by HEC, as well as ensuring they have access to food, water, and other resources;
3. Taking appropriate steps for sending HEC victim(s) to hospital for treatment or post-mortem;
4. Working with the Forest Department to ensure that developmental activities do not cause habitat loss or fragmentation that exacerbates conflict;

5. Ensuring repair of houses and other property damaged by elephants;

6. Maintaining roads, power lines, and other key infrastructure in areas where conflict is a regular problem to ensure help can reach conflict areas quickly.

The civil administration also plays a broader role in HEC management that includes building and supporting community institutions to manage HEC, assisting with translocations of elephants, and assisting in verification to enable payments of compensation to HEC victims.

The roles of civil administration are described in the following sections of the Field Manual:

- “Emergency situation 1: Elephant conflict occurring in village/ agricultural areas near/adjacent to elephant habitat” on page 33;
- “Emergency situation 2: Elephant(s) appearing far from their habitat” on page 39;
- “Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings” on page 45;
- “Emergency situation 4: Government responses to rescue an elephant” on page 48;
- “1. Generating awareness about human-elephant conflict and potential interventions” on page 58;
- “2. Seeking consent and support for the development and installation of a barrier to reduce human-elephant

conflict” on page 62;

- “3. Forming a barrier maintenance committee to ensure upkeep and funds collection” on page 64;
- “2. Non-lethal power fences” on page 80;
- “3. Elephant-proof trenches” on page 86;
- “3. Translocation” on page 102;
- “Collecting information for compensation/ex-gratia” on page 118.

Police

The police can help deal with emergency HEC situations. They help control crowds and can keep people from interfering with the Forest Department's efforts when dealing with an emergency.

In times of HEC emergency, the police's responsibilities include:

1. Crowd management during conflict incidents (including enforcement of provisions of Section 144 under CrPC in conflict villages when necessary);
2. Sending deceased to hospital for post-mortem if a person is killed by an elephant and sending the injured to primary health centre (PHC)/community health centre (CHC)/hospital for treatment;
3. Assisting in safe evacuation of people during acute conflict situations;
4. Identifying and booking habitual offenders who hinder effective and safe HEC management.

The police play a broader role by

providing assistance during HEC emergencies, translocation of elephants, and capture of elephants. These roles are described in the following sections of the Field Manual:

- “Emergency situation 1: Elephant conflict occurring in village/ agricultural areas near/adjacent to elephant habitat” on page 33;
- “Emergency situation 2: Elephant(s) appearing far from their habitat” on page 39;
- “Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings” on page 45;
- “Emergency situation 4: Government responses to rescue an elephant” on page 48;
- “Emergency situation 5: Government responses for elephant deaths” on page 53;
- “3. Translocation” on page 102;
- “4. Captivity” on page 107.

Para-military

Para-military forces can aid the police and Forest Department in regions and situations where they may need support to control crowds, protect people from injury, or help rescue/translocate an elephant.

As such, they can potentially play a supporting role in all areas where the police may be helpful.

Fire Department

The Fire Department is trained to deal with emergencies and is equipped to

conduct rescue operations. They can help the Forest Department plan and execute emergency operations when either elephants need to be rescued or driven away from dense human habitation. These roles are described in the following sections of the Field Manual:

- “Emergency situation 2: Elephant(s) appearing far from their habitat” on page 39;
- “Emergency situation 4: Government responses to rescue an elephant” on page 48.

State Disaster Response Force

Some states might use their State Disaster Response Force (SDRF) in some HEC emergency situations, especially for rescues and/or evacuations.

State Health Department/Health Services

Health services personnel are essential in situations when human- elephant conflict could pose a risk or has resulted in human injury/death.

In rural areas where access to hospitals is insufficient, the role of Primary Health Centres (PHC) and/or Community Health Centres (CHC) is paramount. PHCs and CHCs need to have all the equipment and provisions necessary to provide emergency treatment.

- “Emergency situation 2: Elephant(s)

appearing far from their habitat” on page 39;

- “Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings” on page 45.

Veterinarians and/ or the Veterinary Department

Veterinarians, sometimes from the State Veterinary Department or Forest Department, need to be involved in situations where an elephant needs to be rescued, collared, captured, or translocated. They need to monitor the health of elephants in such situations.

In times of HEC emergency, the responsibilities of veterinarians include:

1. Assessing the health status/making measurements of elephants involved in conflict;
2. Ensuring availability of the drugs, restraining equipment, and related supplies necessary for capture operations;
3. Supervising darting operations, including formation of a capture team;
4. Ensuring the welfare of elephants (wild and captive) being handled for any management purpose;
5. Ensuring proper care of elephants during capture, transport, and in captivity.

More details on the roles veterinarians play in HEC management can be found in the following sections of the Field Manual:

- “Emergency situation 4: Government responses to rescue an elephant” on page 48;
- “1. Capture and collaring” on page 92;
- “3. Translocation” on page 102;
- “4. Captivity” on page 107.

Electricity Board/ Department

The Electricity Board (EB) is to be contacted when there is a possibility of elephant death due to electrocution.

The Electricity Board’s responsibilities with respect to HEC include:

1. Monitoring transmission lines and similar infrastructure in elephant-affected villages (identified using a list from the DCF) to ensure they do not electrocute elephants or people. To help with this, the Chief Engineer of the EB can provide an emergency helpline to elephant-prone villages;
2. Ensuring electricity poles are unlikely to break if rubbed by elephants and wires are sufficiently high from the ground (and properly insulated);
3. Preventing sagging power lines and ensuring that they are maintained at a height safe for elephants;
4. Preventing illegal tapping of power by villagers to create lethal fences;

5. Ensuring adequate lighting in villages prone to HEC, including rapid restoration of power in case of power loss, especially at night.

The Electricity Board plays an especially crucial role in investigating elephant deaths, described in “Emergency situation 5: Government responses for elephant deaths” on page 53.

Local Bodies and Local Actors

Local bodies and local actors help govern community efforts to reduce HEC. They ensure such efforts are beneficial to the whole community and ensure the sustainability of such efforts.

The responsibilities of various local actors during HEC emergencies include:

1. The sarpanch/village leader is expected to:
 - a. Quickly reach conflict sites and participate in decision making
 - b. Aid in evacuations of villagers when necessary
 - c. Assist various departments engaged in conflict management
 - d. Keep villagers properly informed and help maintain calm and order
 - e. Assist in providing relevant information on individuals killed by HEC and other losses, ensuring appropriate compensation
2. Other villagers working with the RRT (such as anti-depredation squads, see page 68) are expected to:

- a. Help the Forest Department monitor elephant movements
- b. Help monitor conflict at the village level
- c. Help keep other villagers safe from elephants during conflict

Local bodies play a role in the following activities in the Field Manual:

Panchayat

- “Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings” on page 45;
- “1. Generating awareness about human-elephant conflict and potential interventions” on page 58;
- “2. Seeking consent and support for the development and installation of a barrier to reduce human-elephant conflict” on page 62;
- “3. Forming a barrier maintenance committee to ensure upkeep and funds collection” on page 64;
- “4. Formation of an anti-depredation squad (ADS) to forestall elephant learning and coordinate with the Forest Department” on page 68.

Public representatives/MLAs

- “2. Non-lethal power fences” on page 80;
- “3. Elephant-proof trenches” on page 86;
- “4. Captivity” on page 107.

Local community

Includes community leaders (like sarpanches/village leaders) and non-professional village groups (e.g., farmers’ groups).

- “Emergency situation 1: Elephant

- conflict occurring in village/ agricultural areas near/adjacent to elephant habitat” on page 33;
- “Emergency situation 2: Elephant(s) appearing far from their habitat” on page 39;
- “Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings” on page 45;
- “Emergency situation 4: Government responses to rescue an elephant” on page 48;
- “1. Generating awareness about human-elephant conflict and potential interventions” on page 58;
- “2. Seeking consent and support for the development and installation of a barrier to reduce human-elephant conflict” on page 62;
- “3. Forming a barrier maintenance committee to ensure upkeep and funds collection” on page 64;
- “4. Formation of an anti-depredation squad (ADS) to forestall elephant learning and coordinate with the Forest Department” on page 68;
- “2. Non-lethal power fences” on page 80;
- “3. Elephant-proof trenches” on page 86
- “1. Capture and collaring” on page 92;
- “2. Negative conditioning” on page 99.

Barrier Maintenance Committee (BMC)

- “4. Formation of an anti-depredation squad (ADS) to forestall elephant learning and coordinate with the Forest Department” on page 68;
- “2. Seeking consent and support for the development and installation of a barrier to reduce human-elephant

- conflict” on page 62;
- “3. Forming a barrier maintenance committee to ensure upkeep and funds collection” on page 64;
- “Selecting the best type of barrier” on page 76;
- “2. Non-lethal power fences” on page 80;
- “3. Elephant-proof trenches” on page 86.

Community-based organizations and local NGOs

CBOs can help with forming and maintaining community institutions.

- “1. Generating awareness about human-elephant conflict and potential interventions” on page 58;
- “2. Seeking consent and support for the development and installation of a barrier to reduce human-elephant conflict” on page 62;
- “3. Forming a barrier maintenance committee to ensure upkeep and funds collection” on page 64;
- “Part 3: Selecting and constructing non-lethal and safe barriers to mitigate HEC” on page 72.

Anti-Depredation Squad

The ADS consists of trained community members who can aid the Forest Department in monitoring elephants, monitoring HEC, and aiding with responses to HEC. They can also be approached to help with community institution efforts to reduce HEC.

Their formation and primary uses are

described in “4. Formation of an anti-depredation squad (ADS) to forestall elephant learning and coordinate with the Forest Department” on page 68, and they play a role in the following efforts:

- “Emergency situation 1: Elephant conflict occurring in village/ agricultural areas near/adjacent to elephant habitat” on page 33;
- “Emergency situation 2: Elephant(s) appearing far from their habitat” on page 39;
- “Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings” on page 45;
- “Emergency situation 4: Government responses to rescue an elephant” on page 48;
- “1. Generating awareness about human-elephant conflict and potential interventions” on page 58;
- “2. Seeking consent and support for the development and installation of a barrier to reduce human-elephant conflict” on page 62;
- “2. Negative conditioning” on page 99.

Elephant Mahouts

Koonkies (trained captive elephants) and mahouts are required in situations which require working in close proximity to wild elephants such as:

- “Emergency situation 2: Elephant(s) appearing far from their habitat” on page 39;
- “Emergency situation 4: Government responses to rescue an elephant” on

- page 48;
- “1. Capture and collaring” on page 92;
- “3. Translocation” on page 102.

for identifying individual elephants and addressing conflict, laboratories also are becoming more important. See the following sections:

- “Identifying individual elephants” on page 124;
- “Collecting and storing blood and dung samples for DNA analysis” on page 128.

Specialized NGOs

NGOs specialized in working on HEC can help with technical information and support during HEC situations. They can also aid the Forest Department in dealing with HEC as and when required. Some specialized NGOs are equipped to carry out rescue operations as well. While NGOs with the correct speciality could help with any of the activities in this manual, the following might be areas where they can be particularly helpful:

- “Emergency situation 4: Government responses to rescue an elephant” on page 48;
- “1. Capture and collaring” on page 92;
- “Identifying individual elephants” on page 117.

Media

Media are important stakeholders for communicating the do’s and don’ts to the general public in conflict areas. They can highlight conservation issues and communicate ongoing efforts by the Forest Department to the general public.

- “1. Generating awareness about human-elephant conflict and potential interventions” on page 58;
- “1. Capture and collaring” on page 91;
- “3. Translocation” on page 102.

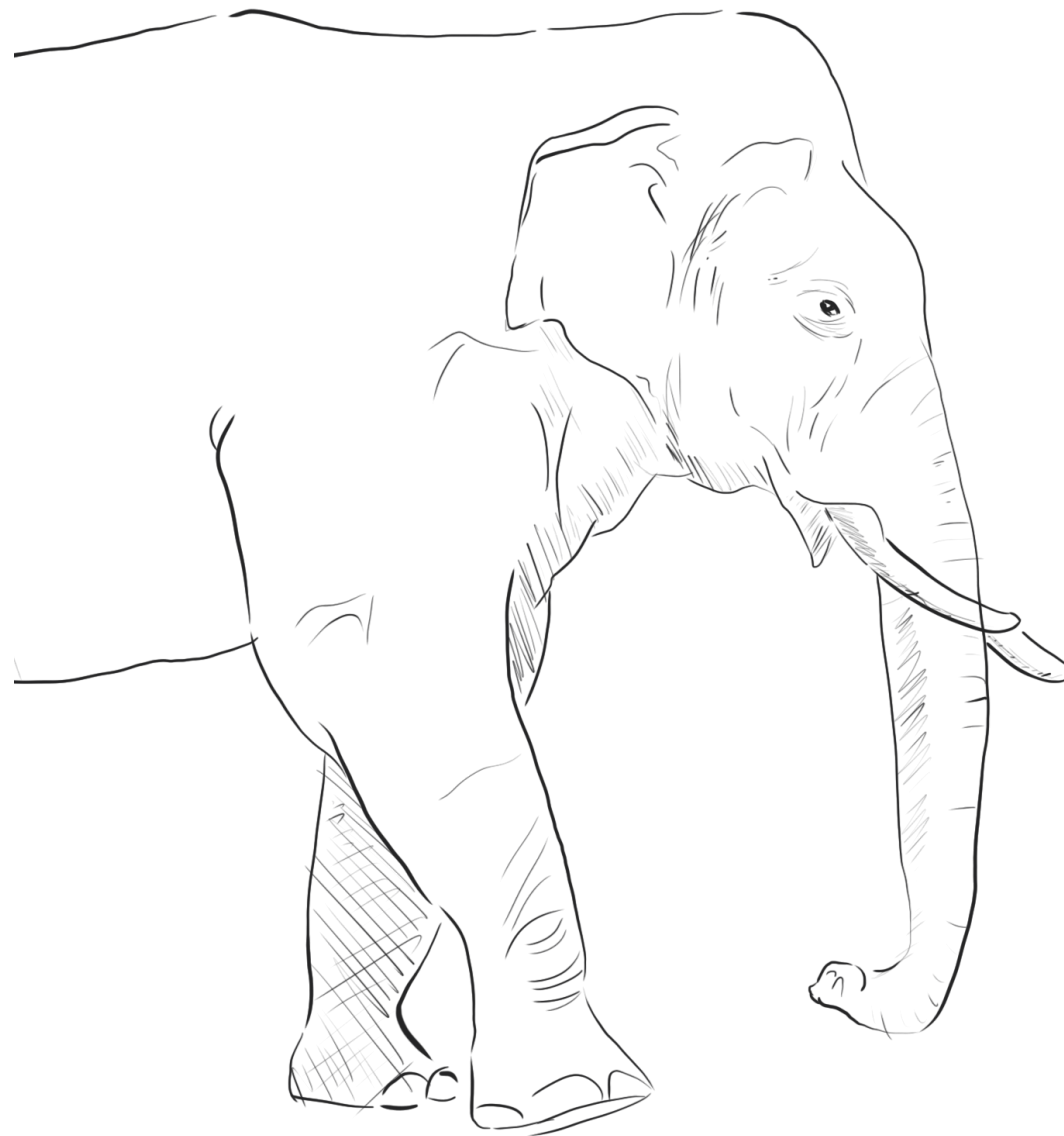
Elephant Researchers

Identifying and studying behaviour of elephants requires scientific rigour and the expertise of a researcher. These researchers may be employed by the government, NGOs, or academic institutions.

- “Identifying individual elephants” on page 124.

Laboratories

As genetics becomes more important



How to ?

The following pages provide detailed operating procedures and best practices for various interventions that can help manage human-elephant conflict.

Part 1:

Emergency field management of human-elephant conflict

Part 1 explains how the Forest Department can establish and use Rapid Response Teams for HEC (page 30), a key institution for managing emergencies related to human-elephant conflict. In addition, Part 1 should help the Forest Department understand best practices for handling five types of emergencies and time-sensitive situations related to human-elephant interactions:

There is an emergency related to human-elephant conflict

- Is one or more wild elephants spending time in/near human habitation?
- Has there been a human death/injury?
- Is an elephant stuck in a well, trench, snare trap, or otherwise in need of rescue?
- Has a dead elephant been found?

Is the elephant emerging in villages near the forest/habitat boundary?

Emergency situation 1
Elephant(s) conflict occurring in village/agricultural areas near/adjacent to elephant habitat.
page 33

Formation of RRTs
page 30

Is the elephant emerging far away from the habitat boundary in human populated areas?

Emergency situation 2
Elephant(s) appearing far from their habitat
page 39

Formation of RRTs
page 30

Emergency situation 3
Elephant(s) have killed or caused severe injury to one or more humans
page 45

Formation of RRTs
page 30

Emergency situation 4
Government responses to rescue an elephant
page 48

Emergency situation 5
Government responses for elephant deaths
page 53

Formation of Rapid Response Teams to manage human-elephant conflict

Purpose of section:

To guide the Forest Department in establishing a “rapid response team” (RRT), a group of people trained and equipped to respond to severe, time-critical conflict situations and help communities manage human-elephant conflict. RRTs will play a role in all the five types of emergency/time-sensitive matters discussed in [pages 33 to 53](#).

Recommended practices:

A. Role of RRTs:

Rapid Response Teams (RRTs) serve as a professional group, employed by the Forest Department, that intervenes to respond to human-elephant conflict. While the primary work of RRTs is to respond to conflict in a time-critical manner, they can also play an important role in monitoring their area for threats to elephants, especially during high-conflict season.

B. Forming an RRT:

Ideally there should be at least one RRT per elephant conflict-affected range. For particularly large ranges and ranges with high conflict intensity, more than one RRT may be required. The RRT should report

 **Main Actors:** RRTs/ Forest Department.

Other actors and government agencies to involve: Sarpanches/village leaders and related community institutions.

 **Tools and resources necessary for intervention:** Jeep or a small truck fitted with halogen lights and equipped with firecrackers, searchlights, hooters, public address (PA) system, camera, GPS, wireless radio set, voltmeter to assess the working of electric fences.

to the concerned FD Range Officer and should be led by a Forest Department officer who is at the post of forester or above. An RRT should include at least one biologist, one social scientist/social worker, and one vet, as well as several members of front-line forest staff. The RRT should have enough members to ensure adequate rest for the team even during high-conflict season. The members of the RRT should be given orientation on HEC management methods (i.e., the contents of this manual) and elephant behaviour by a competent authority



Fig: Four-wheel drive vehicle with emergency and search lights.

identified by the Forest Department. They should also be informed of the roles of the DCF, ACF/SDO, Range Officers, Deputy Range Officers, beat guards, and other actors as specified in the “[Who can help us? —Forest Department roles](#)” on [page 15](#).

Two phone numbers should be established. One should be a toll-free number by which communities can contact the RRT and a second by which communities can inform authorities if the RRT is not arriving promptly to help them. This should serve as both an accountability measure and help authorities understand if an additional RRT needs to be established to help manage HEC.

C. In preparation for emergency conflicts:

1. RRTs should develop contacts in every village where regular elephant visitation occurs in order to get first-hand and timely information on incidences of elephant visitations and crop damage.
2. These contacts should be provided all relevant phone numbers so they can easily reach RRTs for help. These phone numbers should also be displayed prominently on a relevant website, and this website should be provided to communities.
3. The Range Officer to which the RRT reports should ensure that the RRT’s vehicle is in good condition and fitted

with necessary equipment including a high-mast light, a microphone and speakers, and siren such that the RRT will be well-equipped for driving elephants if necessary.

baited traps or snares (which might be targeting other species but are a threat to elephants). They can also use a digital voltmeter or fence tester to ensure non-lethal fences carry sufficient voltage.

D. Availability for emergency conflict:

The RRTs should be available 24/7 during periods of the year when conflict is high.

1. Villagers should be informed to call RRTs if any of the following has happened:

- a. Elephants have entered areas of human habitation and/or property and pose a threat to either human property (including crops) or life;
- b. Elephants face a threat due to humans;
- c. A wild elephant is found to be behaving unusually;
- d. A dead elephant has been found.

2. When summoned, RRTs should report as quickly as possible, **ideally within 1 hour of being called.**

Note: The RRT should give villagers a clear idea of where they are and about how long they will take to get to the village.

E. Reducing threats to elephants:

Just before and during the conflict season(s), when RRTs are not engaged in dealing with emergency situations, RRTs should target areas with conflict to search for threats to elephants, especially lethal fences, naked and sagging wires that might accidentally kill elephants, and

Emergency situation 1:

Elephant conflict occurring in village/ agricultural areas near/adjacent to elephant habitat

Purpose of section:

To explain how the Forest Department/ RRT might cajole elephants away from human habitation without causing further property damage or injury or death to humans or elephants, as well as try to prevent re-entry. In addition, data on the elephants involved should be collected to add to a database used to track HEC patterns. Finally, data related to any damage done by elephants should be collected to facilitate compensation. While this section focuses on situations where elephants are engaged in conflict adjacent to elephant habitat (e.g., forests and grasslands) and movement/shelter areas (e.g., tea estates), the next section deals with situations where elephants engage in conflict deep in human-dominated areas.

Data sheets to be filled during intervention (as relevant):

- ["Form to apply for compensation for elephant damages to crops and property" on page 135](#)
- ["Record of \(suspected\) new elephant" on page 142](#)
- ["Known elephant record datasheet" on page 147](#)



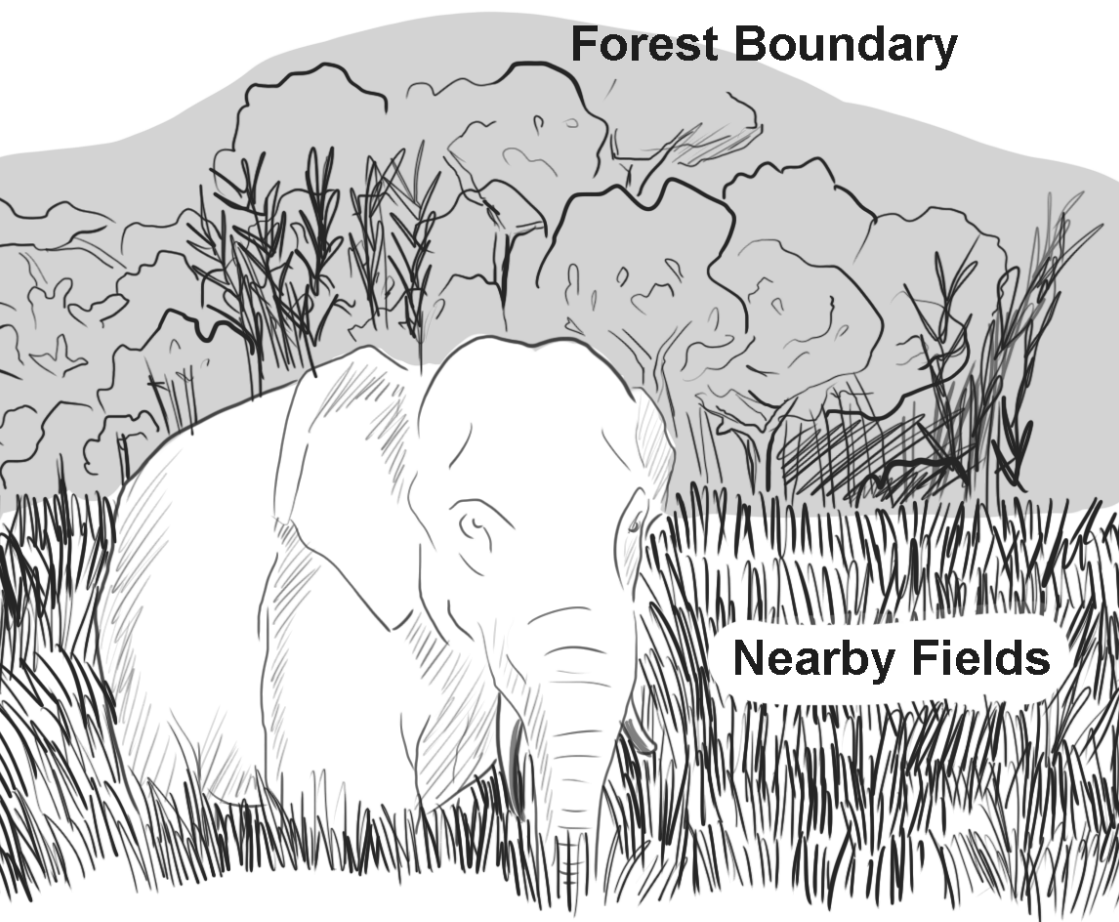
Main actors: RRT/ Forest Department, ADS

Other actors and government agencies to involve: Police, Gram Pradhan/sarpanch/village leader, civil administration (district collector), relevant civil society organizations, Electricity Board.



Tools and resources necessary for intervention: Sound-making devices (drums, fire crackers, horns), chilli/pepper spray, rubber bullets, megaphone system/ loudspeakers, search lights, sampling kit for elephant dung (to enable DNA extraction).

Helpful context: Generally, elephants move into crop fields at night and return to forests (or tea/coffee/similar plantations where they shelter) before dawn. As such, much of the activity discussed below will occur between evening and early morning.



Recommended practices:

A. When elephants are engaged in conflict in areas near their habitat, there are two primary objectives:

1. To ensure elephants return to their habitat with no harm to the elephant or people and minimum damage to property;
2. To collect information on the individual elephants involved.

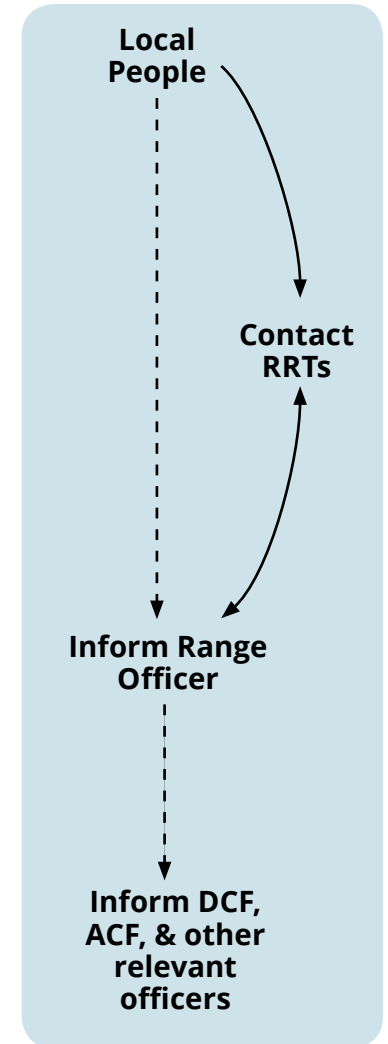
B. Informing concerned officers:

Once the RRT has been alerted of a conflict incident that requires their intervention, they should ensure the Range Officer/Deputy Range Officer is aware of when and where they plan to intervene. This official should then proceed to inform all concerned officers—the relevant DCFs and ACF—of the situation and reach the site as soon as possible. The Range Officer/Deputy Range Officer may also mobilize further staff as necessary.

C. Rapid field situation assessment:

1. The RRT and Forest Officer-in-Charge (the Range Officer for the area of the operation at hand unless otherwise specified) should:
 - a. immediately address any life-threatening situations for elephants or people (e.g., house damage or risk of electrocution—see below)
 - b. ascertain the number of elephants around and look for known/identified

Informing concerned officers:



problematic elephants
c. seek to understand where the elephants have come from

2. The RRT/Forest Officer-in-Charge should ensure that the following are covered:

- a. To continuously monitor the elephants (ideally, the Range Officer should lead this)
- b. Consistently communicate with the public and provide accurate instructions (preferably someone with a relationship with the community should do this). The Gram Pradhan/sarpanch/village leader of the village should be kept informed of all decisions.
- c. To talk to the media if they are present or make inquiries (ACF/DCF/Higher officers where possible).

D. Driving elephants away from human habitation:

If elephants are damaging buildings, the RRT/ADS's first priority should be to ensure the safety of all community members in buildings damaged by elephants and in danger of collapse. This might require driving the elephants away first (see **Driving elephants away from crop fields**, see point G4 below), or it might require evacuating specific buildings first, depending on the situation. Drives can otherwise proceed similarly to those from cropfields (part G below).

E. Preventing electrocution of elephants:

If elephants are exploring areas or objects that place them in danger of electrocution

(e.g., a part of the village with low-hanging wires), the RRT or an authorised officer of the Forest Department should inform the Electricity Department to disconnect the local power supply.

F. Management of crowds:

In densely populated areas, the police and Fire Departments should assist to clear crowds around the elephants:

1. At least an area of 100 meters (and ideally 250 meters) around the location of the elephant(s), and around any pathways between the elephants and their habitat, should be cleared of any people's presence.
2. If crowds become unruly, the civil administration should be asked to invoke section 144 of CrPC, and the police should be asked to enforce section 144 of CrPC.
3. Where elephants have come in search of grains, salt, or fermented local brew, it may be best to move people away from these attractants immediately to prevent injury.

G. Driving elephants away from crop fields:

The RRT, working in coordination with an ADS (page 68) or other trained community members when available, should follow the steps below to identify whether and how to drive elephants away from crop fields. Note that drives in new areas (where elephant drives have not been previously conducted) must be conducted under the supervision of officers of the rank SDO/DCF or above

unless they are unable to be present.

1. Identify whether the elephants are actively foraging on crops, or whether they are just passing through the area. If the latter, no action may be required, as agitating the elephants may lead to more damage to crops. If elephants are foraging, a drive may be initiated.

2. Elephant drives in tea and coffee plantations cannot be done at night due to low visibility; it can be dangerous for the driving team.

Where driving elephants in plantations is necessary for human safety, the drive has to be planned before sunset.

3. Before beginning the elephant drive, RRT should issue verbal warning using loudspeakers and siren sounds to keep the crowd alert of the elephant drive and to avoid encounters with elephants during the operation. All community members and onlookers should be made to move to at least 250 meters away from the elephants and the drive path before the drive. As persons under the influence of alcohol or drugs are highly vulnerable to attack by elephants as they don't always heed instructions and often have slow reaction times, the Officer-in-Charge might wish to try to exclude such individuals from driving operations.

4. The drive should start from a safe distance with shining lights, sound making devices, and firecrackers. If elephants either ignore these stimuli or charge at the driving team, then chilli/pepper spray and/or rubber bullets may be used. **Rubber bullets should be used only after lights, firecrackers, and other sound-making devices have failed to repel the elephants, and they**

should not be fired at the eyes or heads of the elephants. If the elephant exhibits aggressive behavior, RRT members should immediately get into the vehicle and drive away from the animal.

5. In some cases, elephants recently driven back to the forest wait for the RRT to leave and then return to the same field or nearby fields. To prevent this, when possible, the team should patrol the forest boundary for the rest of the night (unless they are called to another site of HEC) to ensure the elephants do not return. Vigilance in the area should remain elevated for around two days. The relevant beat officer and forest staff should gather as much information as possible regarding elephant locations within the forest during the day so as to anticipate potential problems at night.

H. Barrier damage reconstruction:

Barriers in the form of fences, concrete compound walls, or trenches specifically intended to prevent intrusion of elephants in human habitations might have been damaged before or during the HEC incident. These—whether private or government-owned—need to be repaired on a priority basis to prevent elephant intrusions through this weak point.

In the case of government-owned barriers, the RRT should ensure the Forest Department works with community members to repair the barriers right away. In the case of privately owned barriers, the RRT should contact the private owner and provide appropriate support to help repair the barrier.

I. Identification of individual elephants:

Wherever possible, during and after the HEC event, data should be collected to allow identification of individuals involved in conflict.

1. Where possible, establish key identification characteristics of the elephants by taking photographs of the elephants involved from specified angles by skilled personnel (see “Identifying individual elephants” on page 117 and “Appendix I: Identifying elephants” on page 159); ADS members can be trained to take photos of elephants for identification purpose.

2. If the CWLW has permitted DNA sampling, take dung samples from elephants for DNA analysis (see “Collecting and storing blood and dung samples for DNA analysis” on page 128 and “Datasheets for individual elephant profiles for elephant database” on page 141).

J. Collect data on damages caused by elephants to provide fair compensation to victims of HEC. (see “Recording HEC events and providing ex-gratia/compensation” on page 131).

Emergency situation 2: Elephant(s) appearing far from their habitat


Purpose of section:

Sometimes, elephants get far away from their usual habitats and deep into human-dominated areas before authorities are able to intervene. This section seeks to explain how the Forest Department/RRT might remove elephants from human habitation and return them to their habitat without causing further property damage or injury or death to humans or elephants. In addition, data on the elephants involved should be collected to add to a database used to track HEC patterns. Finally, data related to any damage done by elephants should be collected to facilitate compensation.

Data sheets to be filled during intervention (as relevant):

- “Form for verification of damage for compensation payment for crop or property damage” on page 138
- “Record of (suspected) new elephant” on page 142
- “Known elephant record datasheet” on page 147

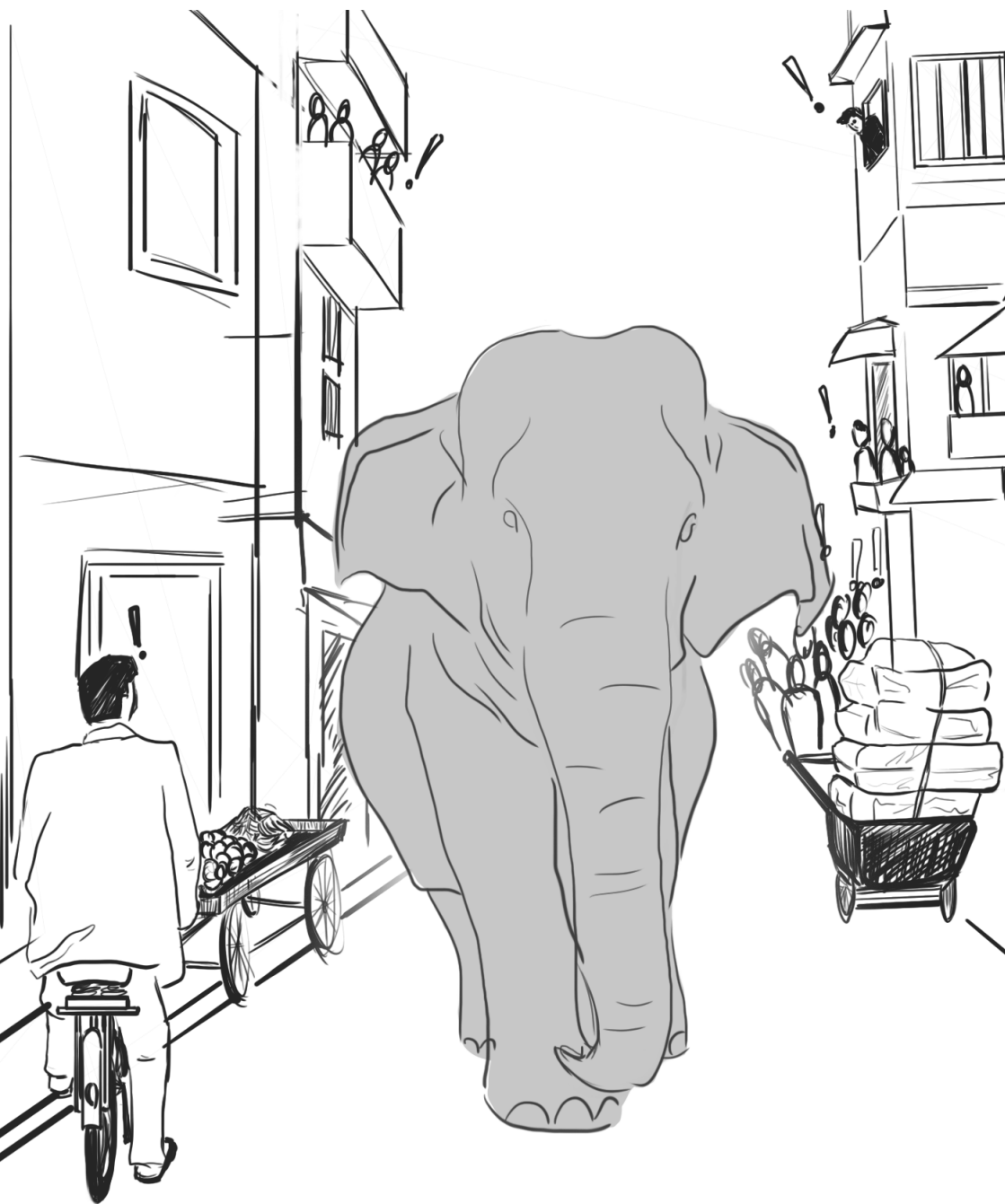
Helpful context: Elephants that have moved far away from their usual habitats and penetrated deep within human-dominated areas often meet communities lacking experience in how to deal with wild elephants, leading to greater risks for both people and elephants. Furthermore, the elephants are more likely to be disoriented and/or aggressive. Authorities

 **Main actors:** RRT/ Forest Department

Other actors and government agencies to involve: Local police, Gram Pradhan/sarpanch/village leader, fire department, civil administration, and health services.

 **Tools and resources necessary for intervention:** Mobile wireless communication equipment such as walkie talkies and wireless fitted vehicles, sound-making devices (drums, fire crackers, horns), chilli/pepper spray, rubber bullets, megaphone system/ loudspeakers, search lights, sampling kit for elephant dung (to enable DNA extraction). In case transporting the elephant is necessary, see page 102.

might have to exert greater effort to prevent accidents.



Recommended practices:

A. When elephants enter human habitations:

The goal is to drive them back to the forest/their habitat as soon as it is safely possible. But if that is not possible - if elephants are unresponsive to being driven or driving the elephant cannot be done safely (e.g., too many people and property are surrounding the elephant), tranquilizing and returning the elephant(s) to their habitat might be necessary. Thus, the goals of the operation become:

1. To relocate elephants back into their habitat with no harm to the elephant or people and minimum damage to property;
2. To collect information on the individual elephants involved.

B. On receiving information of elephants close to human habitation,

The Forest Department field staff/ Rapid Response Team (described page 30) should make it to the site immediately.

C. Informing concerned officials in Forest Department and beyond:

Once the RRT has been alerted of a conflict incident that requires their intervention, they should inform the Range Officer/Deputy Range Officer closest to the site in question. This official should inform all concerned officers—the

relevant DCFs and ACF—of the situation and reach the site as soon as possible. The Range Officer/Deputy Range Officer may also mobilize further staff as necessary.

- Since it is in close vicinity to human habitation, the relevant departments (the police, fire department and civil administration) should simultaneously be informed to help manage the crowds to avoid any mishaps. **If human injury/loss of human life has already been reported from the scene**, an ambulance should also be summoned for assistance immediately, see “**Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings**” on page 45.

D. Rapid field situation assessment:

1. The RRT and Forest Officer-in-Charge (the Range Officer for the area of the operation at hand—or the nearest forest range—unless otherwise specified) should:
 - a. Immediately address any life-threatening situations for elephants or people (e.g., house damage or risk of electrocution—see section G below)
 - b. Ascertain the number of elephants around, look for known/identified problematic elephants
 - c. Seek to understand where the elephants have come from
2. The RRT/Forest Officer-in-Charge should ensure that the following are covered:
 - a. Continuous monitoring of elephants.

- b. Frequent and consistent communication with the public and provision of accurate instructions (preferably someone with a positive relationship with community should do this). The Gram Pradhan/sarpanch/village leader should be kept informed of all decisions.
- c. Communication with the media where present (ACF/DCF/higher officers where possible).

E. Protecting people in buildings damaged by elephants:

If elephants are damaging buildings, the RRT/ADS's first priority should be to ensure the safety of all community members in buildings damaged by elephants and in danger of collapse. This might require driving the elephants away first (see point I2 below), or it might require evacuating specific buildings first, depending on the situation.

F. Management of crowds:

The police and Fire Departments should assist RRT/ADSs to clear crowds around the elephants. The Gram Pradhan/sarpanch/village leader(s) of the village should be kept informed of all decisions.

1. During the day, an area of at least 100 meters (and ideally 250 meters) around the location of the elephant(s) should be cleared of any people's presence and cordoned off until it is time to drive the elephants back towards their habitat.
2. Unwanted and unauthorised people

are not to be allowed near the area.

3. If crowds become unruly, the civil administration should be asked to invoke section 144 of CrPC, and the police should be asked to enforce section 144 of CrPC.
4. Where elephants have come in search of stored grains or fermented local brew, it may be best to move people away from these attractants immediately to prevent injury.

G. Preventing electrocution of elephants:

If elephants are exploring areas or objects that place them in danger of electrocution (e.g., a part of the village with low-hanging wires), the RRT should inform the Electricity Department to disconnect the local power supply.

H. Preparation for an elephant drive (where possible):

Long distance drives during the day are not advised as elephants resist moving in daylight hours in areas outside of their habitat, and since human activities are also high outside forested areas. Thus the elephant drive needs to be planned for the early evening. While returning to the forests, elephants are generally willing to take the route they came from. The response team needs to verify the route by which the elephant came and plan accordingly. Driving of elephants in areas far from elephant habitat must be conducted under the supervision of officers of the rank SDO/DCF or above unless absolutely impossible.

1. The site where elephants are located during the day should be cordoned off.

2. If veterinary expertise suggests the elephants are in danger of dehydration, provision of water by tankers should be made if there is no water available where the elephants are present.

3. The Rapid Response Team and others involved in the drive must have the equipment listed in the [tools and resources section on page 39](#) above.

4. People living in neighbouring villages, especially the route(s) which the elephant took from their usual habitat and by which the elephants are to be driven, need to be alerted.

5. Wherever barriers like electric or rail fencing occur on the planned driving/return route, these need to be opened for the elephants to pass into the forest.

6. If available, koonki elephants should be brought and prepared to help drive the wild elephants to the forests at nightfall.

I. Conducting the elephant drive:

Ideally, the elephants will gradually become active and move towards their habitat on their own. The RRT needs to assist/guide the elephants wherever needed, especially in case they wander off towards another human settlement. An advance team should alert people ahead of elephant movement to avoid sudden encounters.

1. If elephants are not moving in the right direction, before beginning the elephant

drive, the RRT should issue verbal warnings using loudspeakers to keep the crowd alert of the elephant drive and to avoid encounters with elephants during the operation.

2. The drive should start from a safe distance with shining lights, sound making devices, and firecrackers. If no responsive behaviour is noticed from elephants or the elephants charge at the driving team, then chilli or pepper spray and rubber bullets may be used. **Rubber bullets should be used only after lights, firecrackers, and other sound making devices have failed to repel the elephants, and they should not be fired at the eyes or heads of the elephants.** If the elephant exhibits aggressive behavior, RRT members should immediately get into the vehicle and switch on the engine.

3. After driving the elephant(s) back to their usual habitat, the team should patrol the habitat boundary for the rest of the night (unless they are called to another site of HEC) to ensure the elephants do not return, since elephants might try to return to the same areas in subsequent nights. Vigilance in the area should be elevated for around two days. The relevant beat officer and section officer should gather as much information as possible regarding elephant locations within their habitat during the day so as to anticipate potential problems at night.

J. Barrier damage reconstruction:

Barriers in the form of fences, concrete compound walls, or trenches specifically intended to prevent intrusion of elephants in human habitations might

have been damaged before or during the HEC incident. These—whether private or government-owned—need to be repaired on a priority basis to prevent elephant intrusions through this weak point.

In the case of government-owned barriers, the RRT should ensure the Forest Department works with community members to repair the barriers right away. In the case of privately owned barriers, the RRT should contact the private owner and provide appropriate support to help repair the barrier.

K. If a long-distance drive isn't feasible

- Either because the elephants aren't cooperating or because the path back to elephant habitat cannot be adequately cleared, elephant(s) might have to be tranquilized and relocated to their habitat. For instructions on how to do this, please see the section "1. Capture and collaring" on page 92 and "3. Translocation" on page 102.

Note, however, this might be very challenging for multiple elephants.

L. Identification of individual elephants:

Wherever possible, during and after the HEC event, data should be collected to allow identification of the conflict-involved elephants.

1. Establish key identification characteristics of the elephants by taking photographs of the elephants involved

from specified angles by skilled personnel (see [Identifying individual elephants section, page 124](#));

2. Take dung samples from elephants for DNA analysis (see [Identifying individual elephants section, page 128](#));

M. Collect data on damages caused by elephants to provide fair compensation to victims of HEC.

Please see "Collecting information for compensation/ex-gratia" on page 118.

Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings

Purpose of section:

Elephants are believed to kill around 500 people a year across India. Many others are injured. This section is supposed to help authorities respond constructively to these tragedies, ensuring prompt medical care as required, proper ex-gratia or compensation to the families, and ensuring accurate data on the incident(s) to help guide decision-making to prevent future harm to people or elephants.


Data sheets to be filled during intervention (as relevant):

- "Form for documentation and verification for ex-gratia/compensation payment for human death/injury" on page 132
- "Record of (suspected) new elephant" on page 142
- "Known elephant record datasheet" on page 147

Recommended practices:

A. When elephants have injured human beings, the priorities are as follows:

1. Contact the necessary authorities to provide treatment for anyone who is not deceased.
2. Ensure the offending elephants are not

 **Main actors:** RRT/ Forest Department

Other actors and government agencies to involve: Local healthcare centers, Panchayats, Gram Pradhan/sarpanch/village leader, Police Department, Revenue Department.



Tools and resources necessary for intervention: Wireless walkie talkies and wireless fitted vehicles (so all participants can coordinate), ambulance, medical kit, sampling kit for elephant dung (to enable DNA extraction), stretchers for carrying and transporting the injured; body bags may be needed where people have died.

posing further threat to others.

3. Collect any necessary data to ensure swift and fair compensation and ex-gratia to the victims of HEC

4. Collect any available data to help identify the offending elephant(s).

B. If someone(s) has been injured by an elephant, whether or not it is believed s/he is dead

1. Any person/ authority present should call 108 for an ambulance and ensure the victim is rushed to the hospital. Treatment should be provided for free.

2. The RRT should inform the nearest beat or range office.

3. The Range Officer should inform the concerned DCF/ACF and reach the site as soon as possible. The Range Officer may also mobilize staff for deployment at the conflict site.

C. Ensure offending elephant(s) is not still a threat:

Interview those near the incident about the whereabouts of the elephant. If it has not returned to the forest:

1. Establish key identification characteristics of the elephants by taking photographs of the elephants involved from specified angles by skilled personnel (see [Identifying individual elephants section, page 117](#)).

2. Follow the instructions in the sections above ("[Emergency situation 1: Elephant conflict occurring in village/agricultural areas near/adjacent to elephant habitat](#)" on page 33, or "[Emergency situation 2: Elephant\(s\) appearing far from their](#)

[habitat](#)" on page 39) to try and locate and drive the elephant back to its habitat. Especially if the offending elephant is believed to be a serial offender or the human death was clearly not an accident, authorities may consider more drastic action right away (see point L.3 below). Please see "[Part 4: Managing individual elephants engaged in repeated human-elephant conflict](#)" on page 90.

D. Collect data from the field on the human death/injury incident(s) to help ensure compensation, as well as to help better understand why the incident occurred.

1. Interview witnesses of the incident to understand how it occurred. Fill out the "[Form for documentation and verification for ex-gratia/compensation payment for human death/injury](#)" on page 132 and any other required paperwork. The most important details are the identity of the



deceased, date, time, location, and any known circumstances of the incident. In particular, ascertain the conditions under which the person was killed and whether the death was an accident, was due to irresponsible behaviour/provocation by the victim or other humans, or was likely due to unprovoked or disproportionate aggression by the elephant.

2. Collect any other data on damages caused by elephants to provide fair compensation to victims of HEC. Please see, "[Form to apply for compensation for elephant damages to crops and property](#)" on page 135.

K. Identification of individual elephants:

Wherever possible, during and after the HEC event, data should be collected to allow identification of the conflict-involved elephants. In addition to photographs, dung samples from elephants should be taken for DNA analysis (see "[Collecting and storing blood and dung samples for DNA analysis](#)" on page 128). If multiple dung piles can be found, it is best to sample all of them, especially if multiple elephants were present at the time of the incident.

L. In the case of a fatality due to HEC:

1. The Police Department and Revenue Department should complete all legal requirements/documentation related to the death and move the body for post-mortem.

2. The RRT should collect a copy of

the post-mortem of person(s) killed, performed by a government hospital, and make the report available for the concerned agencies such as the Forest Department. This document should be added by the RRT or other Forest Department officials to the file for providing ex-gratia to the deceased's family (see, "[Form for documentation and verification for ex-gratia/compensation payment for human death/injury](#)" on page 132).

3. An emergency meeting of experts in elephant behavior, Forest/Revenue/Police officials, veterinarian(s) and public/local representatives must be convened to suggest appropriate actions to deal with the elephant that killed a human being, especially if the action was not an accident or the elephant is a repeat offender. The CWLW and other authorities should consider the recommendations from this meeting before taking action. The recommended action could include clearing the route for the elephant to move/return to its habitat, translocation, or removal (including placement in captivity). Guidance for this decision can be found in Field Manual "[Part 4: Managing individual elephants engaged in repeated human-elephant conflict](#)" on page 90.

Emergency situation 4:

Government responses to rescue an elephant

Purpose of section:

Elephants sometimes experience life-threatening situations due to challenges posed by a fast-changing human-dominated landscape. This section is to guide the Forest Department in coordinating and executing a response to a situation where one or multiple elephants are in need of rescue or serious treatment. We focus on three scenarios:

- Where an elephant is trapped in a well or depression,
- An elephant is caught in a snare or injured by a crude bomb.
- A young calf is separated from its herd.

Data sheets to be filled during intervention (as relevant):

- “Elephant death or injury summary sheet” on page 151;
- “Record of (suspected) new elephant” on page 142;
- “Known elephant record datasheet” on page 147.

Recommended practices:

A. Whether rescuing elephants from a well, a snare or other trap, a crude bomb injury, or from being orphaned, some priorities are similar across scenarios:

1. Rapid Response Teams should be able



Major actors: RRT/ Forest Department

Other actors and government agencies to involve: Civil administration (Magistrate), police, Fire Department, Veterinary Department, NGOs involved in rescue



Tools and resources necessary for intervention: Backhoe loader/excavator, crane, truck, thick nylon rope, two pairs of half foot width and 6m long belts, tranquillizing gun, sedating and reviving drugs, first aid kit, focus light, torch light, firecrackers, wireless walkie talkies, machine saw, water, fodder, powdered milk and feeding bottle for rescuing calves if need be.

- to arrive at the scene quickly;
2. RRTs should prevent crowds of people from gathering around the elephant(s), as that can lead to unnecessary stress;
3. Those intervening should try to save the elephant with the least intrusive interventions likely to succeed. Veterinarians should participate in

choosing and applying interventions wherever possible.

4. Where feasible, approaching the wild elephant(s) with the aid of koonkies can help manage the behaviour of both the injured elephant and its herd.

5. If any machinery is used, it should be used with care such that it does not injure the elephant. If contact of any machine with the animal is necessary, the contacting surface of the machine should be padded and any such contact should be as gentle as possible. Similarly, koonkies should be made to handle the elephant with as little force or injury as possible.

6. The goal of any intervention should be to ensure the elephant(s) involved recovers fully and returns to regular activities in the wild as soon as possible. If a veterinarian determines some treatment is necessary before release of the animal to achieve this goal, it should be allowed. Contact between the elephant(s) and people during treatment and time in captivity should be kept minimal. Time in captivity should be avoided; for guidelines on if/when captivity might be considered, see [Captivity on page 107](#). Keeping a wild elephant in captivity requires the permission of the CWLW.

7. As soon as is feasible—ideally, while still close to the elephant—the team should fill out datasheets identifying the individual elephant(s) involved ([see page 141](#)).

B. Situational response in case of elephant(s) stuck in a

pit/fallen in an open well:

1. The area with the elephant(s) should be cordoned off to avoid people from gathering around.

2. The police need to be informed immediately for crowd control and to minimize disturbance.

3. If the trapped elephant’s herd remains close to the site of rescue, there is a chance that the herd might charge at the rescue team during the operation. Therefore, a team needs to be assigned to monitor the herd’s reaction and movements, and a plan should be in place in case the herd charges. This plan should include:

- a. A team solely dedicated to monitoring the elephant herd to sound the alarm if they begin to return or charge.
- b. Tools to scare the elephants back or away, including firecrackers and other sound-making devices, lights, a shotgun with rubber bullets, and (where available) koonki elephant(s). **Rubber bullets should be used only after lights, firecrackers, and other sound making devices have failed to repel the elephants, and they should not be fired at the eyes or heads of the elephants.**

4. At least one qualified veterinarian needs to be called as soon as possible to monitor the health condition of the trapped elephant and suggest measures to keep the elephant alive.

5. If at times a veterinarian is not available on site, a communications system should be established to regularly relay information on the elephant’s condition to a qualified veterinarian.

6. In anticipation of the rescue operation, fodder and water provisions should be prepared for an adult elephant and milk (preferably powdered) should be made ready for any calves with guidance of the veterinarian.

7. The method of rescue depends upon the situation and should be approved by the DCF/ ACF/ Range Officer of the area with support from the veterinarian. Where relevant, the Fire Department should also be consulted. Some recommended considerations include:

a. If the well or pit is not deep, digging the area using a backhoe loader/excavator to create a gentle slope could assist the elephant to come up on its own.

b. If the elephant is stuck in mud and is unable to move:

i. Machinery like backhoe loader/excavator should be used to clear the mud around the elephant if possible,
ii. The elephant can be pulled out of the mud using either a koonki elephant or (if koonki is unavailable) excavator or other motor vehicle,

c. If the pit is deep and digging and flattening the slope is not possible, a crane will be useful to lift the animal by securing the elephant with wide belts.

8. The DCF may deputize the ACF/ concerned Range Officer to lead the operation.

9. If authorities opt to tie a belt around the animal to execute the rescue, sedation is required (see "1. Capture and collaring" on page 92) before approaching the elephant to fix the belt. The drugs used for sedation should be based on context and decided by an experienced veterinarian.

10. To pull the elephant: The veterinarian should guide how the ropes are tied so that they do not endanger the animal's health. Soft jute ropes should be tethered around the leg or neck of the elephant. If unsedated, the elephant will likely use its trunk to pull back on the rope, reducing stress on its neck. Where possible, koonki elephants should be used to pull the elephant out of the mud. If koonkis are not available, an excavator or similar machine may be (very carefully) used.

11. During lifting of elephants, the following equipment need to be kept ready:

Description	Capacity	Length of webbing	Number
Lifting web sling belt straps	3 ton	5 meter	2
	3 ton	10 meter	2
	5 ton	5 meter	2
	5 ton	10 meter	4
	10 ton	5 meter	2
D shackles	10 ton	10 meter	4
	5 ton		2
Chain pulley assembly	10 ton		2
	5 ton		2

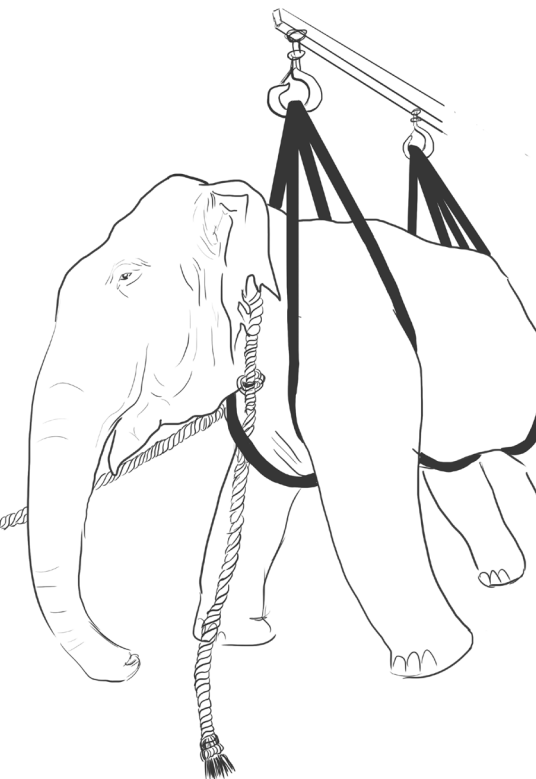
12. To lift the elephant: If the elephant is in a standing position, belts and ropes should be fixed to the chest and hind quarters of the elephant as seen to the right. If the elephant is laying down, belts and ropes can be tied to the elephants' legs. The veterinarian should guide how the belts/ropes are tied so that they do not endanger the animal's health. Make sure the belt is fixed properly so that it will not loosen or tighten or unlock. The elephant can then be lifted by a crane.

The entire lifting operation should not last more than 3-5 minutes.

13. Once the animal is removed from the well/pit, first aid medical treatment should be immediately applied on injuries before release is planned.

14. After the release, the team should keep the elephant under watch for at least 3 days to monitor its health condition. If the elephant is believed to be part of a herd, whether the elephant has rejoined the herd should be observed.

15. As soon as possible, the DCF should inform the Conservator and CWLW of the operation.



C. Situational response in case an elephant is trapped in a snare or foot-trap or injured by a crude bomb :

1. If an elephant is found with a snare stuck on its leg or trunk (with or without severe injuries), or if the elephant has injuries to or inside its mouth which affect intake, the elephant must be tranquilized so that the wound may be provided veterinary treatment (see "1. Capture and collaring" on page 92).

2. During the rescue, the veterinary team should assess the elephant's injury. If the injury is minimal, the wound should be cleaned and medicines should be applied. After treatment, the elephant should be released back to the forest/habitat. In cases when the wound is severe and recovery will take time, the elephant has to be taken into custody for regular treatment until recovery is apparent (see "4. Captivity" on page 107). If treatment

is required for several weeks or more, the elephant should be taken to an elephant camp for treatment. Throughout this period, efforts should be made to provide the elephant as much natural fodder as medically advisable while minimizing cooked food or other anthropogenic foodstuffs to avoid habituation to human-made food, as this would complicate return to the wild. During the period of treatment, contact with humans should also be minimal so that release of the elephant back into the wild remains viable. Once recovery is assured, the elephant should be released into the forest. If the elephant's wounds fail to heal after several weeks or months and the elephant cannot be safely released, permission must be sought from the relevant veterinarian and the Chief

Wildlife Warden to train the elephant as a camp elephant (see “4. Captivity” on page 107).

D. Situational response in case an elephant calf is lost/abandoned:

1. If an elephant calf is found detached from or abandoned by the herd, the need for intervention needs to be assessed. One team of field staff needs to observe the calf while another team searches for its herd.

2. A veterinarian needs to be brought on site to determine the age and assess the health condition of the calf. Any food or milk should be provided only with the prescription of the veterinarian.

3. The first objective should be to observe the calf to see if the herd comes to rescue it. The rescue team needs to ensure no unnecessary handling of the calf, as it could lead to unnecessary stress for the calf. Furthermore, foreign (human-related) smells on the calf could complicate re-acceptance of the calf by its herd.

4. The field staff can intervene to move the calf (either to return it to the herd, or to an elephant camp) with the Chief Wildlife Warden’s consent, ideally in one of two cases:

a. The calf is too weak and needs medical intervention. In this case, the calf may be moved to a facility for treatment. Intervention should be made with minimum handling. Ensuring that only one person handles the calf, with gloves, during treatment should help ensure that

the calf is accepted by the herd during reunion.

b. The calf has been monitored for a day, and the herd has not found the calf by themselves. In this case, the calf may be taken to the herd if its location is known.

5. If the calf has been handled by people, before returning the calf to the herd, rubbing the calf with elephant dung or mud or washing with plain water could decrease the chance of the calf being rejected.

6. If the herd is not found, then the calf may (with permission from the CWLW) be taken to an elephant camp and fostered with close observation by a dedicated person. Please see the section on [Captivity \(page 107\)](#).



Emergency situation 5: Government responses for elephant deaths

Purpose of section:

To help the Forest Department coordinate and execute a response when a wild elephant has died. When a dead elephant is found, it is crucial to quickly collect accurate data on the cause of its demise. An elephant post-mortem is also a key opportunity to collect data that can be used for demographic, genetic, and other biological analyses. This section describes best practices for (i) conducting elephant post-mortems and (ii) forensic and criminal investigation in case elephants have been targeted with the intent to seriously injure or kill them, perhaps with guns/hand-held weapons, poison, bombs, lethal fences, electrocution, etc.

Data sheets to be filled during intervention (as relevant):

- [“Record of \(suspected\) new elephant” on page 142](#)
- [“Known elephant record datasheet” on page 147](#)
- [“Elephant death or injury summary sheet” on page 151](#)
- [“Post-mortem format” on page 153](#)

Helpful context: The protocols described here are to be followed whether the elephant death occurs inside or outside of areas under the Forest Department’s jurisdiction.



Main actors: Forest Department.

Other actors and government agencies to involve:

Veterinary Department, NGO representative, local elected official (village leader, Panchayat leader, etc.), media person. For electrocutions: Electricity Board. For all illegal killings: Police Department, Wildlife Crime Control Board.



Tools and resources necessary for intervention:

Standard veterinary toolkit for post-mortems, backhoe loader/excavator, crane, thick nylon rope, focus light, torch light, large knife, axe, measuring tape, salt (4 bags), daily wage labour, containers to store organ parts, formaldehyde and liquid phenol.

Also refer:

- [“Appendix II: Salient points to be observed/check list of samples to be collected by the on-site veterinarian during suspected electrocution deaths” on page 171](#)
- [“Appendix III: Mandatory samples to be collected for all post-mortem for toxicology analysis:” on page 172](#)

Recommended practices:

A. If the carcass of an elephant is found, there are several primary priorities:

1. Describe the elephant and its place and time of death as accurately as possible.
2. Ascertain the cause of the elephant's death as accurately as possible.
3. If the death is due to poaching or other illegal activity, take appropriate responsive action immediately.

B. The first respondents to the site should be the Forest Department and a veterinarian, including sniffer dogs if available to the Forest Department:

The local Range Officer should form an enquiry team to collect evidence.

C. Conduct a post-mortem (led by a veterinarian) in accordance with the document on page 153. This document includes guidelines on:

1. Post-mortem process.
2. Collection of all necessary samples, such as tusk and tissue samples.
3. Disposal of carcass.

D. Establish key identification characteristics of the elephants by having skilled personnel take photographs of the elephants from specified angles (see "Identifying individual elephants" on page 124);

E. Take blood and/or dung samples from elephants for DNA analysis (see "Identifying individual elephants" on page 124, and "Collecting and storing blood and dung samples for DNA analysis" on page 128)

F. The area around the carcass should be thoroughly scanned by forest personnel for all evidence related to cause of death:

This should ideally be done with the help of sniffer dogs. In case any illegal activity is suspected, a preliminary offence report (POR) needs to be filed by the Range Officer.

1. The enquiry team should work with the police to search for evidence in nearby communities.
2. If there is any evidence of illegal activity, the case should be registered under the Wild Life (Protection) Act, 1972. If the elephant was killed by gunshot or poisoning is suspected, police must be involved in the investigation.

G. If the elephant was killed by electricity

The Electricity Board should be involved in the investigation. (see "Appendix II: Salient points to be observed/check list of samples to be collected by the on-site veterinarian during suspected electrocution deaths" on page 171)



Part 2: Developing community institutions to manage and reduce human-elephant conflict

We are working with communities that face chronic human-elephant conflict.

Does the community have effective institutions to mobilize against conflict?



1. Generating awareness about human-elephant conflict and potential interventions

Purpose of section:

Human deaths due to HEC in particular can be made less likely with changes in human behaviour, especially if communities are supported in such behaviour change by officials. This section aims to help Forest Department officials guide communities in learning how to make accidental encounters with elephants less likely.

Recommended practices:

A. Forest Department officials should hold a meeting (with or without NGO members) with the local community

B. The village leader and all households should be given a basic awareness session on HEC that includes:

1. An explanation of why HEC occurs (see video titled “WWF Human-Elephant Conflict | Eunoians” on YouTube).
2. Contact information for the Rapid Response Team in case elephants come close to the village. Where an anti-

Main actors: Forest Department, local community.

Other actors and government agencies to involve (as available/relevant):

Panchayat representative, local NGO members, sarpanch/village leader(s), religious leader, tea/coffee plantation management, farmers’ groups, women’s groups, teachers, students’ organizations, local media representatives, local conservationists, honorary wildlife warden of the area, Eco-Development/Joint Forest Management Committee and ADS members. Government agencies might include the civil administration, Electricity Department or Agriculture Department.



Helpful tools and resources: Videos explaining interventions and best practices in HEC, posters, informational leaflets or booklets, laptop computer, projection system, power generator, PA system, resource person.

depredation squad (ADS) already exists in the community, their contact information should also be highlighted. See “4. Formation of an anti-depredation squad (ADS) to forestall elephant learning and coordinate with the Forest Department” on page 68.

3. Instructions on what to ask the RRT when the community calls them in a time of conflict: where the RRT is at present, when they are likely to arrive, and what the community should do in the meantime.

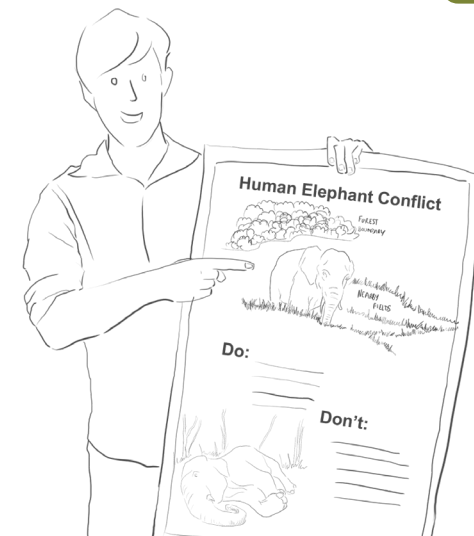
4. “Dos and don’ts” that help authorities discourage high-risk behaviour, such as drinking or open defecation, in areas frequented by elephants. These should include the following:

Do

- Understand that wild elephants are intelligent, adaptive, and powerful and can be dangerous.
- Always be cautious and maintain distance when you spot elephants.
- When elephants are sighted near the village, share information about the number and location of elephants. Especially be aware about males, including males in musth. Quickly inform the Rapid Response Team/ Forest Department, ADS, other villagers, and known conservation NGOs about the presence of elephants.
- Until the authorities arrive, appoint watchers or activate ADS and use a watchtower or large tree to monitor elephants safely.

Don’t

- Don’t try and get close to wild elephants.
- Don’t try and drive away elephants from property without the Rapid Response Team or other experts.
- Don’t produce country liquor in your village unless it can be stored away from the house in a safe place (e.g., in an underground cellar or similar community storage space).
- Don’t roam in the conflict prone area in an inebriated condition especially at night.
- Don’t defecate in the open.
- Don’t impede movement paths used by elephants near the village (i.e., by building new structures in their way).



Do

- Work with the Forest Department and elephant conservation NGOs to install safe solar power fences.
- If HEC is common around your village, petition authorities to install lights to improve visibility.
- Ensure that everyone in the village has access to a latrine in or close to their home so that open defecation is not necessary.
- Take extra precautions if you plant fruit trees like jackfruit and banana near your home as they might attract elephants.
- Arrange for a lookout to keep watch for approaching elephants when working in areas with low visibility such as coffee plantations, sugarcane fields, tea plantations, etc.

Don't

- Don't get in between elephants and the habitat from which they came, as they might try to return suddenly.
- Don't surround wild elephants.
- Don't injure elephants, as they can then become (more) violent.
- Don't install illegal power fences as they often kill elephants, other wildlife and people. This is a violation of the law and will invite prosecution.

all ages, genders, and backgrounds are encouraged to ask questions.

C. An explanation of the main interventions available to reduce HEC should be provided to the Gram Sabha (or village leader and affected households) with a focus on how barriers can help reduce conflict. This should address:

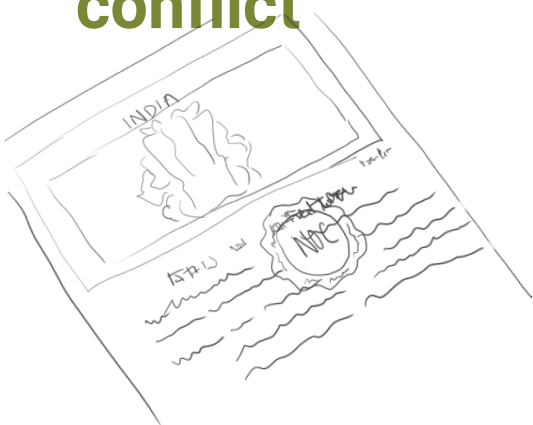
1. The difference between a lethal and non-lethal fence and how people can misuse the fence.
2. How the community must participate in siting fence and trench entry/ exit points to prevent sabotage and ensure functionality.

3. That barriers must be positioned such that they do not prevent elephant movement between habitat patches.

4. The importance of maintenance for barrier effectiveness.
5. Why elephants must not be allowed to learn how to get past the fence or trench.
6. How "anti-depredation squads" (ADSs) can make it less likely that elephants learn to get past a fence or trench.

D. Hold a question and answer session in which community members of

2. Seeking consent and support for the development and installation of a barrier to reduce human-elephant conflict



Purpose of section:

Physical barriers are generally the most effective way to help reduce human-elephant conflict. While some barriers will be both built and maintained entirely by the Forest Department (mostly at the edge of protected areas and reserve forests), many barriers are often jointly built and maintained by the Forest Department or an NGO and the community. Such barriers work best if the community participates actively in their design and maintenance. Before installing barriers, authorities should begin by ensuring communities are invested in their success. One key step is to seek the formal consent of the community or communities at hand to install a barrier. This section provides tips on how to seek both support and consent.

Main actors: Forest Department and/or relevant NGO, community members.

Other actors and government agencies to involve (as available/relevant): Panchayat representative, local NGO members, local community leader/coffee plantation management, farmers' groups, women's groups, student organizations, Eco-Development/Joint Forest Management Committee ADS members, and civil administration.

Helpful tools and resources: Videos explaining interventions and best practices in HEC, posters, informational leaflets and booklets, laptop computer, projection system, power generator, PA system, resource person, and understanding of potential sources of funding for barrier development.

Recommended practices:

A. The Forest Department must seek the explicit consent of community leaders, the Gram Sabha, and/or the subsection of the community that will be affected by the fence before proceeding further with the development of a barrier.

The relevant Panchayat representative also needs to be informed and consulted.

B. Developing a barrier should be made conditional on the following:

1. Community agrees to help build the barrier (in-kind contribution).
2. Community agrees to raise funds for the maintenance of the barrier (unless funds for maintenance of the barrier for at least three years is available with the Forest Department).
3. Community agrees to form a barrier maintenance committee to ensure upkeep and funds collection for the barrier.
4. Community agrees to form an anti-depredation squad (ADS) to guard the crop and common property and prevent elephants from learning to break fences/ cross trenches (see "4. Formation of an anti-depredation squad (ADS) to forestall elephant learning and coordinate with the Forest Department" on page 68).
5. Community agrees to conduct a joint survey with FD officials to ensure that the

barrier will not prevent elephants from moving between patches of elephant habitat.

6. Community agrees to get a no-objection certificate from the concerned Forest Officer (Preferably from the Divisional Forest Officer).

7. Community nominates at least two individuals to be fully trained in technical maintenance of the fence.

E. To assess whether the community is invested in process, ask them if, by the next meeting, they could have:

1. Started a barrier management committee and fixed the roles and responsibilities of the members. The roles include president and secretary; the responsibilities include maintenance, monitoring of maintenance, funds collection, equipment purchase, and communication of problems with the barrier to the barrier committee.
2. Begun collecting money for barrier maintenance.
3. For fences: started preparing the posts for the fence/ other necessary materials. See page 76 to select the correct barrier and choose the necessary materials accordingly.
4. Applied for necessary no-objection certificate.

3. Forming a barrier maintenance committee to ensure upkeep and funds collection

Purpose of section:

Low-cost barriers (both fences and trenches) require maintenance to remain effective under the pressures of curious and hungry elephants, which are likely to otherwise find and learn to exploit weaknesses in barriers. Maintenance of the barriers can be conducted by someone hired by the Forest Department (subject to the availability of funds), or by someone hired by the community themselves. In either case, a barrier maintenance committee should be present to ensure that effective maintenance of the barrier occurs.

Data sheets to be filled during intervention (as relevant):

- For recording financial contributions see [“Appendix IV: Standard register for the barrier maintenance committee” on page 173](#)
- For ensuring effective fence maintenance see [“Appendix V: Fence maintenance checklist” on page 174](#)
- For ensuring effective trench maintenance see [“Appendix VI: Trench maintenance checklist” on page 176](#)



Main actors: Barrier maintenance committee, Forest Department and/or relevant NGO.

Other actors and government agencies to involve: Local community, MLA/MP fund, Panchayat, local NGO, plantation management, village headman.



Helpful tools and resources: Laptop computer, projection system, power generator, PA system, resource person and source/potential source of funding for barrier development.

Recommended practices:

A. Form a barrier committee that includes people of all ages, genders, and ethnic backgrounds.

The committee should include at least one representative of every household that is/will be directly impacted (potentially benefited and/or hindered) by the barrier. Where possible, include an elected member or an ex-officio member of the Panchayat as a member. This could be a ward member or (if relevant) the headwoman/man of the Panchayat.

1. For a circular barrier, beneficiaries include all households or landowners within the barrier boundary.

2. For linear barriers, beneficiaries should include at least all the households within half a kilometre of the barrier. If local people have established that, prior to barrier installation, elephants are engaged in conflict in areas farther than 0.5km from the barrier, households from those affected areas should be represented in the committee as well.

3. If an existing community institution enjoys the appropriate membership as described above, and members are willing to take on the responsibility of barrier maintenance, it may also serve as a barrier maintenance committee.

B. Define the jurisdiction of the committee: how large an area or long a barrier should be governed by a single committee?

Pre-existing spatial jurisdictions, such as villages or labour lines, should be used where possible to ease governance of the barrier.

C. Outline the main responsibilities of the barrier committee. These shall include:

1. Conduct a survey involving the Forest Department and NGO partner (if one exists) to determine the length of the barrier, the terrain covered, and possible disturbance that may be caused by a barrier to natural movement of elephants.

Ensure that any planned barrier will not impede movement of elephants between elephant habitat patches.

2. Ensure proper installation and maintenance of the barrier. This includes design of the barrier and preparation and implementation of a maintenance plan. For power fences it also includes working with authorities on selection of materials and the type of fence to be constructed (see [“Part 3: Selecting and constructing non-lethal and safe barriers to mitigate HEC” on page 72.](#))

3. Collect required fees to maintain the barrier and keep records of income and expenditure using the [Standard register for the barrier maintenance committee](#) (see [Appendix III, page 173](#)) data sheets.

4. Ensure that the barrier remains safe for people and animals (e.g., that fence is not connected to an AC power source).

D. Selecting a model for raising funds for barrier

maintenance:

Unless the Forest Department is willing and able to fully fund maintenance of the barrier, the barrier maintenance committee should lead/work with the Gram Sabha (or the relevant segment of the community protected by the barrier) to decide on a model for collecting funds for barrier maintenance. Options include:

1. Collections from each household in the village: if the barrier is protecting crop fields and the village, the required funds could be divided equally by the number of households and collected from each household. If the community finds this unfair/ infeasible, a different and more practical/ equitable way of dividing up the costs can be proposed.

2. Collection from each farming household in the village: if the fence/ barrier is only protecting crop fields (and not houses or other property) then the required funds should only be collected from farming households protected by the barrier.

3. Collection by allocating funds from the Panchayat: the community can approach the Panchayat to see if the required funds can be sourced from the Annual Gram Panchayat Development Plan.

4. Similarly, the committee may seek funding from any other interested individuals or institutions.

E. Selecting barrier maintainers:

Barriers will be effective only as long as they are well-maintained. At least

two people should be selected by the community and Forest Department for the daily monitoring and maintenance of the barrier. Barrier maintainers must be well-trusted by the community and reliable.

1. For electric fences, the fence maintainers should be given training on the working principles of power fences and the function of each component. They should be taught how to monitor fence components like the battery, energizer, solar panel, earth connection, wire, posts, and insulators. They should be provided tools (voltmeter/neon tester, pliers, screwdriver, wire tightner).

2. For both fences and trenches, maintainer(s) should carry the necessary tools for clearing vegetation.

3. The maintainer(s) should be selected from the village at hand or a nearby village so that s/he can reach the barrier site with minimum effort; ideally, they should also be a beneficiary of the barrier.

4. Ideally, if there are two maintainers, at least one should be a woman unless none are interested. This will both promote equity and make more likely that a diversity of interests are represented by the maintainers.

F. In cases where the community will be partially or fully responsible for funding the maintenance of the barrier:

The committee must decide how much needs to be raised from the community for barrier maintenance. The committee

should determine how much to collect considering the following factors:

1. The cost of daily maintenance of the barrier. If the barrier maintainers must be paid monthly, the amount raised should cover these costs.

2. The costs of replacing or repairing components of the fence on an approximately annual basis. For this, the committee should collect approximately 5-10% of the cost of the fence. Additional funds may be collected as required.

G. Help the community set up their register for recording payments for barrier maintenance:

The register should ideally be in line with the [“Appendix IV: Standard register for the barrier maintenance committee” on page 173](#).

4. Formation of an anti-depredation squad (ADS) to forestall elephant learning and coordinate with the Forest Department

Purpose of section:

Anti-depredation squads are a community institution intended to help provide hyper-local support mitigating HEC. ADSs exist in various forms (and have various names) across states and regions. This section explains how anti-depredation squads should be formed, what they should do, and how they should do it. While some barriers are generally strong enough to withstand the full force of a determined elephant (see [High-investment fences section, on page 78](#)), these are often too expensive to implement. Elephants, given enough time to learn, can gradually learn to breach many barriers such as trenches, low-cost fences, and even hanging fences. To prevent this, communities should develop anti-depredation squads (ADSs) that drive elephants away before they have time to carefully study the barriers. The ADS is also key for coordinating with the Forest Department in case some elephants are able to breach barriers and for working with the RRT/Forest Department officials to drive the elephants away. The ADS is thus the final community institution that needs to be constituted to make barriers effective in minimizing HEC.



Main actors: Local community, RRT/ Forest Department

Other actors and government agencies to involve (as available and relevant): sarpanch/village leader, JFMC/ EDC, Panchayat, farmers group.



Tools and resources necessary for intervention: firecrackers, searchlights, camping materials, mosquito nets, temporary watch towers, first aid kit.

Recommended practices:

A. Anti-depredation Squads (ADS)

ADSs are voluntary groups from the local community comprising of 10-20 villagers based in their own village. ADSs do the following:

1. Prevent elephants from learning how to breach barriers.
2. Strengthen the link between the local community and Forest Department and establish a functional information network on HEC incidents and elephant movement.
3. Act quickly to respond if elephant(s) breach the barrier, minimizing HEC-related damage before the Forest Department has a chance to get to the scene.

B. The formation of ADSs is a consultative process involving local communities and experienced Forest Department officials.

1. If the community agrees to form an ADS, the village leader(s) and community should select interested villagers and volunteers to be members.
2. The final list and contact numbers of ADS members and their leaders should be shared with the nearest Forest Range Office and the Rapid Response Team to promote coordination.

C. Training of an ADS is intended to ensure the ADS members are able to safely minimize the damage done by elephants to crops or property.

Training should include:

1. Basic understanding of elephant psychology / behaviour during raiding events
 - a. Male elephants are often most dangerous when they are in musth, and female elephants are often most dangerous when they have calves— however, in general, any elephant can be dangerous.
 - b. An elephant in musth does not follow clear patterns of behaviour and can become very aggressive.
 - c. Females or herds with one or more calves are dangerous; they should ideally not be disturbed.
 - d. Herds are led by a “matriarch”, often the oldest female.
 - e. Sometimes elephants will “mock charge”—that is, they will act as though they are going to give chase but then not follow through. **Mock charges should be taken seriously as a sign of aggression and be regarded like a full charge:** all people should get farther away from the elephant quickly.
 - f. Elephants can run up to 40 km/hour and maintain a chase for over one kilometer, so one should not proceed too near an elephant.
 - g. Elephants have a very strong sense of smell and hearing, but their vision is often limited compared to ours. If elephants suddenly detect humans nearby, they might also charge suddenly. It is best not to surprise elephants when near to them.

2. How to safely drive elephants away from the village, including “dos and don’ts” (see table: **Do’s and Don’ts while driving elephants away**)

Do’s and Don’ts while driving elephants away:

Do

- Wait for authorities (Rapid Response Team) before beginning a drive. Cooperate with the Forest Department, police, and other authorities and help them drive the elephants in the right direction.
- Before beginning a drive, scout out the positioning of all the elephants in/near the village.
- Before beginning a drive, try to figure out if there are any calves or males in musth in the group.
- Inform all villagers/households falling along the drive route before beginning elephant drives; make sure no people are vulnerable to being trampled.
- Make sure none of those participating in the drive are consuming alcohol or are drunk.
- Ensure calves are not separated from the herd during drives.

Don’t

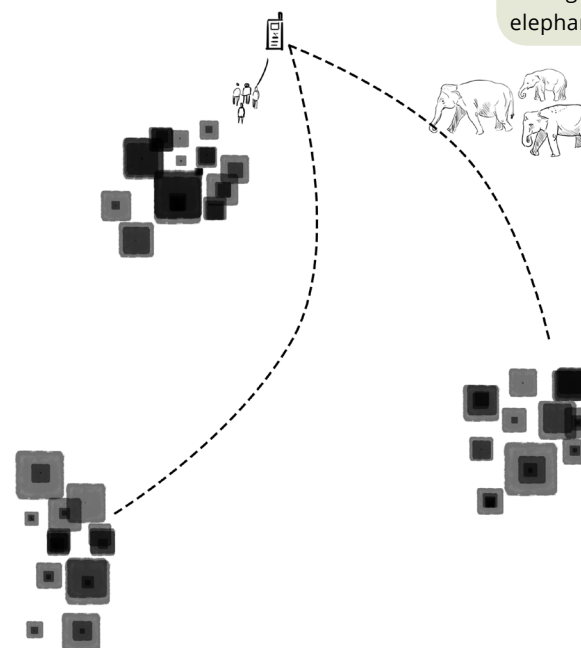
- Don’t block the passage of elephants during the drive operation.
- Don’t drink alcohol while on duty. Also encourage other people not to drink.
- Don’t get too close to elephants during the drive operation.
- Don’t allow untrained members of the public to join the front of the ADS and try to drive elephants—ask them to follow and support the ADS from the rear.
- Don’t try to drive elephants away alone or without proper equipment; they might respond aggressively, causing loss of human life and property.
- Don’t use fireballs, spikes that elephants might step on, or other tools that might cause elephants injury. These are illegal.

3. How to acquire support/help from civil administration in cases of unruly behaviour by the public. Refer: **“Emergency situation 2: Elephant(s) appearing far from their habitat” on page 39.**

D. Planning monitoring of the barrier:

During the season(s) when HEC is most likely, the ADS must develop a plan for how to monitor the barrier for attempted breaches by elephants. ADSs can monitor barriers using one or both of the following tools:

1. Create a schedule by which a small number of the ADS members take turns monitoring the barrier at night and sounding the alarm if elephants attempt to cross the barrier.
2. Set up an automated “early warning system” along key stretches of the barrier. This system should sound the alarm if elephants approach close to the barriers, alerting the ADS so that they can repel the elephants.



Recommendations for early warning systems

In principle, early warning systems (EWSs) can allow ADS members to sleep until the EWS alerts them to the presence of an elephant. Some simple EWS designs are available, such as those described in the manual titled *There’s Many a Way to Keep the Elephant Away*, published by MoEFCC and the Wildlife Research and Conservation Society.

Since more advanced early warning systems are still a work in progress, where possible, the Forest Department should encourage the development and testing of low-cost, effective early warning systems that will make night-guarding unnecessary. More broadly, conservationists should invest in early warning systems that combine visual, sound, or seismic sensors with artificial intelligence software for distinguishing elephants from other stimuli.

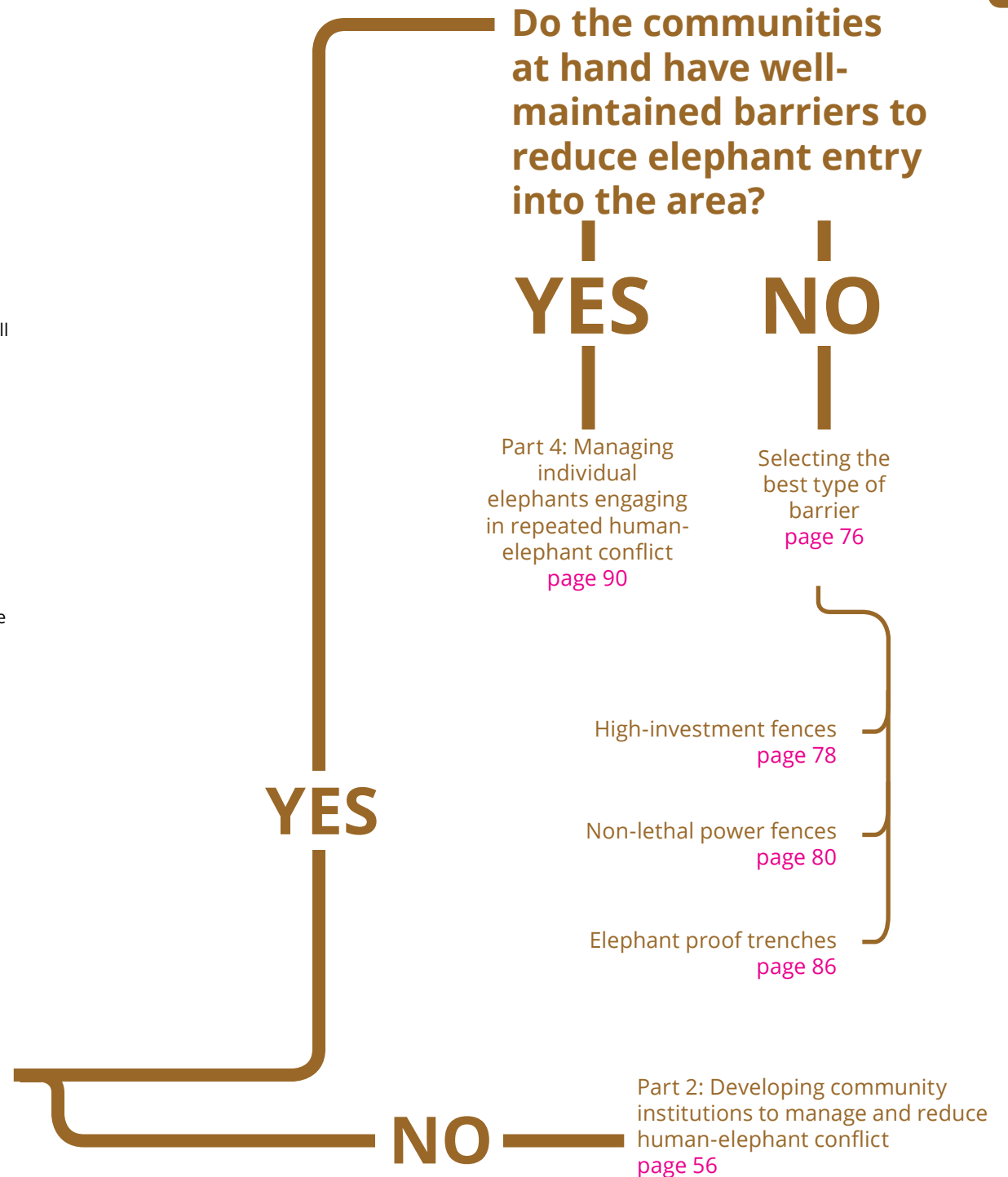
Part 3: Selecting and constructing non-lethal and safe barriers to mitigate HEC

Elephants are intelligent, and when motivated to seek resources such as crops, they can learn that many of the sounds and lights often used to scare them away (e.g., firecrackers) don't pose an immediate physical threat. As a result, physical barriers (or barriers with a physical component) are likely to succeed for longer since elephants will either be unable to break them down or take time to learn how to overcome them. If reinforced with anti-depredation squads (on page 68), barriers like low-cost electric fences and trenches can remain effective for a longer period since the ADSs allow less time for elephants to learn how to breach them.

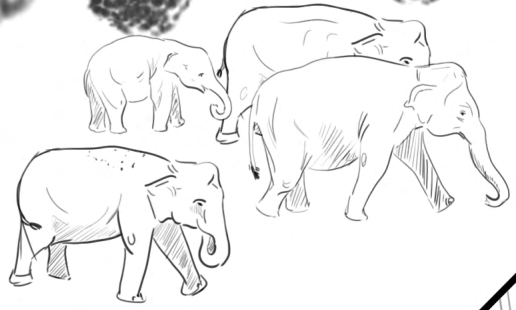
In this section, we cover the basics of several physical barriers: two types of high-investment fences (rail-track fences and steel-rope fences), three types of non-lethal power fences (hanging fences, five-strand fences, and single-strand fences), and elephant-proof trenches. The chart on selecting barriers (on page 73) will help officials and community members select which fence is right for a given situation, while the following sections give helpful instructions on design and construction of the various types of barrier.

Forest Department authorities are working with communities that have chronic HEC.

Does the community have effective institutions to mobilize against conflict?



Elephant habitat patch 1



Barriers should never be built such that they prevent elephants from moving from one habitat patch to another.

Human settlement

Elephant habitat patch 2

Selecting the best type of barrier

- Suitable for dry soil conditions
- Most suitable for moist soil conditions

Purpose of section:

The following pages describe the most dependable and promising barriers for stemming human-elephant conflict. This chart should help users determine what barriers are likely to fit their context best.

Do multiple elephants in the area regularly break well-maintained power fences?

Are species other than elephants (e.g. wild pig) also a concern for farmers?

Does the barrier need to be easily crossed across its length?

NO

YES

NO

YES

YES

NO

Also: Barrier is easily removable

Also: Barriers do not require frequent monitoring

Single-strand fence
At least Rs. 60,000/km
on page 82

Multi-strand fence
At least Rs. 3 lakh/km
on page 83

Hanging fence
At least Rs. 5.5 lakh/km with posts;
Rs. 2 lakh/km with trees as posts
on page 84

Steel-rope fence
About Rs. 45 lakh/km
on page 79

Rail-track fence
Access to old rail tracks OR
Rs. 1.5 Cr/km (rail track)
on page 79

Elephant-proof trench
About Rs. 5 lakh/km in less rocky areas;
About Rs. 7 lakh/km in rocky areas
on page 86

1. High-investment fences (rail-track fences and steel-rope fences)

Purpose of section:

Rail-track fences and steel-rope fences are largely impermeable physical barriers for elephants, requiring essentially no maintenance. They are also practically unaffordable in the vast majority of HEC situations. This short section suggests how/when high-investment fences may be worth the investment, and how to place them effectively.

Helpful context:

The cost of a rail-track fence is Rs. 1.5 Cr. per kilometre while it is Rs. 45 Lakhs per km for a steel-rope fence. Unless funds are available—or discarded rail-tracks are available—these barriers are not likely to be feasible.

Recommended practices:

A. In what situations are these fences most likely to be a good investment?

1. Wherever terrain is very rocky, marshy, or undulating (making electric fences difficult to build or maintain).
2. In high rainfall areas where trenches quickly lose integrity.
3. Along diffused forest boundaries of large, intact habitat patches that are

Main actors: Railway Department, Forest Department, Panchayat, village leaders, and relevant NGOs.

Tools and resources necessary for intervention:
Rail-track bars or steel rope, concrete post and/or eucalyptus posts.

otherwise difficult to fence.

4. When there are no (or, for long stretches, very few) roads cutting across the boundary to be delineated by the fence.
5. In high-conflict sites where elephants have learned to breach less expensive barriers.

B. Designing a fence at a given site: A joint survey involving villagers, Forest officials, and participating NGOs should determine:

1. What area villagers wish to protect.
2. What routes villagers need to use for movement. The barrier should not impede key routes used by villagers

and their livestock for this could lead to sabotage of the barrier.

3. What routes elephants use to move between their habitats. These should remain unimpeded by the fence.

C. Specifications for an effective rail-track fence:

1. Meter gauge rails should be cut to 3m and 6m lengths. 3m lengths are used as vertical posts while the 6m lengths used horizontally.
2. Vertical posts are concrete fixed in 1.5m pits. These posts are fixed 6 m apart.
3. 6m rail lengths are connected horizontally to the vertical posts with the first line at 0.70m height from the ground and the second line at 1.5 m above ground. Holes are made in the flat parts of both the horizontal and vertical rail bars using a gas-welding drill, and the bars are fastened using four-inch bolts and rivets.

4. It is recommended to have a single non-lethal electrified wire running along the rail-track fence between the horizontal posts to further prevent elephants from crossing the fence, see “2. Non-lethal power fences” on page 80.

D. Specifications for an effective steel-rope (i.e. Armstrong) fence:

1. Pre-cast reinforced concrete posts, about 4m tall and 0.3m x 0.3m size, should be fixed vertically at 10m interval. Two different kinds of posts are used as corner posts and intermediate posts. The

corner posts have an extra supporting arm at an angle to the ground for better structural stability.

2. Each post has to be grouted 1.5m underground with at least 2.3m left above the ground.

3. Four or five strands of steel-rope (14mm diameter, 6x19 strands steel core and 12.8 tonnes of break force) should be fixed horizontally.

4. Sturdy wooden posts (0.15m-0.2m diameter) should be fixed halfway between the concrete posts to avoid excessive flexibility in the steel rope strands.



Fig: A rail-track fence.



Fig: A steel-rope fence

2. Non-lethal power fences

Purpose of section:

In most cases, physical barriers that can withstand the force of a determined elephant are simply not affordable at scale. An alternative is non-lethal electric or power fences that give elephants a shock if they try to cross it, discouraging crop-raiding and protecting human habitation. This section features three types of power fence (hanging, five-strand, and one-strand) that vary in cost, useful context, and effectiveness. Users can choose the best fence for their context (see "Selecting the best type of barrier" on page 76), and instructions on how to design, situate, build, and maintain them are provided below.

Recommended practices:

A. Power fences should be developed only where accompanying community institutions to manage the fence are available (see "2. Seeking consent and support for the development and installation of a barrier to reduce human-elephant conflict" on page 62 and "3. Forming a barrier maintenance committee to ensure upkeep and funds collection" on page 64)

B. Designing a fence at a given site: a joint survey involving villagers, Forest Department officials, and participating NGOs should determine:

Main actors: Barrier maintenance committee (see page 64), Forest Department, relevant NGOs.

Other actors and government agencies to involve: civil administration, public representative/MLA, village leaders.

Tools and resources necessary for intervention:
For all fences: Fault finder.

Single-strand and multi-strand fences: Iron/wooden post, galvanized iron (GI) or high-tensile wire, insulators, wire tightener, section corner insulators, cutting pliers, digital voltmeter, 12V battery, energizer and solar panel.

Hanging fences: Iron/wooden post or existing trees, GI galvanized wire, section corner insulators, insulation pipe for putting around the tree, cutting pliers and digital voltmeter, 12V battery, energizer and solar panel.

1. What area villagers wish to protect.
2. What routes villagers need to use for movement (that should not be impeded by the barrier).

3. What routes elephants use to move between their habitats, as these should remain unimpeded by the fence.

4. Whether a linear fence or a circular fence is appropriate: a linear fence is meant to completely prevent elephants from exiting a habitat area, whereas circular fences allow elephants to move around an area from one part of habitat to another.

5. How to avoid building the fence under power lines or near other AC current sources.

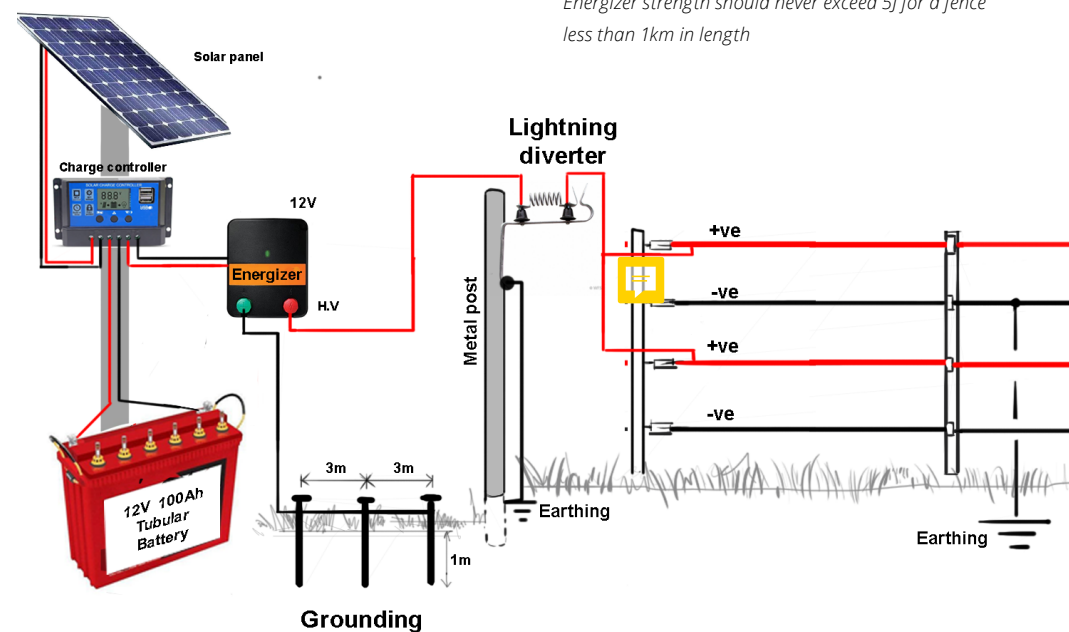
C. Technical specifications of fences—we describe the specifications for each of the three types of fences:

Electrical components of all power fence types:

Energizer: A maximum of 5 Joules ISO, BIS certified standard energizer needs to be used (see table). Each battery needs a separate energizer. A sturdy, good-quality energizer should be used, producing a pulse of 6000 to 9000 volts with an impulse duration of 0.003s at 1.2s intervals.

Length of fence	Recommended energizer strength*
<3 km	1 J
<4 km	2 J
<5 km	4 J

*Greater energizer strength might be considered in conditions where there is dry soil, high vegetation and/or more number of strands used per km. Energizer strength should never exceed 5J for a fence less than 1km in length



Battery: The battery powers the fence. The battery needs to be compatible with the energizer requirements. The number and capacity of batteries to be used depends on the type of fencing and environmental conditions, and ideally an expert should be consulted. If an expert isn't available for consultation, it is recommended to use a 12V, 100-120Ah deep-discharge battery system.

Solar Panel: Ideally, an expert should be consulted to select a solar panel based on local conditions and the battery and energizer chosen. In general, a 15-17V, 3-5A and 100W solar panel is recommended for a 4J energizer. The solar panel is to be angled to the south at an angle equivalent to the latitude of the location. It is to be installed in the sunniest area available within reach of the fence.

Charge controller: The solar charge controller protects the battery from overcharging/over discharging, prolonging the life of the battery. The solar panel is connected to the charge controller. Two other sets of wires (each set including positive and negative wires) come from the charge controller. The first set connects to the battery, and the other set of wires connects directly to the energiser from the charge controller (see figure on page 81). The charge controller should be set to shut off at 13.5V at the solar panel end and at 11.5V at the energizer end.

Lightning protection: A lightning diverter device needs to be installed between the energizer terminal and the fence to protect the system from lightning surges.

Earthing: The system needs earthing to make it functional. The energizer's earth terminal is grounded using at least three metal rods that are at least 1m into the ground. The earthing must be in a moist place (or have sand, gravel and peat in case of a dry area) away from any other earthing systems. In case of a dry environment, additional earthing rods and/or an earthing wire running parallel to the fence on the outside of the fence can make the fence more effective. This earthing wire is always recommended for hanging fences.

Non-Electrical Components—Instructions for each type of fence:

Single-strand fence:

These are low cost fences used in areas where soil is moist (i.e. earthing is easy). These fences are also low-maintenance as there is a single wire at a height of about 1.7m, high enough to deter elephants and stay clear of unmanaged vegetation for some time.

Ideally, fences should be less than 2.5km long as that eases maintenance. Fences longer than 5km should be split up into smaller fences.

Posts: each fence post should be made of bamboo, wood, iron, or concrete. Each post should be 7.5 feet tall with 5.5 feet above ground. The post should tilt at least 70 degrees towards the direction from which elephants might come. Posts should be placed no more than 8 meters apart from each other.

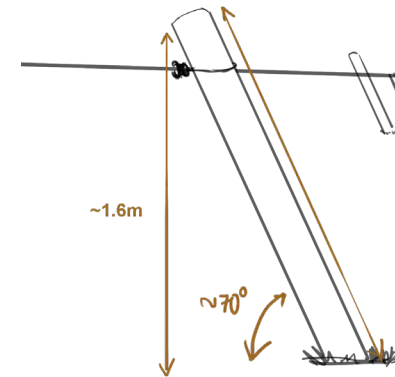
Wire: High quality 2.5mm galvanized iron

(GI) or high-tensile wire should be used in the fence as the main wire; in case of galvanized iron, hot-dip galvanizing coats are recommended. Binding wire should be 2 mm thick and of same quality. **Barbed wire should never be used in a power fence** as it can prevent a human or animal from moving away from the power fence, resulting in injury or death.

Insulators: Reel insulators should be used to pass the wire and attach it to the posts. Corner post insulators should be used in the corners and each of the turns.

For detailed instructions on constructing a single-strand fence, please see WWF-India's Elefence Manual: installation of solar-powered fences to manage human-elephant conflict.

Fig: Single-strand fence



Multi-strand fence:

These fences are used to keep out elephants and other animals as well. They will follow similar specifications as the single-strand fence except for the following differences:

- The post will have a total of 2-5 strands, with one strand at 1.8m above the ground, one at 1.2m above the ground, and the remaining strands placed lower to the ground to keep out small animals.
- Each post needs to be protected with tentacles or post-protecting wireframes to prevent the elephant from being able to grab the post and pull the fence down.
- Multi strand fences can be vertical or angled based on the soil consistency.

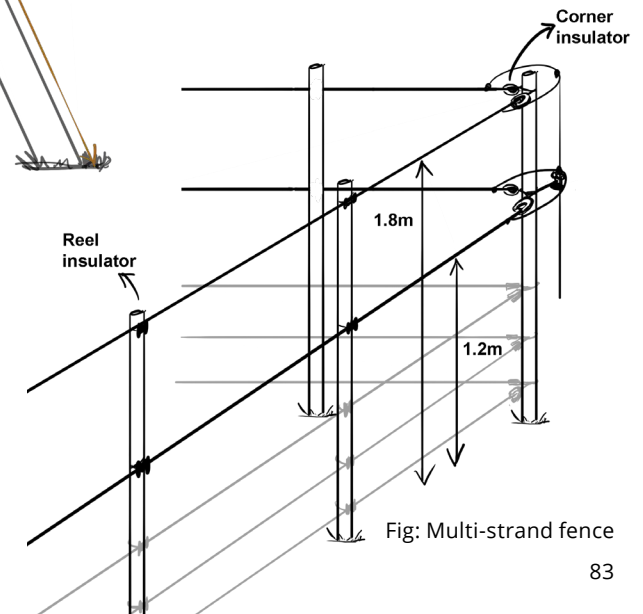


Fig: Multi-strand fence

Hanging fences:

These more expensive fences are designed to thwart elephants that are able to break more conventional fences. They are meant to:

- (i) be too tall for an elephant to easily drop an object on them, and
- (ii) use vertical strands to prevent an elephant from reaching and pushing down the fence's posts.

Hanging fences have a main horizontal wire that carries current (like in a single-strand fence) at a height and then vertical wires that come down, forming a screen to block elephant entry.

Posts: The posts should ideally be made of 2.5 inch (6.35 cm) diameter, B-class (4mm thick) galvanized iron pipes. Each post should be about 4.9 m tall, with 4.3m above the ground. Posts should be inserted 0.6 m into the ground with concrete reinforcement (especially in case of loose soil). Posts should be placed a maximum of 20m apart, but should be placed closer together if the soil is less firm or the posts are not inserted straight, as this increases the load on each post. The posts of hanging fences are generally shaped either like a "T" or a half-"T" (see figure) to ensure the hanging wires hang away from the post and prevent the elephant from being able to reach the post. If a half-"T", the hanging wires should come between the post and the direction from which elephants come.

Wire: The horizontal wire should be galvanized iron (GI) or high-tensile wire (14 gauge/2mm) or similar. The main horizontal wire should attach to the end of the protruding parts of the posts at about 4.3m (see diagram). An optional second

horizontal wire may be attached directly to the vertical part of the posts at 1.3m. The hanging strands should be 3m long and ideally not come within 1.3m of the ground. The hanging strands should hang at most 1m apart from each other. Each hanging strand should be composed of two manually twisted, 16-gauge (1.6mm) galvanized iron, stainless steel, or high-tensile wires. Alternatively, a multi-strand steel rope could also be used. **Barbed wire should never be used in a power fence** as it can prevent a human or animal from moving away from the power fence, resulting in injury or death. The hanging strands should be attached to the horizontal wire using a crimp if a multi-strand wire rope is used or twisted on if a wire is being used.

Insulators: Reel insulators should be used to pass the wire and attach it to the posts. Corner post insulators should be used in the corners and each of the turns.

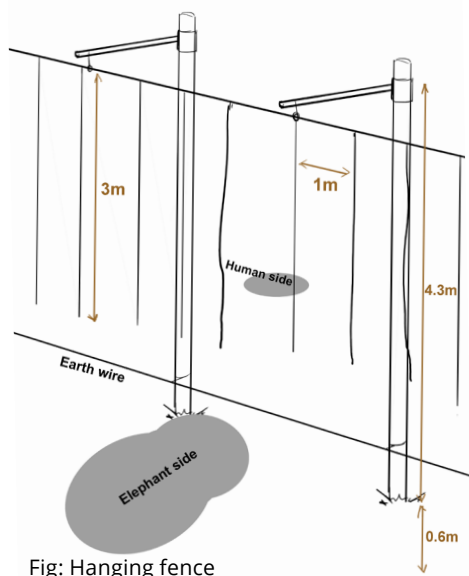


Fig: Hanging fence

D. Assessment of completed fence:

After installation, the following aspects should be verified by a team consisting of representatives of the Forest Department, Electricity Department, and relevant wildlife NGOs:

1. Voltage
2. Power source
3. Proximity to an AC current source like power supply line (fence should not be located near or under such sources)
4. Quality of fence components including the energizer, battery, solar panel, fence posts, wire, and insulators.
5. Whether fence inhibits elephant movement between valid elephant habitat areas (it should not).

E. Monitoring and maintenance of fence:

Refer "Appendix V: Fence maintenance checklist" on page 174

1. The barrier/fence maintenance committee should ensure adequate monitoring and maintenance of the fence.
 2. The power supply and earthing system should be checked daily.
 - a. Check voltage of battery
 - b. Check voltage of fence wires at different distances from energizer
 3. Check vegetation below the fence regularly to make sure it does not come near the wires of the fence. Clear vegetation touching the fence wires regularly, at least twice a month, checking more frequently in the case of multistrand fences.

4. Clean the solar panel at least once in a month.

5. Electrical connections: Check breaks (daily), loose connections (weekly), and for rust (monthly).

6. Battery: Check charge (daily) and distilled water (once in 15 days).

7. While fence maintenance will be the responsibility of community institutions, the Forest Department should also remain aware of the operational level of fences to the extent possible. Every RRT should be provided a digital voltmeter or fence tester to check and help maintain the required voltage.

F. Additions that could enhance fence performance

1. A trench could help prevent elephants from learning to break a power fence (refer, "3. Elephant-proof trenches" on page 86).

2. Anti-depredation quads (ADSs) and early warning systems can also help forestall elephants learning to break power fences. See, "4. Formation of an anti-depredation squad (ADS) to forestall elephant learning and coordinate with the Forest Department" on page 68".

L. The cost of the fence can be calculated by filling in the table found in "Appendix VII: Budget table template" on page 177".

3. Elephant-proof trenches

Purpose of section:

Elephants are not easily able to negotiate steep slopes and are unable to jump. As such, trenches that are sufficiently steep, deep, and strong pose a barrier to elephant movement, and they can be used to reduce crop-raiding or elephant visitation of human habitation. They require dedicated funds and labour to maintain. This section describes how to design, situate, build, and ensure the proper maintenance of elephant-proof trenches.

Recommended practices:

A. Elephant-proof trenches (EPTs) and other barriers should be developed only where accompanying community institutions are available (see “Part 2: Developing community institutions to manage and reduce human-elephant conflict” on page 73).

B. Conditions for whether trench would be suitable:

1. Soil type: soil must not be loose, as elephants can then use their feet to break down the walls of the trench until the trench is filled/passable. Relatedly, soil should not be too moist, as such soil can also be made loose by elephants.
2. There are relatively few streams or other natural topographic depressions



Main actors: Barrier maintenance committee (see page 64), the Forest Department, and relevant NGOs.

Other actors and government agencies to involve: civil administration, public representatives/MLAs, Panchayat, village leaders



Tools and resources necessary for intervention: Backhoe loader/excavator, Bulldozer, driller to cut rocks, and measurement sticks

that might compromise trench effectiveness.

C. Designing trench at a given site:

A joint survey involving villagers, the barrier maintenance committee, Forest Department officials, and any participating NGOs should determine:

1. What area villagers wish to protect.
2. What routes villagers and livestock need to use for movement (these should either not be impeded by the trench or crossings should be provided).

3. What routes elephants use to move between their habitats—these should remain unimpeded by the trench.



D. Technical specifications:

1. An EPT should be about 2m deep and 3m wide. Ideally, the trench’s walls should be straight-cut, i.e., the walls should be vertical.
2. Excavated soil should be kept far from the EPT so that elephants do not have a chance to fill the trench with soil.
3. Trenches should be made clearly visible from 3m on either side of the trench by clearing the understory vegetation (for safety).
4. Avoid building a trench in stretches where the soil is loose and likely to collapse with minimal pressure. Such locations may be sealed by constructing a barrier like a wall or non-lethal power fence just in that area.
5. Elephants often use rocky portions of a trench to cross over since trenches are often not dug to the adequate depth in these locations. The trench needs to be made sufficiently deep in these locations by cutting rock.

E. Creating crossings:

1. Simple wooden bridges can be placed at locations that the community uses to access the forest. These bridges should bear the weight of cattle but not elephants.
2. Wherever roads cut across, an

electrified gate or other effective barrier must be installed to prevent elephants from using the road to enter and exit human habitation. For roads that have regular movement of vehicles, a manned check post is needed.

3. If a stream cuts across the trench, one of the following may be used to ensure elephants do not use the stream to cross the trench:

- a. Concrete pillars can be inserted in places where the stream cuts across the trench, allowing the water to flow while blocking elephants.
- b. The stream can be diverted to pipes and concrete walls can be used to prevent elephants from crossing where the pipes/stream cross the trench.

F. Monitoring and maintenance of trench:

1. The barrier/trench maintenance committee should be responsible for monitoring and maintenance of the trench.
2. The barrier maintainers should ensure that, after any heavy rains, the silt and soil that fill the trench due to erosion are taken out. This should occur at least once a year, but more often if there is exceptional erosion. Eroded soils fill the trench gradually, and such locations become potential crossing for elephants. Excavation of silt prevents elephants from crossing at such weak points.
3. Elephants often use rocky portions of the trench, as the trench has often not been dug to the adequate depth in these locations. The trench needs to be made

sufficiently deep in these locations by cutting rock

4. The ground vegetation (e.g., bushes—not trees) on both sides of the trench need to be cleared for 3 – 5 m to keep clear visibility, allowing elephants near the trench to be seen. A thorough clearing of vegetation in the trench is necessary every year after the monsoon season.

5. As maintenance and monitoring require funds, the barrier maintenance committee should collect the required resources necessary for this work. Ways to do this are described in ([“3. Forming a barrier maintenance committee to ensure upkeep and funds collection” on page 64](#)).

Fig: An Elephant-Proof Trench



Note: Non-barrier interventions

In some areas, elephants regularly crop-raid and might even have learned to break through barriers with regularity. In places where more expensive barriers are not affordable, the next best thing to do is to try and manage the losses through compensations (see [“Collecting information for compensation/ex-gratia” on page 118](#)). We note, however, that compensations can sometimes become unsustainable if elephants are causing too much local damage.

While there are no sure-fire solutions to this dilemma, authorities might propose some combination of the following interventions to communities facing HEC:

1. Paying local communities to help with habitat restoration activities in elephant habitat, planting trees and grasses palatable to elephants;
2. Where HEC is occurring in part because there is no hard boundary between human habitation and elephant habitation, offer to buy agricultural land so as to enable the development of a hard boundary along which successful barriers can be established. Habitat restoration may also be considered on acquired land;
3. Paying communities (market value) for the crops they are losing for three years, giving them an opportunity to experiment with crops unpalatable to elephants as well as alternative livelihoods.

If the Forest Department is interested in this last option—trying to help foster a move to alternative crops or livelihoods that would reduce conflict—one possibility is for Forest Department officials to seek to connect HEC-prone communities with authorities from various other departments that can help agriculturalists transition from crops palatable to elephants to unpalatable crops or to other livelihoods. Forest Department officials may do this through the District-Level Coordination Committee (DLCC) through meetings led by the collector/District Magistrate. Some departments/agencies that might be able to provide alternative livelihoods guidance could include:

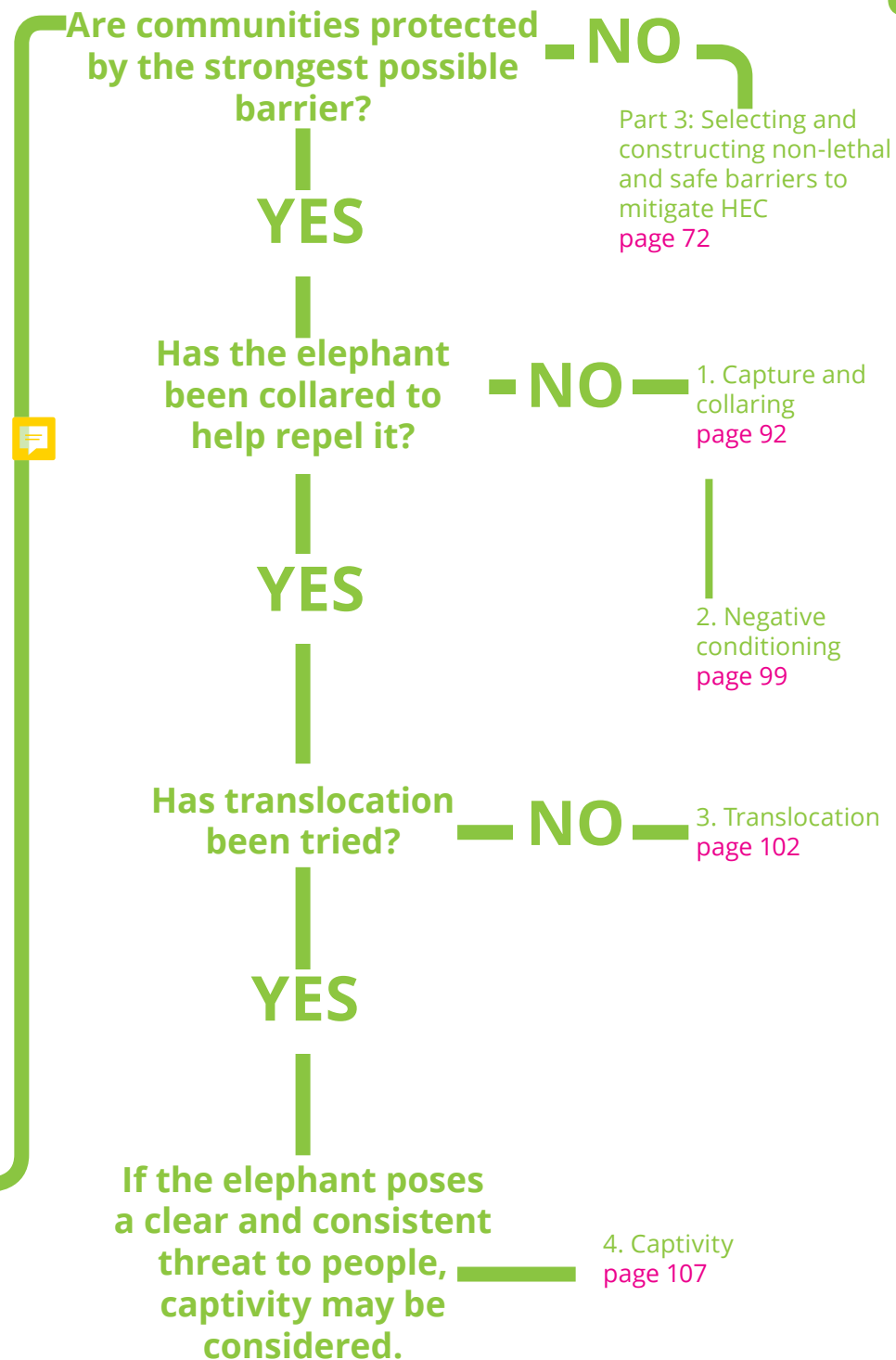
1. Agriculture Department
2. Fisheries Department
3. Dairy Development
4. Sericulture Department
5. Handloom and Textiles Department
6. Tourism Department
7. Financial institutions/banks
8. Commercial partners

Part 4: Managing individual elephants engaged in repeated human-elephant conflict

In many parts of India, some individual elephants repeatedly breach barriers or enter human-dominated areas. Generally, these individuals are looking for resources more readily available outside their natural habitat like crops, salt, or alcohol. Sometimes, individual elephants become accustomed to human-dominated areas and include such areas as a part of their regular range. These individual elephants can be totally harmless, even beloved by local communities—or they can be highly aggressive, even killing one or multiple people. The government should obviously intervene when the elephant is aggressive. However, even in cases where local communities enjoy visits by certain individual wild elephants, the government should ideally still intervene to prevent these elephants from visiting human habitations, as such elephants could suddenly become aggressive due to an accident, hormonal changes (like musth), or the provocation of irresponsible people.

In the long-term, a combination of habitat restoration and better landscape planning—including effective barriers—can help minimize the time that elephants spend in human-dominated areas. But in the meantime, if individual elephants learn to regularly breach even well-maintained barriers, the Forest Department will sometimes have to intervene to manage those elephants. This guideline provides instructions for four inter-related interventions to deal with problematic individual elephants.

We are dealing with at least one elephant that repeatedly breaks barriers, even if they are well-maintained.



1. Capture and collaring

Purpose of section:

Collaring can allow authorities such as a Rapid Response Team to track an elephant that is suspected (or known) to be frequently involved in conflict. A collared elephant might not only provide information useful for managing conflict, but data that provides insights into the behaviour of elephants in the region. Furthermore, collaring is a necessary prerequisite for (potentially) effective negative conditioning (see “2. Negative conditioning” on page 99). Ideally, since it is not financially or logistically possible to collar and monitor a large number of animals, collaring should only be conducted where effective barriers have been deployed and found wanting or where barriers cannot be installed for some reason.

Data sheets to be filled during intervention (as relevant):

- “Record of (suspected) new elephant” on page 142
- “Known elephant record datasheet” on page 147

Recommended practices:

A. Collaring to better understand HEC makes sense in a couple of cases:

1. When an individual elephant or a herd uses areas close to human habitation but only sometimes raids crops, strays in human use areas, or poses danger to human life, collaring the elephant(s) can be useful for understanding their



Main actors: RRT/Forest Department, expert veterinarian(s).

Other actors and government agencies to involve: Veterinary Department, village leaders, Police Department, koonkies and mahouts.



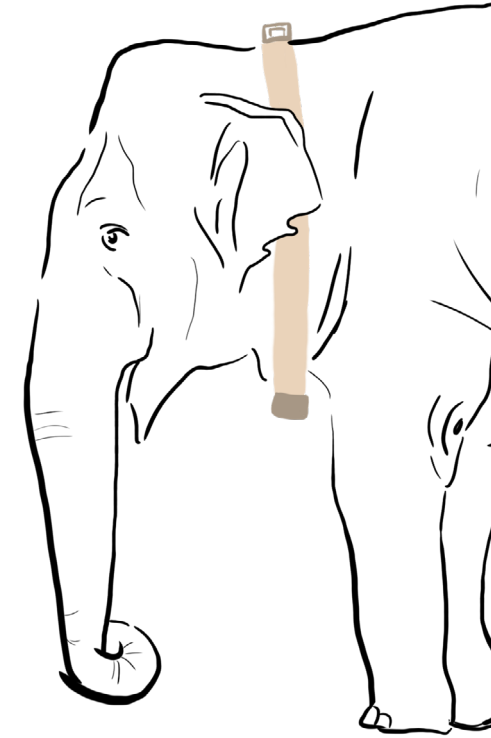
Tools and resources necessary for intervention: GPS/GSM/radio collar, vehicles for operation, torch light, sound making devices, protective field gear, wireless communication devices, GPSs, smart phones, heavy-duty ropes/chains, an elephant blindfold, water to cool elephant, measuring tape, heavy-duty clipper, materials to take blood/related samples, darting equipment (including radio darts) and all necessary veterinary equipment including drugs and antidotes and other supporting medicines.

ranging behaviour while also enabling intervention if and when necessary. In this case, however, authorities should carefully consider whether the benefits of collaring outweigh the costs and risks.

2. When an individual elephant or herd does appear to be frequently engaging in HEC, collaring them can make it possible for the RRT to intervene more quickly, forestalling conflict.

B. Prerequisites for collaring:

1. Establish identification of the elephant involved in conflict (refer to section on “Identifying individual elephants” on page 124).
2. Develop a proposal for collaring with a clear justification for why elephant capture and collaring is necessary in terms of conflict mitigation. This proposal should be submitted to the Chief Wildlife Warden.
3. Authorities must have sufficient resources to successfully execute a collaring. This includes the funds necessary to purchase the requisite collar, the correct drugs, and resources for the collaring operation itself (including the field team, vehicles and koonkies). In addition, procuring a high quality collar from abroad can take 4-5 months at least. Advance planning is necessary to ensure collaring is feasible.



C. Preparation for collaring:

On receiving the Chief Wildlife Warden’s permission, the Officer-in-Charge (the Range Officer for the area of the operation at hand unless otherwise specified) should make sure the following things are ready for the capture and collaring of an elephant:

1. An elephant collar needs to be procured. Selection of collar type (satellite, GSM, radio, or combination) should be based on the collar’s battery life and ability to provide real-time locations of the elephant. Before selecting a GSM collar, the Forest Department should make sure the area of interest has

cell phone coverage. VHF facilities must always be included on all collars. Before selecting the collar type, authorities should work with collar manufacturers and experienced practitioners to assess what collar type (if any) will be able to provide real-time (or near real-time) locations in the given area. Authorities should also ensure that the collar will be safe and operational in all field conditions, e.g., when the animal is entirely submerged in water.

2. Procure sufficient quantities of necessary drugs, antidotes, and radio darts, as specified by the Forest Department Veterinarian. Radio darts generate a signal that helps locate the sedated elephant, which usually moves some distance before the drug has an

effect. In some cases, delay in locating the darted animal can be life-threatening for the elephant.

3. Other necessary field equipment such as heavy-duty ropes and chains to tie the elephant if necessary, a large cloth to use as a blindfold, drugs to be used in case of an emergency, water to cool the elephant if necessary, measuring tape, a heavy duty clipper to cut off extra length of the belt of the collar and equipment to monitor the vital parameters of the elephant. Equipment for taking blood and any other samples should also be made ready by the Range Officer in collaboration with the veterinary team.

D. Formation of teams for coordinated operation (after the approval is obtained from authorities)

1. Administrative leader: outside of Tiger Reserves, this should be the concerned Deputy Conservator of Forests (DCF). Inside of Tiger Reserves, this should be the Director of the Tiger Reserve. This team will update the CWLW regularly and oversee the activities of all other teams.

2. Veterinary team: at least one veterinarian and his/her assistants. This team will be responsible for tranquilization drugs, other medicines, and related equipment. The team should identify the site for tranquilization and assess the body condition of the elephant before, during, and after capture. They should also collect necessary tissue samples.

3. Darting team: a veterinarian, trained veterinary assistant, or any trained forest

official can perform darting. In case the darter is not a veterinarian, the vet needs to inform the darter which body parts should be avoided by the dart.

4. Tracking team: some 3-6 people with excellent skills in elephant tracking. Their role is to follow the elephant before, during, and after tranquilization and keep the other teams informed of the elephant's whereabouts. This team must also be provided required training in the use of all technology relevant to tracking and monitoring of collared elephants. This includes familiarity with programs to view satellite locations and handheld VHF/UHF devices.

5. Elephant mahouts' team (with koonki elephants): well-trained koonki elephants can help reposition the wild elephant in case it goes down in the wrong position after tranquilization, as well as to assist while collaring.

6. Collaring team: a veterinarian, biologist, and assisting members. Their role is to check the functionality of the collar and its accessories, as well as to assess the elephant's body condition to decide upon the collar fix measurements.

7. Logistics team: Forest Department Range Officers will arrange for vehicles, machinery, materials for making ramps, ropes, and other such non-veterinary equipment. They will also ensure the koonki elephants are able to arrive on site and make food, water, and accommodation arrangements for the teams. They may also be delegated other logistics.

8. Crowd management team (in case the operation is outside forest): police and

Forest Department personnel. Their role is to keep people away from the site of capture.

E. Monitoring and selecting the elephant for collaring:

As noted above (B1), a specific elephant or herd should have been identified for collaring. Beginning a few days before the collaring, a small team of skilled trackers should be deployed to track and monitor the movement of the elephant during the day-time.

1. The general habits of the elephant herd in question—i.e., where and what time of day they feed, rest, etc., should be noted.

2. Wherever possible, only a full-grown adult elephant should be selected for collaring (see section L below). Elephants with a small calf or advanced pregnancy should not be targeted for collaring. As far as possible, in order to ensure the correct individual is ultimately tranquilized and collared, all mothers with young calves should be identified through monitoring prior to the collaring effort.

F. Site selection for tranquilizing

1. As far as possible, flat terrain with high visibility should be selected for tranquilization.

2. A detailed map of the selected area for tranquilization should be created based on field observations. It should include information on land-use, suitable and unsuitable locations such as deep cuttings, waterlogged sites, and presence

of tree stumps. The detailed map should be used to mark out the suitable sites for the operation. The ideal site is one that the target elephant visits daily or almost daily and where (i) the elephant can easily and safely be approached by the darting team (e.g., near a road navigable by jeep or a tea estate) or (ii) the darting team can safely and easily be stationed (e.g., in a tree or watch tower) before the target elephant arrives.

3. The selected area should be cordoned off and villagers and others should be prevented from entering the operation site.

G. Communicating with the media:

An authorized spokesperson of the Forest Department should inform media of the effort and instruct them to gather at a specified location for regular updates. The spokesperson should be provided updates at least every hour during the operation (more often if possible), which s/he then passes on immediately to the gathered media. If the media present can come to a consensus on 1-2 media people to witness the operation, the Forest Department may allow them to watch the operation from a safe vantage point.

H. Execution stage of capture and collaring:

1. Morning hours are ideal for darting. Hot times of the day are to be avoided where possible since it could be harder to manage the temperature of the tranquilized elephant at those times. No darting should occur at night hours as it

will be difficult to track the elephant after it is darted.

2. Group discussion: the leaders of each team need to have a discussion to develop the final plan. Team leads should then apprise the other members of their respective teams.

3. Darting the elephant

- a. The quantity of drug to be administered is to be decided based on assessment of the body weight of the elephant by veterinarians.
- b. The veterinary team and darting person should be ready with tranquilizers.
- c. The darting person is to be positioned safely at the pre-planned location. The darting person can either approach the target elephant (if this can be done without startling the elephant) or wait for the elephant to approach (if the elephant is likely to be attracted to the darting location). Alternatively, the elephant can be driven towards the darting person.
- d. Koonki elephants that are not used to dart the wild elephant are to be stationed nearby for assistance.
- e. The drugs used for sedation should be based on context and decided by an experienced veterinarian. Standing sedation may be preferable where there is a risk of the elephant endangering itself if it collapses in the terrain at hand.

I. Tracking the elephant after it has been darted

1. Immediately after darting, tracking should start, keeping the elephant within eyesight from a safe distance.
2. While following the darted elephant,

one should remain vigilant of other elephants in the same area. If the darted individual is a part of a herd, the other individuals also might stay with the tranquilized elephant.

3. In situations where the visibility is low or many elephants are present, and approaching the elephant by foot would be dangerous, koonki elephants should be used.
4. Before approaching, the team should ensure the elephant has been effectively sedated. Symptoms include:
 - a. Cessation of ear-fanning
 - b. Snoring
 - c. Unsheathing of male genitalia

J. Monitoring the health condition of elephant upon contact

1. Ensure the elephant is fully sedated before approaching the elephant.
2. The health condition parameters need to be checked immediately by the veterinary team.

K. Fill out the relevant data sheet for the captured elephant.

- “Identifying individual elephants” on page 124
- “Known elephant record datasheet” on page 147

L. Fixing the collar

1. Fitting a radio/GPS/GSM collar enables

tracking of the tranquilized elephant.

2. If the target animal is under standing sedation, use the koonki elephant and/or backhoe loader/excavator machine to allow those collaring the animal to reach the required height to safely do so.
3. Cover the elephant’s eyes with cloth while collaring the elephant. In addition, water should be available to cool the elephant if necessary, and the veterinarian should have the required resources to keep the elephant hydrated.
4. The elephant collar must be fixed on the elephant such that it is neither too loose (such that the elephant can pull the collar off over its head) nor too tight. The latter is of particular concern since the girth of an elephant’s neck can be less when it is standing than when it is resting on its front or laying on its side.
5. Ideally, only full-grown adult elephants should be collared. For adult elephants, collars should be fixed such that any changes in body size due to seasonal fluctuations in food availability/body condition will not lead to discomfort for the elephant.
 - a. During the dry season, the body condition of the animal will likely be poor. So the collar should be fixed such that the length of the collar (from end to fixing point) is 30 cm greater than the circumference of the elephant’s neck while standing. (Note that crop-raiding elephants may not be in poor body condition at any time of year: see next point).
 - b. In the wet season, food resources are more readily available, and the elephant is likely to be closer to peak condition. So the collar should be fixed such that

the length of the collar (from end to fixing point) is 25 cm greater than the circumference of the elephant’s neck while standing.

6. Collaring of sub-adult elephants—as well as young adult elephants that are not full grown—is to be avoided as much as possible, as the collar (if not removed in a timely manner) could lead to strangulation of the animal. **If a sub-adult or young adult elephant is causing serious conflict and is living and ranging by itself (or without the company of full-grown adult elephants), then only should the animal be considered for collaring.** If a sub-adult or young adult that is still likely to grow is collared, the collar should be at least 30cm (1 foot) loose—that is, when hanging from the neck of the elephant, there should be about 30cm between the bottom of the collar and the neck of the elephant. (Note that while for adults the 30cm difference was in circumference, here it is in terms of diameter). After collaring, the sub-adult or young adult must be continuously monitored so that the collar can be immediately removed if strangulation due to growth of the elephant becomes a risk.

7. Under no circumstances should a young sub-adult, juvenile, or calf be collared.

M. After fixing the collar, reviving medicines are to be administered. Ensure all surrounding people have moved away from the elephant as it is revived.

N. Post-collaring monitoring of health condition:

1. Elephant body condition needs to be monitored from time to time especially for a week immediately after collaring.
2. In case of any emergency, the veterinarian needs to be informed for inspection and intervention.

O. Developing a tracking plan

1. A tracking system should be set up with the Divisional Office to monitor the collared elephant's movement. This may be made the responsibility of the Rapid Response Team (see "Formation of Rapid Response Teams to manage human-elephant conflict" on page 30) or delegated to a specialized team as necessitated by conflict levels and funds availability.
2. The tracking team in field should have a radio receiver and smart phone to check the elephant movement from their office and the field. If phones lack internet connectivity in the field, they should be regularly informed about the elephant's whereabouts by someone in the office.
3. Both the relevant Forest Department Divisional Office and other designated officials should be given access to the online portal to monitor data coming from the collared elephant(s).
4. Concerned Forest Department personnel should be informed of the elephant whenever the elephant moves close to human habitation.

P. Data management:

The data from the collar and field assessment need to be stored systematically in the Forest Department Divisional Office by the tracking team. Spreadsheets of the data can be downloaded from the online portal for the collar.

Q. Analysis:

Analysis of data from the collar and accompanying field observations can be carried out to understand annual and seasonal ranging, post-translocation response, conflict behaviour, corridor use, habitat use, social behaviour, etc.

R. The collar should be removed from the elephant if there is any indication that the collar is causing harm to the elephant, e.g. by interfering with the healing of a wound in the neck area or becoming too tight due to growth of the animal. The collar should be removed well before the battery of the collar runs out of charge, as finding the animal after the battery has ceased to function might not be feasible. Once the collar life is over, the collar should be removed and deposited with the Divisional Forest Officer.

2. Negative conditioning

Purpose of section:

Sometimes, specific elephants may be identified as repeatedly engaging in aggressive HEC. If they are able to break through barriers and/or are very aggressive, negative conditioning techniques are theorized (but not proven) to help change their behaviour. Negative conditioning of a collared elephant involves intervening and ensuring the elephant has a negative experience each and every time it attempts to raid crops or human habitation for a fairly long period of time. This approach offers an opportunity to shape an elephant's behaviour without translocating it or placing it in captivity, and is thus often worth a try despite the current lack of data proving it is effective.

(Note: to stay updated on science related to negative conditioning, conservationists should monitor the literature on "positive punishment" in wildlife).

Data sheets to be filled during intervention (as relevant):

- "Known elephant record datasheet" on page 147
- "Recording HEC events and providing ex-gratia/compensation" on page 131

Recommended practices:

A. Negative conditioning should be attempted if a single, reliably identified



Main actors: Forest Department/ RRT, anti-depredation squads.

Other actors and government agencies to involve: Leaders and institutions of affected communities and wildlife NGOs.



Tools and resources necessary for intervention: See the "Tools and resources" described in the sections on rapid response teams (page 30), anti-depredation squads (page 68), and capture and collaring (page 92).

elephant or small group of reliably identified elephants has been shown to repeatedly engage in HEC in areas where:

1. Barriers in the areas frequented by the elephant(s) have already been erected and are well-maintained, **AND**
2. The elephant(s) in question have demonstrated the capacity to breach these barriers, **AND**
3. A GPS/GSM collar is available to place on the elephant in question, **AND**
4. The communities and Forest

Department in the area are willing to coordinate and communicate such that the Rapid Response Team and any community institutions (especially Anti-Depredation Squads) will be able to intervene every time the elephant is about to engage in HEC behaviours.

B. Prior to collaring the elephant (or one of the elephants in the identified group of elephants), the Forest Department should ensure everything necessary to conduct negative conditioning is ready.

This includes:

1. A monitoring team of 4-5 people should be assigned to observe the whereabouts of the collared elephant

at all times for at least 5-6 months (timespan to be determined depending on the vulnerability of local crops and property). Where HEC is otherwise low, the Rapid Response Team can take on the role of the monitoring team. Otherwise, additional personnel should be assigned.

2. Where the Rapid Response Team cannot act as the monitoring team, a communications plan must be developed that allows the monitoring team to promptly alert the Rapid Response Team to intervene and negatively condition the elephant if it attempts to enter human habitation/crop raid.

3. If the Rapid Response Team is likely to be unable to fulfill their regular duties and consistently respond to the collared elephant, a secondary short-term RRT

intended just to negatively condition the elephant should be established.

C. Collaring of the elephant should follow section starting page 92 (above).

D. Executing negative conditioning:

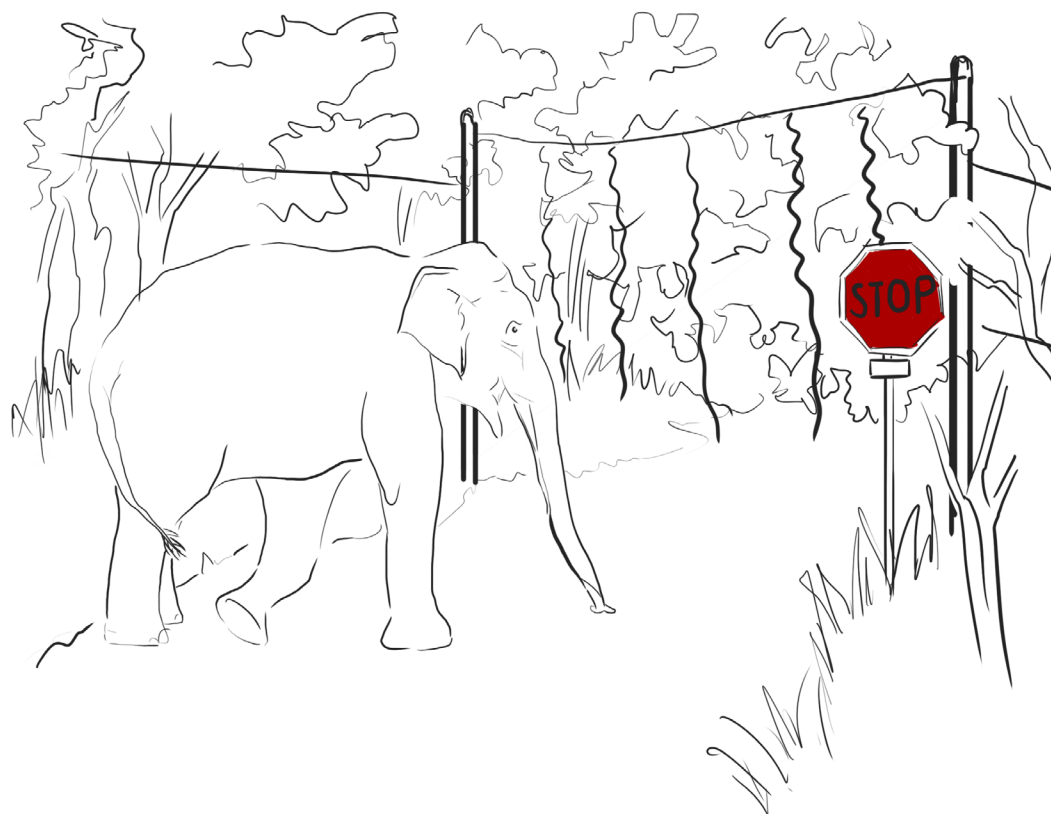
1. The monitoring team should notify the RRT whenever the collared elephant is approaching human-inhabited areas where crop-raiding or property destruction is possible, providing enough time for the RRT to approach that area and be on call.

2. When the collared elephant is within 1-2 km of a settlement, the RRT should be notified and should move to the settlement in preparation for negative conditioning.

3. The RRT should repel the elephant using the methods described in **Emergency Situation 1: Elephant conflict occurring in village/agricultural areas near/adjacent to elephant habitat (page 33)**. Ideally, the elephant should be repelled just as it attempts to breach the barrier(s) intended to protect the community so that it comes to associate the effort to breach the barrier with negative stimuli.

4. In communities repeatedly visited by the collared elephant, an ADS (**see page 30**) can also be notified by the monitoring team if the collared elephant is approaching and equipped to begin negative conditioning until the RRT arrives.

5. A record/log of all the dates and times that the Rapid Response Team was summoned for negative conditioning, all the times negative conditioning was attempted, and a description of the result in each case should be maintained by the monitoring team (in coordination with the RRT).



3. Translocation

Purpose of section:

Translocating elephants is a way to move individual elephants that continuously engage in human-elephant conflict to an area where they either have more access to natural resources, where HEC is easier to manage, or both. Elephants that repeatedly engage in conflict might sometimes live in an area where establishing and defending barriers is impractical due to the configuration of the forest boundary and/or its orientation towards human settlements. In such a situation, translocating a conflict-prone elephant (or multiple elephants) to an area with plentiful natural food and a well-defined and easy-to-defend forest boundary could make it possible to reduce losses to that elephant, or even gradually shape that elephant's behaviour such that it becomes less likely to seek anthropogenic resources over time. Translocation is an extreme intervention, likely to be very stressful for the elephant and expensive for authorities, with a low to moderate chance of success. As such, elephants should only be translocated when more modest interventions have failed; it should be very rare. Taking an animal into captivity will be the last resort, exercised if translocation fails or is not an option.

Data sheets to be filled during intervention

- [“Known elephant record datasheet” on page 147](#)



Main actors: Forest Department, expert veterinarian(s).

Other actors and government agencies to involve:

Police Department, Electricity Board, Veterinary Department, elephant mahouts, civil administration, Gram Sabha/leaders of affected communities/MLA, and media.



Tools and resources necessary for intervention:

Transporting truck, tethering ropes, convoy vehicle, medical kit, sedating and reviving drugs, water tanker, fodder, backhoe loader/excavator, koonki elephants, focus lights, and non-lethal electric fence for soft release

Helpful context:

- Collaring is a key element in translocation, so please see [“1. Capture and collaring” on page 92](#) for some relevant instructions.

Recommended practices:

A. The Wild Life (Protection) Act, 1972, gives each state's Chief Wildlife Warden the authority to decide whether

an elephant should be translocated. The Chief Wildlife Warden has the responsibility and freedom to make this decision based on case-specific context. This section recommends guidelines to help with decisions related to translocation.

B. Assessing whether translocation is the best option:

Translocation is a stressful process for an animal with a fairly high probability of failure. Failure could mean the return of the elephant to its original area and resumption of HEC, the engagement of the translocated elephant in HEC in its new location, or the injury or death of the elephant during or due to the translocation process. Elephants, like many cognitively sophisticated species, have to learn about their environment in order to be able to navigate it safely and thrive. Releasing an elephant in a new location without context is thus risky and likely to induce stress. Due to all these considerations, translocation should be treated as a near-last resort intervention.

C. A wild elephant may be considered an appropriate candidate for translocation to address public safety concerns if there is hard evidence beyond a reasonable doubt that the individual elephant being considered for capture meets condition set 1 AND either condition set 2, 3, or 4

below:

Condition set 1: All the following are true:

- i. Affordable barriers (especially single-strand and multiple-strand fences such as those described in [“2. Non-lethal power fences” on page 80](#)) have been deployed in conflict areas used by the elephant at hand, and the elephant regularly crosses/breaks through them;
- ii. Budget for building more expensive physical barriers such as [“1. High-investment fences \(rail-track fences and steel-rope fences\)” on page 78](#), [hanging fences on page 84](#), and [“3. Elephant-proof trenches” on page 86](#) across areas used by the elephant cannot be attained;
- iii. Collaring ([page 92](#)) and negative conditioning ([page 99](#)) have been tried but not led to a change in the elephant's behaviour for at least a month;

Condition set 2: The elephant has killed at least one human in an incident that was neither accidental nor due to irresponsible behaviour by the person/people involved (if there has been more than one such incident, please also see [“4. Captivity” on page 107](#));

Condition set 3: The elephant regularly damages human homes or dwellings in a way that inhabitants reasonably perceive as a threat to their lives;

Condition set 4: The elephant regularly spends its time foraging some distance away from elephant habitats in urban areas and villages, posing a regular and credible threat to human life or property (as determined through consultation with the Gram Sabha and/or legitimate representatives of the human communities involved);

D. Alternatives to translocation:

In cases where barriers are not sufficiently successful in stemming conflict with elephants, but dangerous aggression towards humans by the elephants in question is minimal or absent, authorities might propose some combination of the following interventions to communities facing HEC:

1. Paying local communities to help with habitat restoration activities in elephant habitat, planting trees and grasses palatable to elephants;
2. Where HEC is occurring in part because there is no hard boundary between human habitation and elephant habitation, offer to buy agricultural land so as to enable the development of a hard boundary along which successful barriers can be established. Habitat restoration may also be considered on acquired land;
3. Paying communities (market value) for the crops they are losing for three years, giving them an opportunity to experiment with crops unpalatable to elephants as well as alternative livelihoods.

For more information, please see “**Note: Non-barrier interventions**” on page 89.

E. Selecting a location for translocation: if translocation is decided as the best available option, a site for translocation should be selected such that:

1. It is a large area of contiguous habitat (at least 650 sq. km.) with no apparent

shortage of food or water;

2. It is (ideally) non-contiguous with the area in which the elephant currently resides, making return less likely;
3. It is (ideally, when possible) at least 200 km away from the current home-range of the elephant;
4. The type of palatable vegetation available to the elephant in the new area is not altogether different from that available in its home range;
5. The boundaries of the new site with human habitations are clear, have effective barriers, and/or are well-governed by local people such that crop-raiding and property damage are unlikely. Please note that while the Chief Wildlife Warden has final say about where the elephant should be relocated, recommendations should ideally be made based on the above criteria.

F. Approval for translocation

1. Permission from the CWLW is a must for capture and translocation of an elephant.
2. The Officer In-Charge of the division from which the elephant is to be captured should send a detailed note with justification as to why this elephant translocation is necessary. The note should address considerations put forth in letters “B. Assessing whether translocation is the best option”, and “D. Alternatives to translocation” above, as well as other relevant considerations.
3. CWLW has to decide the site to which

the elephant will be translocated.

G. Preparation for translocation:

On receiving approval from the Chief Wildlife Warden, a veterinarian experienced in tranquilizations and collaring must be brought on board to participate in operations. In addition, the following should be kept ready:

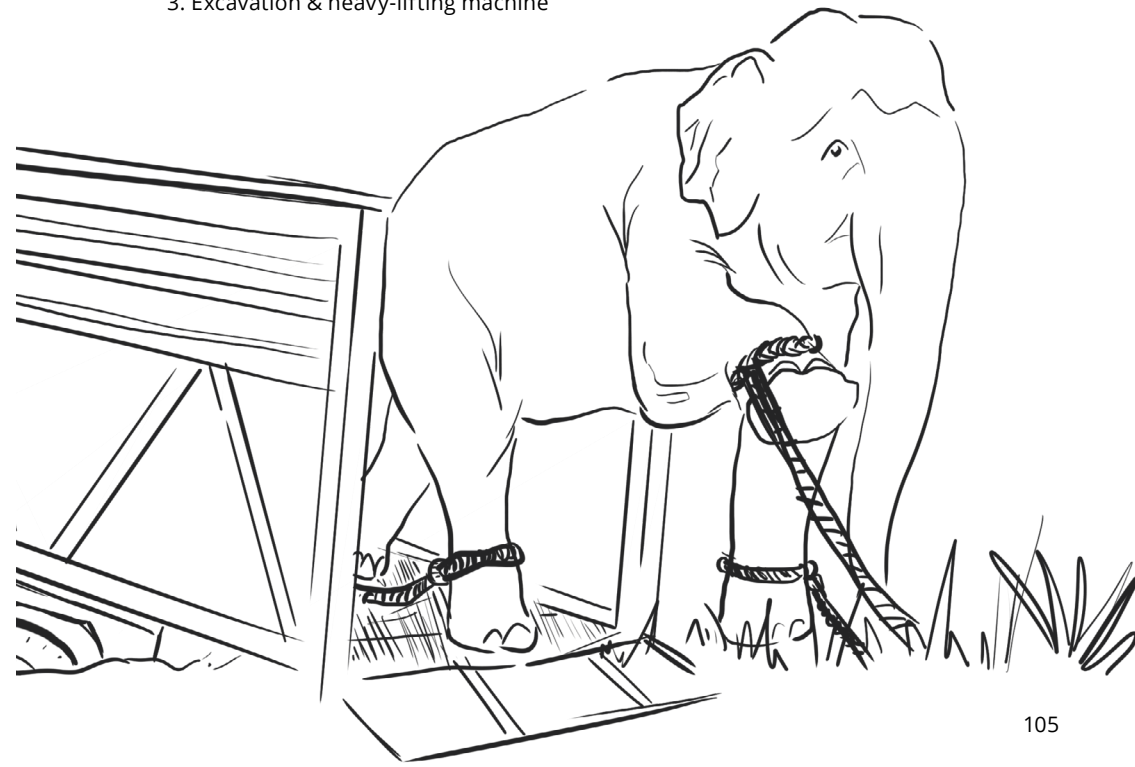
1. A customized transportation truck (body length 560 cm; width 236 cm and height 280 cm; four holes inside the body of the truck to tether the elephant’s legs; 8 mm steel plate as platform of the body of the truck);
2. Ropes to tether the elephant (four ropes 6.3 m long and 18 cm thick);
3. Excavation & heavy-lifting machine

(backhoe loader/excavator)- for building a ramp and loading;

4. Koonki elephants and their mahouts;
5. Satellite- or GSM-based GPS collar with VHF capabilities.

H. See above section on Capture and collaring (page 92) for instructions on how to capture elephant for translocation.

NOTE THAT semi-sedation is strongly preferred for translocation to minimize resistance from the elephant and thus risk of injury to the elephant or humans involved.



I. The loading process: a sturdy earthen ramp can be used to make it possible to lead the semi-sedated elephant onto the truck.

1. In order to avoid dragging, the position of the ramp and the truck should be as close to the elephant as possible.
2. Koonki elephant(s) can be used to enable gentle adjustments while loading.
3. Machineries like backhoe loader/ excavator are helpful to assist while loading.

J. Safe transportation:

1. As elephants are temperature sensitive, the transportation of the elephant should be attempted at night. In cooler environments, transportation can happen during the day as well with approval from a veterinarian. In all cases, the temperature of the environment in which the elephant is being transported must not exceed 30-32°C.
2. Water should be readily available, especially for longer trips or in hotter conditions, to both spray the elephant for cooling and to providing drinking water if necessary. This can be done by allowing a tanker to accompany the translocation team.
3. The Police Department can/should help manage the traffic and also escort the convoy while transporting.
4. The Electricity Board should be called to assist in areas such as those with low-hanging power lines.

K. Method of release:

While releasing in an open habitat, exploratory movement may be anticipated. A “soft release” (in which the animal is initially held in a confined area so that it becomes acclimatized) should be avoided as it can be stressful for the animal. Where a soft release is deemed necessary by authorities, the animal should be held for as short a period as possible and no longer than two weeks. The confined area should have resources like water, food, and shade trees.

L. Post release:

The elephant must be continuously monitored, with negative conditioning applied as required, until authorities are confident that the elephant is no longer participating in conflict. Monitoring should occur for at least 3 months. Please see sections on “1. Capture and collaring” on page 92 and “2. Negative conditioning” on page 99.

4. Captivity

Purpose of section:

Placing a wild elephant in captivity should be extremely rare. Capturing a wild elephant is a last resort generally reserved for (i) badly injured or severely ill elephants or (ii) elephants that are posing a regular and otherwise un-remediable threat to human life or property. These categories include injured elephants that have become aggressive towards people and seem unlikely to heal. If an elephant is captured for treatment, return to the wild must be the goal wherever feasible. This section provides guidelines on how to decide whether or not to place an elephant in captivity, as well as the minimum standards of care to be provided to all elephants captured and kept by the Forest Department.

Recommended practices:

A. The Wild Life (Protection) Act, 1972, gives each state’s Chief Wildlife Warden the authority to decide whether to take a dangerous, disabled, and/or diseased wild elephant into captivity, have it translocated, or allow it to be killed. The Chief Wildlife Warden has the responsibility and freedom to make this decision based on case-specific context. This section recommends guidelines to help with these decisions.

 **Main actors:** Forest Department, expert veterinarians, mahouts.

Other actors and government agencies to involve: Veterinary Department, Police Department, civil administration, public representative/MLA, Gram Sabha, leaders of affected communities.

 **Tools and resources necessary for intervention:** Tools needed for tranquilization, transportation of elephant, keeping elephant in humane captivity.

B. Captivity should be the last resort for elephants primarily because elephants’ social and physiological needs are very hard to fully and ethically meet in captivity. This is particularly true for elephants who have experienced life in the wild. There are only two justifications for taking an elephant into captivity: for animal welfare reasons (C and D below), and/or to address public safety concerns due to an elephant

known to be aggressive and dangerous towards people (E and F below).

C. Authorities should attempt to reunite any captured elephant calves with their mother. If an elephant calf rescued in a human-dominated environment (see “Emergency situation 4: Government responses to rescue an elephant” on page 48) cannot be returned to its herd and/or veterinarians deem that it will be unlikely to survive or recover properly without coming into captivity, it may be brought into captivity. If rehabilitation and return to the herd is possible after treatment, return to the wild must be attempted.

D. In case a wild elephant has been injured, it may be captured for treatment only if necessary to prevent serious suffering of the elephant and/or to address increased aggression towards people, as detailed below. In all cases, the goal of capture for treatment should be to rehabilitate and release the elephant to the wild as quickly as possible. Elephants captured to treat illness/injury must only be kept in captivity after treatment if there is clear evidence they will be unable to survive in the wild if

released.

1. Capture of a wild elephant for treatment may be considered if any one or more of the three following condition sets are satisfied:

i. Condition set 1: The elephant has suffered an injury due to a human cause (e.g., crude bomb, car accident, snares), and veterinarians assess the injury is unlikely to heal without human intervention (and that human intervention can improve outcomes);

ii. Condition set 2: The elephant has a serious injury of human or natural cause that is associated with increased unprovoked aggression towards people, making the capture necessary for public safety;

iii. Condition set 3: The elephant is experiencing great and extended suffering (greater than one month) due to an injury or illness of natural cause that is unlikely to heal naturally, and veterinarians assess that the elephant is unlikely to die soon (within a week) and could fare better under treatment.

If authorities decide to capture or otherwise interfere with the life of any wild elephant, it is highly recommended that the CWLW/other authorities publicly document the rationale for their decision.

2. In case the injured elephant does not pose a threat to public safety, it should not be captured if no effective treatment for its ailment is known or available, as the stress of capture and captivity will then outweigh any benefits.

3. If captured, elephants should be

exposed to the minimum human contact necessary for successful treatment and be provided natural forage to the extent possible to minimize the risks of habituation to people and anthropogenic foods. Only if veterinarians conclude that the elephant will never be healthy enough to survive in the wild may it be retained and trained as a captive elephant.

4. Once deemed fit to survive in the wild by veterinarians, the elephant must be returned to the wild immediately. The elephant should be monitored for at least one month to ensure no worsening of its injury or increased aggression towards people. Collaring should be conducted if possible (see “1. Capture and collaring” on page 92). An aggressive elephant may then be recaptured if it fits the criteria outlined in sections E and F below.

E. An individual wild elephant can be taken into captivity without consideration of additional criteria if that elephant has been demonstrated, beyond a reasonable doubt, to have caused human fatalities in at least two separate non-accidental incidents in which that elephant showed directed and unprovoked aggression. (Note: irresponsible behaviour by the victims or other participants, such as deliberately coming close to the elephant, shall constitute provocation). If capturing and placing such an elephant in captivity is not possible, termination of the elephant may be considered as an option.

F. A wild elephant that does not satisfy the description in (E) above must only be taken into captivity to address public safety concerns if there is hard evidence beyond a reasonable doubt that the individual elephant being considered for capture meets condition set 1 AND either condition set 2, 3, or 4 below:

Condition set 1: All the following are true:

- i. Affordable barriers (especially single-strand and multiple-strand fences such as those described in “2. Non-lethal power fences” on page 80) have been deployed in conflict areas used by the elephant at hand, and the elephant regularly crosses/breaks through them;
- ii. Budget for building more expensive physical barriers such as “1. High-investment fences (rail-track fences and steel-rope fences)” on page 78 , hanging fences on page 84, and “3. Elephant-proof trenches” on page 86 across areas used by the elephant cannot be attained;
- iii. Collaring (page 92) and negative conditioning (page 99) have been tried but not led to a change in the elephant’s behaviour for at least a month;
- iv. Translocation to an area where conflict can be better managed (see page 102) has either been tried unsuccessfully or is not possible.

Condition set 2: The elephant has killed at least one human in an incident that was neither accidental nor due to irresponsible behaviour by the person/people involved;

Condition set 3: The elephant regularly

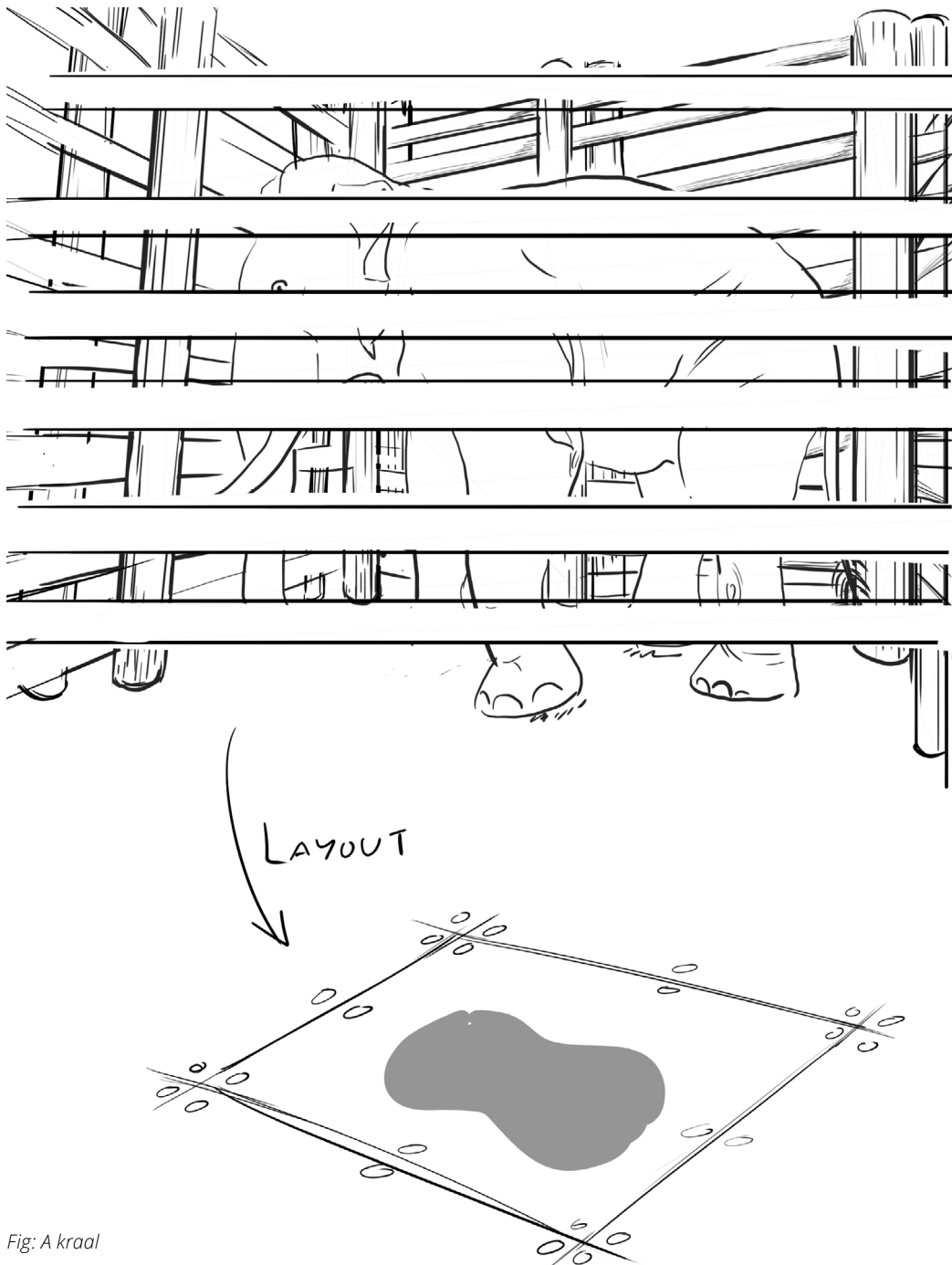


Fig: A kraal

damages human homes or dwellings in a way that inhabitants reasonably perceive as a threat to their lives;

Condition set 4: The elephant regularly spends its time foraging some distance away from elephant habitats in urban areas and villages, posing a regular and credible threat to human life or property (as determined through consultation with the Gram Sabha and/or legitimate representatives of the human communities involved);

G. In addition, facilities must be available for ethically holding the elephant in captivity.

If the elephant will first be kept in a kraal (a large container which, in this context, is built using tree-trunk-sized bars on all sides) for training, the stability and safety of the kraal should be examined beforehand by veterinarians and an elephant mahout. There should be no sharp or loose items inside the kraal.

Two experienced mahouts, preferably individuals with a good record of treating elephants well, should be employed to care for the newly captured animal. Where positive reinforcement methods are viable, they should be used for training. If traditional methods are utilized, tools and methods that cause pain or discomfort should be avoided as much as practically possible. Each training site should have a binding protocol describing what tools and methods can be used to train or control an elephant and under what conditions such tools and methods may be used.

Conditions in captivity should meet those recommended by the IUCN/SSC Asian Elephant Specialist Group's guidelines on the Management and Welfare of Captive Asian Elephants used in Tourism (currently being finalized). Mandatory requirements, taken from the above-mentioned guidelines, include:

1. Access to large areas of at least a quarter of a square kilometre for free-roaming behaviour (with or without mahout supervision) during part of the day;
2. During daytime, shaded areas providing protection from the elements must be available. Any roofs should be at least six meters high;
3. During the day, elephants should not be chained for more than four hours a day. When chained, chains must be at least two meters long (ideally, closer to 20m long) and only attached to one leg. Time spent chained should be minimized.
4. During the day, when free-roaming, chained, or both, elephants must be able to interact with (touch) other compatible elephants. The exception is for musth males (see point number 18 below). Social time with other elephants should be maximized.
5. The daytime living area must be dry and clean at all times, having sufficient drainage.
6. The space where the elephant is chained must consist of dirt, grass, or other natural or synthetic substance non-injurious to elephants' feet. Similarly, the elephant living space must consist almost entirely of such non-injurious surfaces.

7. At night time, any restriction of elephant movement must:

- a. Allow socially bonded elephants to be in physical contact.
- b. Allow elephants to be able to lie down comfortably at any time.
- c. If chained or tied up, provide a chain/rope length of at least 5 meters, with maximum one leg tied up.
- d. Include night-time resting area grounds composed of natural substances (e.g., dirt, sand, or grass).
- e. Allow elephants to access nutritious fodder.

8. The elephant resting area must be cleaned of dung/urine at least twice a day, with dung stored away from the elephants.

9. The daily elephant diet should include at least three varieties of food, with no more than 10% of calories coming from bananas and sugar cane. In addition, elephants should be able to forage for food during the day, both for nutritional and psychological benefits.

10. Geriatric elephants must be provided specialized diets (e.g., chipped fodder, supplements) and safe living areas (e.g., enclosure, stable).

11. Elephants should have access to clean drinking water at least four times a day.

12. Elephants should have access to a river or other clean water source for bathing at least once a day, and should only be scrubbed (if necessary) with water and a soft cloth (not hard brushes).

13. Each elephant should receive regular health checks at a minimum of once

a year. Elephants must be trained for medical management—blood draws, foot care, and mouth inspection.

14. A medical/vaccine record for each elephant must be available for inspection.

15. A veterinarian with a university-level degree from a nationally accredited university and with training in elephant medicine must be in charge of each elephant's care. S/he must have the authority to order elephants to stop working or be given a break if medically necessary.

16. Deliberate elephant breeding is not to occur in captivity. Furthermore, veterinary intervention should be used to prevent every female captive elephant from conceiving after she has successfully given birth to and raised one calf. This allows the female to enjoy the enriching social structure enabled by motherhood without placing unnecessary strain on a system with limited resources to support elephants in captivity.

17. Calves in captivity must:

a. Be trained from an early age, preferably before half a year of age, using positive reinforcement techniques under the guidance of an expert.

b. Always have the option to choose not to interact with visitors/new people (including tourists).

c. Not be encouraged, by visitors or others, to engage in behaviours that they could be punished for at a later age, such as head-butting people or consuming food outside of designated feeding areas.

d. Be allowed to stay with their mothers until at least four years of age for unlimited suckling, and chained for only short periods as necessary (e.g., veterinary exams, treatment of mother)

18. Musth elephants must be kept in an isolated, secure, and appropriate area on a chain about 20m in length. They should have access to food, water, shade, and other welfare measures.

19. Captive elephants may be used for two forms of work, patrolling (and related Forest Department operations such as efforts to combat HEC) and/or wildlife tourism. Use of elephants for other conservation-related work (e.g., helping remove invasive species) can be conducted with special written permission from the CWLW and a recognized elephant welfare expert*. Any use of captive elephants for work can only be conducted under the following conditions:

a. There is a good balance between work and rest time. Daily work should not exceed five hours, with at least 15-minute breaks between rounds of activities, with each round not exceeding one hour. Exceptional emergencies in which the Forest Department requires more work from a captive elephant can be allowed with authorization by the DCF after consultation with the Forest Veterinary Officer.

b. Elephants should not be ridden when the environmental temperature is higher than 38 degrees Celsius. There should always be a break from tourism rides during peak temperature hours, regardless of the temperature. (e.g., 3PM to 4PM if that is the hottest hour).

c. The trekking surface should be safe and natural, with not more than 30% concrete or asphalt.

d. When giving rides, the elephant should have access to sufficient food and water. Feeding by tourists or others must be incorporated as part of feeding plan.

e. Any elephant bathing tourist interaction should happen no more than once a day for no more than 30 minutes, and a second bathing without visitor interaction should be made available to the elephants. No violence is to be used when bathing the elephant, who should be allowed to keep away from visitors if s/he chooses.

20. Every location where captive elephants are kept should have the following approved by an elephant welfare expert*:

a. An aggression management plan, including a binding protocol describing how and when force may be used against elephants.

b. An environmental enrichment plan to prevent boredom, frustration, or the development of behavioural problems. This can include free exploration in a wilderness or forest area, novel foods, positive reinforcement activities with the mahouts, meeting with other elephants, swimming and bathing.

c. Protocols (where female elephants are kept) for hand-rearing or the placement of calves with surrogates in the case that a mother cannot care for her young (e.g., the mother rejects the calf or maternal death).

d. Protocols (where male elephants are kept) for managing elephants in musth, including training for identifying musth and musth records for each male elephant.

e. A written mandatory policy regarding which elephants can work, and in what activities.

f. Written guidelines regarding free roaming (including social management, space, food, water, night time, etc.). Guidelines should prevent aggressive elephant-elephant interactions.

21. The following shall be prohibited:

a. Short tethers or chains for long periods of time, or regularly for times exceeding those prescribed above;

b. The use of hooks to intimidate or inflict pain if the elephant does nothing wrong.

**Elephant welfare expert: Either a veterinarian with at least ten years of experience working on elephant health and welfare or an animal welfare scientist with a PhD and at least five years of experience working on elephant health/welfare.*

Part 5: Data collection for human-elephant conflict

Effectively managing and minimizing losses due to human-elephant conflict require organized and reliable data. Managers need several types of data to make good decisions with respect to HEC. Where, when, and how is HEC happening? Understanding the distribution of human and elephant deaths due to HEC, as well as other HEC incidents, can help managers understand where intervention is most necessary, what interventions are and are not working, and what might be driving changes in the prevalence of conflict. This section includes instructions and data sheets that guide the collection of the following data:

1. Details of each incident—like those found in post-mortem reports—that are helpful for identifying the most pressing threats facing elephants and the communities experiencing HEC.

2. How much are the damages due to HEC? Better data on how much people are losing due to HEC—and under what conditions—is a key step towards allowing compensations that are more commensurate with losses. Better organization of these data will allow for analyses that help policy-makers come up with a fairer, more efficient, and more effective compensation process.

3. Which elephants are actually engaged in conflict? Elephants, as intelligent animals shaped by their life experiences, vary dramatically in their proclivity for conflict. As such, managers need to be able to prescribe interventions based on the characteristics of the individual elephant(s) at hand. Thus, field operatives need to systematically identify the individuals associated with conflict incidents using photographic and genetic evidence. Profiles of individual elephants promise to revolutionize HEC management.

We are not yet systematically collecting all the data needed to manage HEC.

We need to know the procedure for data collection

We need a list of data that needs to be collected for HEC events

We need to identify one or more elephants for the elephant database

We need data to help maintain the barriers set up to reduce HEC

Collecting information for compensation/ex-gratia page 118

Identifying individual elephants page 124

Collecting and storing blood and dung samples for DNA analysis page 128

“Form for documentation and verification for ex-gratia/compensation payment for human death/injury” page 132

Is it for ex-gratia/compensation?

“Form to apply for compensation for elephant damages to crops and property” on page 135

“Form for verification of damage for compensation payment for crop or property damage” page 138

Is it for elephant death/ injury?

“Elephant death or injury summary sheet” on page 151

“Identifying individual elephants” on page 117

“Record of (suspected) new elephant” on page 142

“Known elephant record datasheet” on page 147

“Appendix II: Salient points to be observed/check list of samples to be collected by the on-site veterinarian during suspected electrocution deaths” on page 171

“Appendix VII: Budget table template” on page 177

“Appendix IV: Standard register for the barrier maintenance committee” on page 173

“Appendix V: Fence maintenance checklist” on page 174


“Appendix VI: Trench maintenance checklist” on page 176

“Appendix VII: Mandatory samples to be collected for all post-mortem for toxicology analysis” page 172


Collecting information for compensation/ex-gratia

Purpose of section:

No matter what efforts are taken, some human-elephant conflict will happen. Elephants, like all wildlife, essentially belong to (and are the responsibility of) the State. Since people are not allowed to use lethal force to defend their property or crops against elephants (the elephant is a Schedule I animal protected by law), the State owes those that have lost crops or property to wild elephants full compensation for their losses. When individuals are injured or lose their lives to wild elephants, the State must also attempt to provide at least enough to the victims or their next of kin as ex-gratia to deal with the short-to-medium-term economic consequences of the loss (acknowledging that one can never compensate the loss of a human life). Furthermore, timely and appropriate compensation and ex-gratia payments serve to protect elephants, as victims or would-be victims are less incentivized to kill or injure elephants to prevent or avenge losses. This section describes best practices for the system of documenting and processing cases of human death/injury to enable ex-gratia payments, as well as compensation for loss of crops or property.

 **Main actors:** Rapid Response Team and/or other Forest Department officials, victims of HEC, village leader(s) (gaon burah, sarpanch, pradhan, gothali, or equivalent)

Other actors and government agencies to involve: Revenue Department

 **Tools and resources necessary for intervention:** Phone/ camera to click pictures of damage, documents necessary for applying for compensation

Data sheets to be filled during intervention (as relevant):

- [“Form for documentation and verification for ex-gratia/ compensation payment for human death/injury” on page 132](#)
- [“Form to apply for compensation for elephant damages to crops and property” on page 135](#)
- [“Form for verification of damage for compensation payment for crop or property damage” on page 138](#)

Recommended practices:

A. In order to be fair and effective, compensation and ex-gratia payments must be commensurate with the economic losses faced by victims of HEC and be provided in a timely manner.

As such, every state in India should have a system for administering compensation that has the following properties:

1. Applications for compensation should be fillable online or using paper applications at every beat, range, and division office;
2. Every application for compensation or ex-gratia should be assigned a unique ID that allows the applicant to track the progress of the application online. This online portal should explain both the process by which compensation and ex-gratia are administered and where in the process the applicant’s application stands.
3. Timing best practices:
 - a. Ex-gratia payments for human death should be disbursed to next of kin within one week of the incident. Some amount (at least 5,000 rupees) should be provided to the family immediately to cover funeral expenses.
 - b. Ex-gratia payments for human injury should be made within one month of the application being filed.
 - c. Compensation for all other damages should be provided within two months of the filing of the application.
4. Amount paid:
 - a. Compensation payments should be

commensurate with the losses suffered by the HEC victim. The process should endeavour to ensure the losses due to HEC are completely offset by compensation.

b. Ex-gratia for human injuries should fully cover the costs of medical care for the injury. Injuries that prevent the victim from returning to their vocation should be compensated at the same level as human death.

c. Ex-gratia for human death should be at least 10 lakhs.

5. Compensation/ex-gratia amount should be transferred to the bank account of the beneficiary.

B. Details of application/ claims process in case of human death:

1. Officials should attend the scene as soon as possible (see [“Emergency situation 3: Elephant\(s\) have killed or caused severe injury to one or more human beings” on page 45](#) for protocol)

2. Officials should immediately fill out [“Form for documentation and verification for ex-gratia/compensation payment for human death/injury” on page 132](#). Officials should ensure copy of autopsy documents are included in application.

3. Officials should immediately enter the data onto the online system and provide the application number and copy of the application to the next-of-kin within **48 hours**.

4. Officials should instruct applicant on how to track status of the application online.

C. Details of application/claims process in case of human injury:

1. Officials should attend the scene as soon as possible (see “Emergency situation 3: Elephant(s) have killed or caused severe injury to one or more human beings” on page 45 for protocol)

2. Officials should immediately fill out, “Form for documentation and verification for ex-gratia/compensation payment for human death/injury” on page 132. In cases of serious injury, officials should ensure copies of relevant medical documents are included in application.

3. Officials should immediately enter the data onto the online system and provide the application number and copy of the application within 48 hours.

4. After they have received treatment, victim(s) seeking reimbursement should submit any relevant medical documents to the nearest Forest Department office with their application number; these documents should be uploaded into the system immediately.

5. Officials should instruct applicant on how to track status of the application online.

D. Details of application/claims process in case of crop/property damage:

1. Applicants should apply online or visit the nearest beat, range, or division office of the Forest Department within 48 hours of the incident to apply for compensation. The village leader/headman should be

able to assist wherever necessary.

2. Applicants should fill out the, “Form to apply for compensation for elephant damages to crops and property” on page 135.

3. If a paper copy of the application is filled out, officials must immediately enter it into the electronic database.

4. Applicant should immediately receive an application number and a receipt copy of the application so that he/she can produce it as evidence if required.

5. Officials should instruct applicant on how to track the status of the application online .

E. Verification process:

Without verification, there is a risk that individuals who are not a victim of HEC will apply for compensation when they have not actually suffered damages due to human-elephant conflict.

Furthermore, there is a risk that those who have encroached on government land will claim compensation for their losses even though their agricultural efforts themselves were illegal. To prevent these abuses of the system, the Forest Department must have a verification process wherever HEC is an issue, and they must involve the Revenue Department in all cases where encroachment is a risk.

The verification system should proceed as follows:

1. Verification should be conducted within 48 hours of receipt of the application form.

2. The verification of the loss should be completed at the location with mutual agreement of the representative of the Forest Department and cultivator/owner; where joint verification occurs, the civil administration’s representative should also concur. The village leader/headman may assist wherever necessary.

3. Together, the officials and claimant should file the “Form for verification of damage for compensation payment for crop or property damage” on page 138.

4. If claims are found to be completely or mostly fabricated, applicants should not be paid. They should also be disqualified from compensation with respect to crop/property damage due to HEC for up to two years.

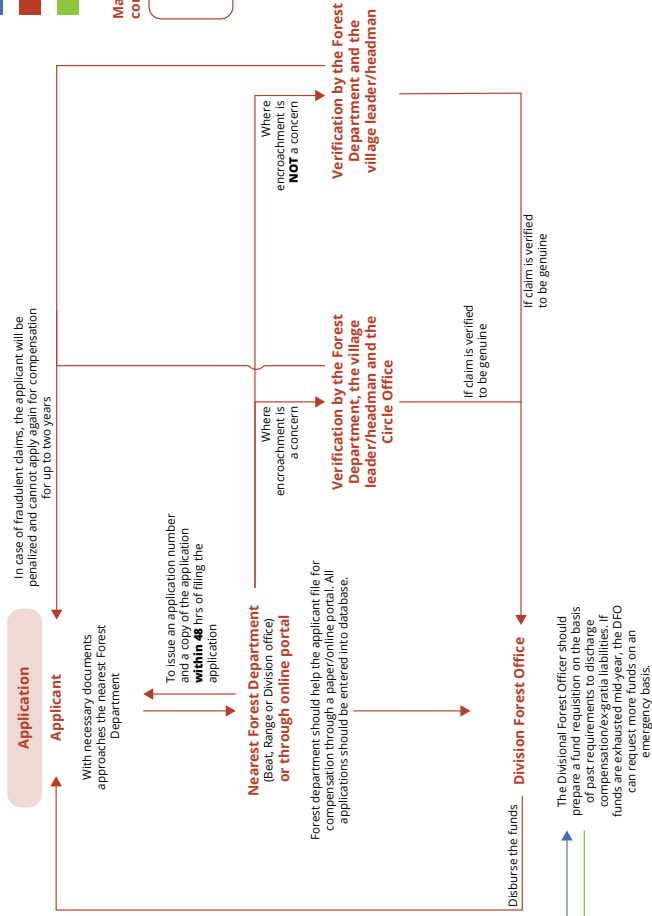


Crop loss/ property damage

- Legend:**
- To be carried out in the beginning of the fiscal year
 - To be carried out for the rest of the year
 - In emergency situations

Maximum time to issue compensation:

For crop loss/property compensation: **2 months**



Documents required for the application for ex-gratia and compensation

- Government ID card
- Account of damage (estimated monetary value and/or area/weight of crops lost)
- Photographs of damage
- Verification by the village leader/headman
- Proof of legality of land use

Allocation of Funds Ministry of Finance

While allocating the funds for the Forest Department, separate funds should be allocated in advance for ex-gratia to the MoEF&CC.

More funds should be allocated on need basis in case the allocated funds prove insufficient

MoEF&CC

HoFF
Can authorise payments

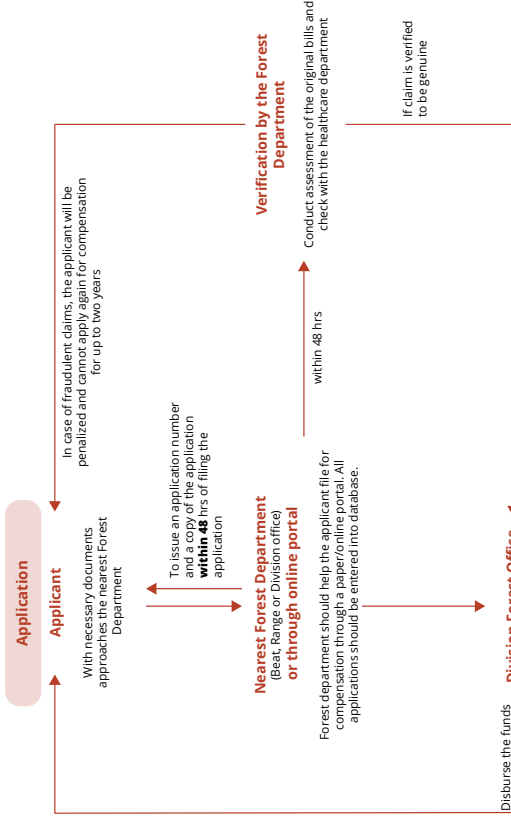
Principal Chief Conservator of Forests
Also serves as Chief Wildlife Warden

More funds should be granted on need basis in case the allocated funds prove insufficient

Human injury/ death

Maximum time to issue compensation:

Human death: **1 week**
Human Injury: **1 month**



- Legend:**
- To be carried out in the beginning of the fiscal year
 - To be carried out for the rest of the year
 - In emergency situations

Documents required for the application for ex-gratia and compensation

- Government ID card
- Bank account details
- A duly filled and signed compensation application form
- All original bills, receipts, memo, etc.
- Medical certificate, applicant's case files and other documents attested by the doctor
- Discharge summary document in case of injury
- Post-mortem report in case of human death
- Cash memo of medicines purchased

Allocation of Funds Ministry of Finance

While allocating the funds for the Forest Department, separate funds should be allocated in advance for ex-gratia to the MoEF&CC.

More funds should be allocated on need basis in case the allocated funds prove insufficient

MoEF&CC

Project Elephant/ Authority responsible for wildlife

Principal Chief Conservator of Forests
Also serves as Chief Wildlife Warden

More funds should be granted on need basis in case the allocated funds prove insufficient

Identifying individual elephants

Purpose of section:

This section describes how to best work to identify individual elephants, or at least capture the information necessary to make identification by experts more likely. Identifying elephants, especially females and makhnas, can be difficult. Individual identification is critical for identifying elephants responsible for conflict, especially if they need to be captured for collaring, translocation, or captivity.

Data sheets to be filled during intervention (as relevant):

- “Record of (suspected) new elephant” on page 142
- “Known elephant record datasheet” on page 147
- “Elephant death or injury summary sheet” on page 151
- “Post-mortem format” on page 153

Recommended practices:

A. Individual identification of elephants should be done compulsorily for animals involved in conflict, but when time permits, Forest Department field staff should also consider developing profiles for elephants spotted near human habitation but not involved in conflict.

B. Forest Department field staff should fill out one of two data sheets for identifying elephants and recording elephant sightings:

1. “Record of (suspected) new elephant” on page 142 for elephants that the observer think is likely an elephant currently not in the database, or
2. “Known elephant record datasheet”



Main actors: Forest Department

Other actors and government agencies to involve:

specialized NGOs and elephant researchers, laboratories able to conduct DNA analyses of dung (SNPs) and/or microsatellites.



Tools and resources

necessary for intervention: Digital camera with reasonable zoom; also sample collection tools including ziplock bags, polyethylene gloves, PAXgene blood DNA tubes, air-tight containers, 100% alcohol, silica gel, sterile swabs, and lysis buffer. Also, freezer for storage.

on page 147 datasheet for elephants that have previously been identified and have partial or complete records in the database

C. Each state should create a searchable “Elephant ID database” in which profiles and sighting records can be organized and sorted based on key elephant characteristics. All the elephant records in a landscape should be grouped together to allow viewing of relevant profiles. A landscape should consist of all the contiguous areas an elephant/ herd of elephants can access at least within a state but, ideally, across states as appropriate. In regions with very large elephant populations, landscapes can be divided based on state lines and reasonable geographic features. Each database may have:

1. Completed and verified profiles in which all the requisite photographs and descriptions are kept, along with DNA data analysis.
2. Completed photographic profiles, without DNA data.
3. Incomplete profiles that have some photographs and/or DNA data.

Each profile should also include all the recorded HEC incidents associated with each elephant, as well as any other locations where it was spotted and recorded.

D. A complete elephant profile consists of the

following information (please use “Appendix I: Identifying elephants” on page 159):

Where completion of a profile is not possible at initial sighting, remaining details should gradually be filled in during consequent encounters with the elephant.

1. Photographs and notes should be taken as follows. Notes should be taken in “Record of (suspected) new elephant” on page 142 or “Known elephant record datasheet” on page 147 datasheet. When collecting data, keep in mind the following:

a. Sex: particularly with younger animals, it can be difficult to distinguish makhnas from females. Photograph the rear quarters of the elephant from the side, as well as the muscles behind the thighs from behind, and the chest such that the photo would capture breasts if present.

Before marking as makhna or female, observe the following:

i. While looking at the rear quarters of the elephant from the side, the muscles below the base of tail are convex for males while they are flat for females.

ii. When looking at the elephant from behind, the muscles between the thighs appear ‘V’ shaped for males.

iii. Between forelegs, the breasts are often visible for female elephants.

iv. During musth, secretion from the temporal gland serves as an additional distinguishing feature (as only males experience musth).

b. Age-class: Elephant age estimation is generally done based on elephant height. Elephants are classified as adult, sub-adult, juvenile and calf. Please see table from Arivazhagan and Sukumar (2008) in [“Appendix I: Identifying elephants” on page 159](#).

c. Photographs: Separate photographs of the full body, back, close-up of head/face, right and left ears, tail and tusks should be taken to capture the features that would be needed to fully fill out the individual identification datasheet. Photographs of each ear should be taken both when flat against the elephant’s body and when spread from body.

2. Genetic identification of elephants: DNA can be collected from blood, tissue and fresh elephant dung, allowing identification of individuals using single-nucleotide polymorphisms (SNPs) and microsatellites. Please see section on [“Collecting and storing blood and dung samples for DNA analysis” on page 128](#). The resulting genetic analysis results/ DNA information should be added to the elephant profile before it is considered complete. If DNA analysis is to be conducted, a profile for the elephant must immediately be established and an ID number generated if one does not already exist.

3. Information on locations and contexts in which elephant was found. This would include both a record of conflict incidents associated with this individual elephant as well as more ordinary sightings that help determine the ranging and social habits of the elephant. If an elephant is spotted with a herd, the age classes of the accompanying individuals should ideally be noted.

E. In addition, while identifying elephants please consider the following advisories:

1. While taking photos, one must be careful not to mistake temporary marks as distinctive features.
2. Some elephants develop depigmentation on the face, ear, trunk and neck. These can be noted, but identification must not rely on these markings as they may not be visible if the elephant covers them with mud.
3. In case sighting and following elephants is not possible, camera traps can be installed on the paths regularly used by elephants. This can be particularly useful in case of crop raiders that use dense understory habitat during day and enter into human use areas only at night. Infra-red based camera traps can take photo and videos during night. For capturing all the individuals in a herd using camera traps, cameras with both still and video features should be used.

F. Incomplete photo profiles and inconclusive photographs should also be stored with accompanying locations using the “Record of (suspected) new elephant” or “Known elephant record datasheet” as the observer deems appropriate.

G. Elephant ID specialists, ideally part of the RRT in each forest range,

should sort through newly submitted sighting records every week. Records from conflict incidents should be processed promptly.

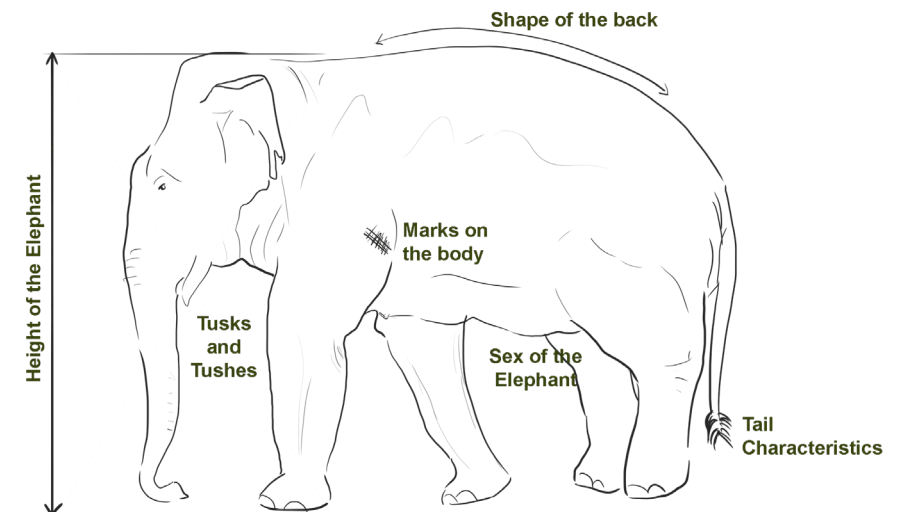
1. Filled [“Known elephant record datasheet” on page 147](#) datasheets should be compared to the existing profile of the elephant identified in the record. If the photographs match, data from the record can be added to the profile. If the photographs do not match, the datasheet should be treated as a [“Record of \(suspected\) new elephant” on page 142](#).
2. Each [“Record of \(suspected\) new elephant” on page 142](#) should be first compared to all existing profiles through a sorting approach. E.g., if the new record is of a makhna with a torn right ear and a hairless tail, it should be compared

to all elephants in the database that fit that description and have been spotted in that landscape. If there is no match, a new profile can be established. The new elephant must be given an alphanumeric ID number name based on a systematic protocol, and may also be given a conventional name.

3. If an elephant has killed one or more human being, its profile must be completed on priority and compared to the profiles of all other elephants known to have killed people in the state and neighbouring states that have elephants (and have connectivity with the locations where the given elephant has been recorded).

Characteristics that could help identify an elephant

Refer to [“Appendix I: Identifying elephants” on page 159](#)



Collecting and storing blood and dung samples for DNA analysis

Purpose of section:

DNA is the most fail-safe way to distinguish elephants from each other, especially for individuals lacking obvious markings or observed mostly when there is poor visibility. Individual elephants vary dramatically in their habits, with most elephants posing little danger to humans, but some individuals becoming habitual crop-raiders, habitually aggressive, or even serial human killers. In order to identify the correct individuals for interventions such as collaring, translocation, or even legal removal (of individual animals declared dangerous to human life), data to accurately identify responsible individual elephants must be systematically collected. Genetic data can also contribute towards developing a country-wide database. A systematic database of elephant DNA can also help law enforcement officials track down the location of poached elephant tusks.

This section details best practices for collection of samples for DNA analysis.



Main actors: Forest Department

Other actors and government agencies to involve: Sample testing facilities, Veterinary College



Tools and resources necessary for intervention: Sample collection tools including ziplock bags, polyethylene gloves, PAXgene blood DNA tubes, air-tight containers, 100% alcohol, silica gel, sterile swabs, and lysis buffer. Also, freezer for storage.

Recommended practices:

A. Permissions and system for DNA analysis of biological samples:

Before any blood, tissue, or dung samples are collected from any individuals, permission must be attained from the state's Chief Wildlife Warden. Ideally, the CWLW will establish a policy of systematically collecting, storing, and analyzing biological samples across conflict events as described in this Field Manual. The CWLW should then also direct the Forest Department to

establish a database for the systematic documentation of the data collected from these samples, allowing the tracking of individual conflict animals over time.

B. Collection of samples from captured (for collaring, treatment, translocation, or placing in captivity) wild elephants:

Blood samples from a live animal must be drawn only by a veterinarian or a trained professional and collected in vacutainers or PAXgene blood DNA tubes. These samples should be frozen for long term storage or long distance transport.

If blood is unavailable, collect hair samples. Pull a few hair strands and store in zip lock plastic bags. These need to be frozen too for long-term storage.

C. Collection of samples from dead wild elephants:

During postmortem, about 100g or 1 inch x 1 inch piece of tissue from the carcass (muscle, liver, or heart) should be collected and placed in an air-tight container and covered with 100% alcohol. Freeze the sample for long-term storage.

D. Collection of dung samples:

A sample from the surface layer of the dung should be collected and placed in an air-tight container and covered with 100% alcohol or silica gel. If air-tight containers are not available, the sample can be collected in a plastic ziplock with silica gel.

In addition, the surface of the dung should be swabbed with a sterile swab and preserved in lysis buffer longmire's solution (or other lysis buffer).

E. Collection of shed hair samples:

Hair samples may be collected from sites like tree bark, elephant resting sites, barbed fences crossed by elephants, and conflict zones. Animals often deposit/shed hair at these sites. Use a pair of forceps to collect strands of hair and store them in a zip lock bag. Store these in freezers for long-term storage.

F. Wherever possible, use disposable single-use gloves for sample collection. If gloves are not available, a plastic bag can be used to cover hands before collecting samples

All precautions must be taken to not touch the sample with bare hands during collection. This is to prevent deposition of DNA digesting enzymes from the human hand onto the samples, the deposition of human DNA on to the samples, and (most importantly) to prevent cross contamination between samples of different elephants. These contaminations can reduce DNA yield significantly. Polythene gloves are cheap and easily available. The gloves need to be disposed after every use.

G. Store individual samples in separate sealed containers, even if they are

from the same individual.

H. Samples should be labelled clearly and should contain the following information:

1. For known elephants, individual elephant ID generated as part of creation of profile (see Identifying individual elephants)
2. Sample type (blood/tissue/dung/hair)
3. Date
4. GPS location (where the sample was found/ animal captured)
5. Other location details (specific area, forest division, state)
6. Collector (name, contact number, designation)
7. Recommended storage conditions for all types of samples: short-term at room temperature and long-term at - 20°C

I. Information on sample collections related to post-mortems can be found on page 153.

Datasheets:

Recording HEC events and providing ex-gratia/compensation

**Form for documentation and verification for ex-gratia/
compensation payment for human death/injury**

1.	Name:	
	Age:	
2.	Gender:	
3.	Death or injury (description):	
4.	Father's/Mother's name:	
5.	Complete address:	
6.	Nearest Forest Department office (Beat/Range):	
7.	Next of kin (In case of human death):	
a.	Name	
b.	Age	
c.	Gender	
d.	Relationship to victim	
e.	Complete address	
8.	Phone mobile no. of victim/ next of kin:	
9.	Details of where human death/ injury took place:	
a.	Latitude (decimal degrees):	
b.	Longitude (decimal degrees):	
c.	Village:	
d.	Beat:	
e.	Range:	
f.	Division:	
g.	Dag No:	

h.	Patta No:	
i.	Mouza name:	
j.	Revenue Circle :	
k.	District:	
l.	State:	
10.	Date of the incident:	
11.	Time of the incident:	

12. Details of the offending elephant(s): attach any photos and DNA reports and either "Known elephant record datasheet" on page 147 or "Record of (suspected) new elephant" on page 142 datasheet as appropriate. If known elephant, enter elephant ID number here:

13. Details of incident: narrative explaining context of conflict event.
a. Describe what happened.

b. Did the person do anything that might have provoked the elephant? If so, what?

c. Did the elephant behave aggressively without provocation? If so, how?

14. Documents of treatment attached (hospitalization, prescription, discharge certificate etc. in case of injury):

15. Cost of treatment (attach documents as required):

16. In case of death: postmortem completed? (attach documents as required):

a. Is the post-mortem completed?

b. Has it been received?

c. Does the post-mortem confirm death due to human-elephant conflict?

17. **Bank account with IFSC code of the victim (in case of injury) or next of kin (in case of death)** (attach bank documents as required):

18. Other documents required:

In case of death

- ID proof (Aadhaar/Voter ID)
- Gaon Burah certificate
- Pass book (front and current page)
- Death certificate
- Police report
- Post-mortem report
- Next of kin affidavit

In case of injury

- ID proof (Aadhaar/Voter ID)
- Gaon Burah certificate
- Pass book (front and current page)
- Photo of damage
- Medical bills
- Medical report
- In case of disability - Disability certificate

Signature of the Verification authority-

Place :

Date :

1. Representative of Forest Department:

2. Representative of Civil Administration/Revenue Department :

3. Victim of HEC/next-of-kin of HEC victim:

4. Village leader as witness:

Form to apply for compensation for elephant damages to crops and property

1.	Name of the applicant:	
2.	Age:	
3.	Gender:	
4.	Father's/Mother's Name:	
5.	Complete Address:	
6.	Nearest Forest Department office (Beat/Range):	
7.	Phone no. of applicant:	
8.	Details of where crop/property damage took place:	
a.	Latitude (decimal degrees) (optional):	
b.	Longitude (decimal degrees) (optional):	
c.	Village:	
d.	Beat:	
e.	Range:	
f.	Division:	
g.	Dag No:	
h.	Patta No:	
i.	Mouza name:	
j.	Revenue Circle :	
k.	District:	
l.	State:	
9.	Status of the land: Revenue / Government/ Forest / Private	
10.	Date of the incident:	
11.	Time of the incident:	
12.	Crop damage, property damage, or both:	

13. For crop damage (please attach photographs if available):

Crop type	Area damaged	Quantity of crop damaged (quintals)	Market price for crop damaged (per quintal)

14. For property damage :

15. Was applicant's house damaged? **Y/N**

a.	Type of house: pucca or kutchra	
b.	Type of damage: partial or full	
c.	Approximate cost of repairs?	

(Please attach photographs if available)

16. Was any other property, including livestock, damaged or harmed? Please fill in here:

Property type/item	Description (age, function, etc.)	Approximate value

(Please attach photographs if available)

17. Bank account details (name, account number, IFSC code) of the claimant (attach bank documents as required).

18. Other documents required:

Common documents

- ID proof(Aadhaar/Voter ID)
- Gaon Burah Certificate
- Pass book (front and current page)
- Photo of damage (except in case of death)

In case of crop loss

- Khazana receipt
- NOC (only for tea estate)

In case of property damage

- NOC (tea estate)

Signature of the Applicant

Place:

Date :

.....

RECEIPT

Application/case no :

Date:

This is to certify that we have received an application for compensation for crop damage /property damage and all required associated documents from:

Mr/Ms.....today on(Date) and found to be valid.

Range/ Beat Forest Officer

Date :

Annexure:

**Form for verification of damage for compensation
payment for crop or property damage**

1.	Application/case no:	
2.	Name of the applicant:	
3.	Age:	
4.	Gender:	
5.	Father's/Mother's Name:	
6.	Complete Address:	
7.	Nearest Forest office (Beat/ Range):	
8.	Phone no. of applicant:	
9.	Details of where crop/property damage took place:	
a.	Latitude (decimal degrees):	
b.	Longitude (decimal degrees):	
c.	Village:	
d.	Beat:	
e.	Range:	
f.	Division:	
g.	Dag No:	
h.	Patta No:	
i.	Mouza name:	
j.	Revenue Circle :	
k.	District:	
l.	State:	
10.	Status of the land: Revenue / Government/ Forest / Private	

11. Assessment of crop-raiding claims (copy first four columns from application):

Claimed crop type	Claimed area damaged	Claimed quantity of crop damaged (quintals)	Claimed market price for crop damaged (per quintal)	Claim accurate?	If no, recommended compensation

12. If any claims are deemed inaccurate, please explain how so:

13. If any of the above claims are fraudulent, please explain how so:

14. If claims above are fraudulent, should the standard punishment (disqualification from system for two years) be given? If not, why not?

15. Assessment of the property damage claims (columns 1 and 2 copied from application)

Property type/ item claimed	Claimed approximate value	Claim accurate?	If no, recommended compensation

Property type/ item claimed	Claimed approximate value	Claim accurate?	If no, recommended compensation

16. If any claims are deemed inaccurate, please explain how so:
17. If any of the above claims are fraudulent, please explain how so:
18. If claims above are fraudulent, should the standard punishment (disqualification from system for two years) be given? If not, why not?
19. Can the bank account details of the claimant be verified?

Signature of the Verification Authority-

Place:

Date:

1. Representative of Forest Department:
2. Representative of Civil Administration/Revenue Department :
3. Applicant for HEC compensation:
4. Village leader as witness:

Datasheets for individual elephant profiles for elephant database

Record of (suspected) new elephant

*For illustrations refer ""Appendix I: Identifying elephants" on page 159

1. Tusker, Makhna, or Female*:
2. Age-class (calf, juvenile, sub-adult and adult):
3. Back shape* (Single peak, double peak, almost flat back and flat back):

4. Peculiar markings on face:

Location (right, left, front, near ear, etc.)	Marking description

5. Ears:

Left Ear—Description	
Size*	
Shape	
Top fold* (Not folded/ 50% fold/ 100% fold)	
Lobe shape* (pointed/ average/ blunt)	
Ear length* (long/ medium/ short)	
Depigmentation (Prominent/ none)	
Ear nick or tears (big/medium/small/ none; near top, outside, inside, or bottom of ear)	
Loose ear flaps (size/location)	
Holes* (small/big/none, in the top half/ in the bottom half/ near inner edge/ near outer edge)	

Right Ear—Description	
Size*	
Shape	
Top fold* (Not folded/ 50% fold/ 100% fold)	
Lobe shape* (pointed/ average/ blunt)	
Ear length* (long/ medium/ short)	
Depigmentation (Prominent/ none)	
Ear nick or tears (big/medium/small/ none; near top, outside, inside, or bottom of ear)	
Loose ear flaps (size/location)	
Holes* (small/big/none, in the top half/ in the bottom half/ near inner edge/ near outer edge)	

6. Tusks

Left Tusk—Description	
Length* (short/ medium/ long/ tush/ none)	
Angle to ground* (parallel, angled towards ground, points towards ground)	
Shape* (parallel/ divergent/ convergent/ divergent and convergent)	
Angle in relation to each other* (even/ uneven) (left over right/ right over left)	
Length compared to other tusk	
Other details	

Right Tusk—Description	
Length* (short/ medium/ long/ tush/ none)	
Angle to ground* (parallel, angled towards ground, points towards ground)	
Shape* (parallel/ divergent/ convergent/ divergent and convergent)	
Angle in relation to each other* (even/ uneven) (left over right/ right over left)	
Length compared to other tusk	
Other details	

7. Tail

Tail and tail hairs—Description	
Length (T1, T2, T3)*	
Straight or twisted?	
Anterior hair length (short, medium, long)	
Posterior hair length (short, medium, long)	
Tail brush shape* (round, spear, long women's hair, circle, hook, tooth brush, two-side almost-join, fish-tail)	
Other details	

8. Warts/ wounds

Location: (Body, face, tail, trunk, legs) & (Left/right/ front/hind)

Description:

9. Any other distinctive features:

Location (near right leg, etc.)	Marking description

10.	Date/Time spotted:	
11.	Location where spotted:	
a.	Latitude (decimal degrees):	
b.	Longitude (decimal degrees):	
c.	Village:	
d.	Beat:	
e.	Range:	
f.	Division:	
g.	Revenue Circle :	

10.	Date/Time spotted:	
h.	District:	
i.	State:	

12. Sighting associated with conflict event?

- Human death? Insert file number and name of victim(s)
- Human injury? Insert file number and name of victim(s)
- Crop damage? Insert name of victim(s) / describe damage if possible
- Property damage? Insert name of victim(s) / describe damage if possible

13. Seen with other elephants?

Total adult males: _____

Total adult females: _____

Total young elephants: _____

Seven nearest elephants? Include any already assigned elephant IDs, whether nearest or not:

Sex	Age-class	Elephant ID (if certain!)

14. Tissue or dung samples collected?

Records of elephant death and injury

- A. **Elephant Death and Injury Summary Sheet (page 151)**
- B. **Post-mortem report (page 153)**

Elephant death or injury summary sheet

1.	Case Number.....	
2.	Elephant ID?:	
3.	Date of the incident:	
4.	Time of the incident:	
5.	Location details	
a.	Lat:	Long:
b.	Inside/outside the forest:	
c.	Village:	
d.	Beat:	
e.	Range:	
f.	Protected Area:	
g.	Division:	
h.	District:	
i.	State:	
6.	Death or Injury	
7.	Who detected the carcass	
a.	Name	
b.	Occupation	
8.	Details of the elephant	
a.	Age	
b.	Tusker/Makhna/Female	
9.	Cause of Death/Injury (Select one)	
a.	Natural	
	i. Disease	
	ii. Infighting	
	iii. Starvation/thirst	
	iv. Old age	
b.	Accidental	
	i. Vehicle/Train Collision	
	ii. Trench/pit/well	
	iii. Electrocution due to transmission lines	
c.	Conflict	

	i. Electrocution due to illegal power fences	
	ii. Poisoning	
	iii. Explosives	
	iv. Snares/ Traps	
	v. Other conflict case (please specify)	
d.	Others	
	i. Poaching	
	ii. Gun Shot	
	iii. Elephant died during a rescue operation	
	iv. Unspecified/Uncertain cause (please describe)	
e.	Remarks on cause of death/injury	
10.	Status of body parts	
a.	Ivory	
	i. Missing	
	ii. Recovered	
	iii. Naturally absent	
b.	Any other body part missing or removed (please specify)	
11.	Documents	
a.	Details of the Vet Team	
	i. Name	
	ii. Designation	
	iii. Phone Number	
b.	Post Mortem/ Serial Number	
c.	Photographs	
12.	Any Human Death or Injury associated with this case	
13.	Additional remarks or comments:	

Signatures:

Range Officer

Division Forest Officer

Post-mortem format

PART-A

Detailed necropsy findings of an Asian elephant carcass

Serial no: _____
Dtd: _____ File Name-Number/PA NAME/Range name/Camp name/
serial no/date (For office use)
Example: RPM-01/KNP/Kohora/Baruntika/001/2020-21
Dtd. XX/01/2020.

Name of PA/Area: _____ **Range:** _____ **Camp/Beat:** _____

Date & day: _____

GPS Coordinates of carcass detection site: _____

Ambient temperature: _____ **Humidity:** _____
Raining: Y/N

Date and time of carcass detection by forest staff: _____

Description of carcass site(Immediate surroundings description like topography, water bodies, woodland, grassland, patrolling path etc.):

Any other significant and relevant details:

External examination of the carcass
Carcass description/Cadaver change:

Sex: _____ **Approximate age:** _____

Rigour mortis: _____ **Approximate time of death:** _____

Condition of mucous membranes of:

Eyes:	
Oral cavity:	
Nasal cavity:	
Genital tract:	
Rectum/anus:	

Condition of:

Eyes:	
Ears:	
Tail:	
Tusk:	
Teeth:	
Superficial lymph nodes:	
Vulva:	

Morphometry (All length in cm):

Length from tip of upper lip to base of tail:		
Height at withers:		
Chest girth:		
Neck girth:		
Approximate weight:		
Tail length:		
Circumference of foot pads:		
	Right fore:	Left fore:
	Right hind:	Left hind:
Tusk/Tush length and condition:		
Tusk circumference at base:		
Tusk length:		

Internal examination

A. Subcutaneous tissues and muscles:

B. Alimentary system/Digestive system:

Buccal cavity:	
Tongue:	
Pharynx:	
Esophagus:	
Abdominal cavity:	
Peritoneum:	
Liver (Appearance, size, colour, edges, consistency):	
Portal ducts, veins and arteries:	
Omentum & mesentery:	
Stomach (Mucosal and serosal surfaces, content, lesions, tumours, parasites etc.):	
Small intestine (Duodenum, jejunum & ileum/ Mucosal and serosal surfaces, content, lesions, tumours, parasites etc.):	
Large intestine (Caecum, colon & rectum/ Mucosal and serosal surfaces, content, lesions, tumours, parasites etc.):	
Lymph glands:	

C. Respiratory system:

Nasal cavity:	
Larynx	
Trachea:	
Diaphragm:	
Thoracic cavity:	
Position of visceral organs:	
Presence of fluids (Ascitic, exudates, pus, blood, serosanguinous fluid etc.):	
Pleura:	
Bronchi and bronchioles:	
Lungs:	
Lymph nodes:	

D. Circulatory system:

Pericardial sac:	
Heart muscle:	
Heart vessels:	
Heart chambers:	
Thoracic blood vessels:	
Spleen (Appearance, size, colour, edges, consistency):	
Lymph glands:	

E. Urogenital system:

Kidneys (Capsule, appearance, size, colour, consistency, cortex, medulla, haemorrhages etc.):			
Ureters:			
Urinary bladder (Serosal and mucosal surfaces, contents, haemorrhages, perforation etc.):			
Urethra:			
Male:	Testes & associated structures:	Penis:	Prepuce:
Female:	Ovary:	Uterus:	Cervix: Vagina/vulva:

F. Nervous system:

Meninges:	
Blood vessels:	
Brain:	
Spinal cord:	

G. Skeletal system:

Major bones:	
Vertebral column:	

Summary of major findings (In bullet form)

List of samples collected, dispatched and address of referral laboratories

S.No	Sample collected	Preservative used	Requested test	Laboratory

Provisional diagnosis:

Date:

Post mortem performed by:

Signature

- 1.
- 2.

Investigation officer (IO)/FRO:

- 1.

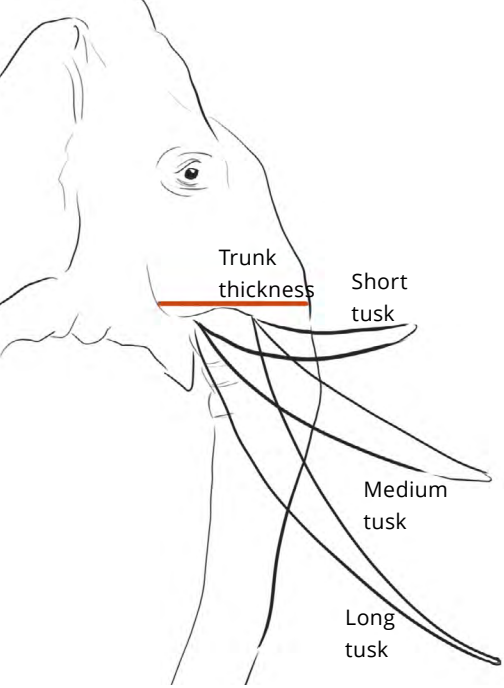
Witness(s):

- 1.
- 2.

Memo No: xxxxxx (Office use)

Copies to:

1. The FD/DCF of respective PA.
2. The respective laboratories where sample is sent.
3. Office copies.



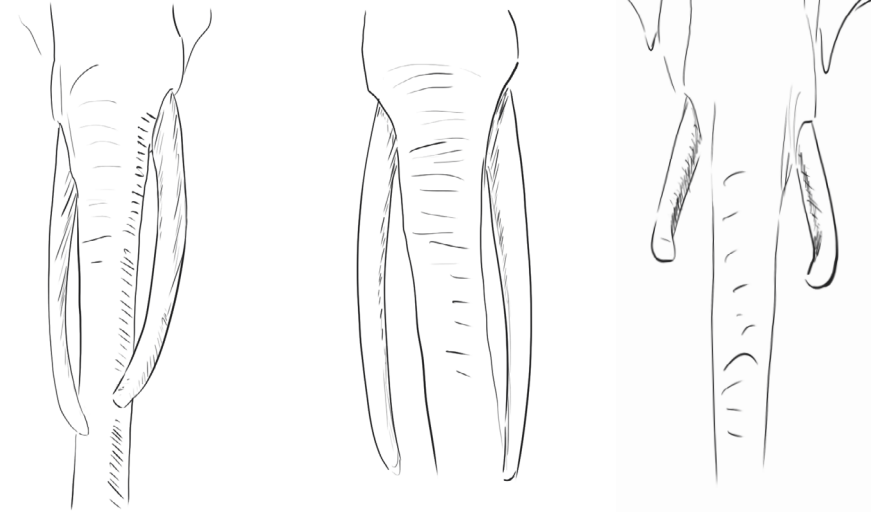
Tusk Length:

1. Short = length less than twice trunk thickness (at lip line, at the root of tusk)
2. Medium = length more than twice trunk thickness but less than three times trunk thickness
3. Long = length more than three times trunk thickness

This is an arbitrary measurement but it brings about some objectivity in classing tusk size

Shape of tusks

Record the shape as converging, parallel or diverging



1. Converging –curved inwards (extreme case will cross each other –record as cross tusker. Note: there are many cross tuskers)

2. More or less parallel to each other, neither spread nor meet

3. Diverging –spread away from each other

Angle in relation to each other

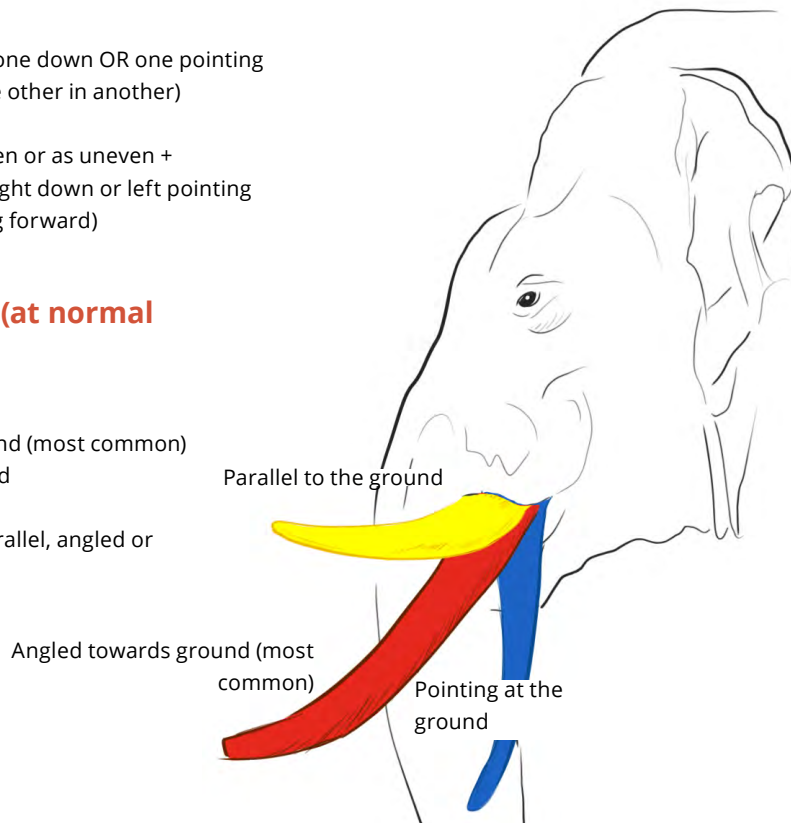
1. Even (both similar)
2. Uneven (one up and one down OR one pointing in one direction and the other in another)

Record the shape as even or as uneven + difference (i.e. left up/right down or left pointing down and right pointing forward)

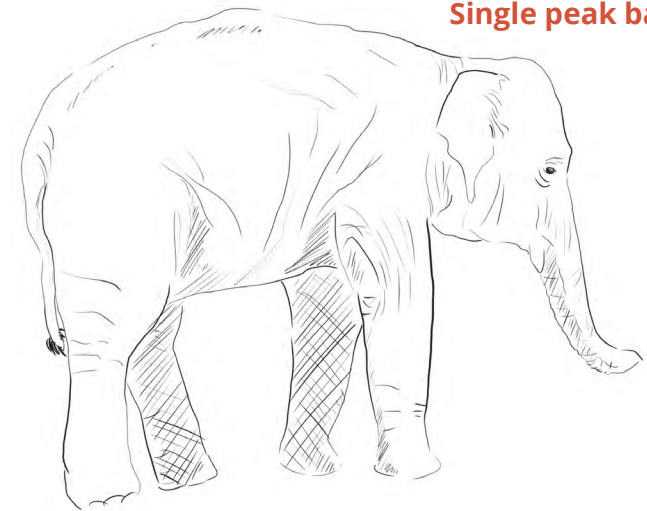
Angle to ground (at normal head position)

1. Parallel to ground
2. Angled towards ground (most common)
3. Pointing at the ground

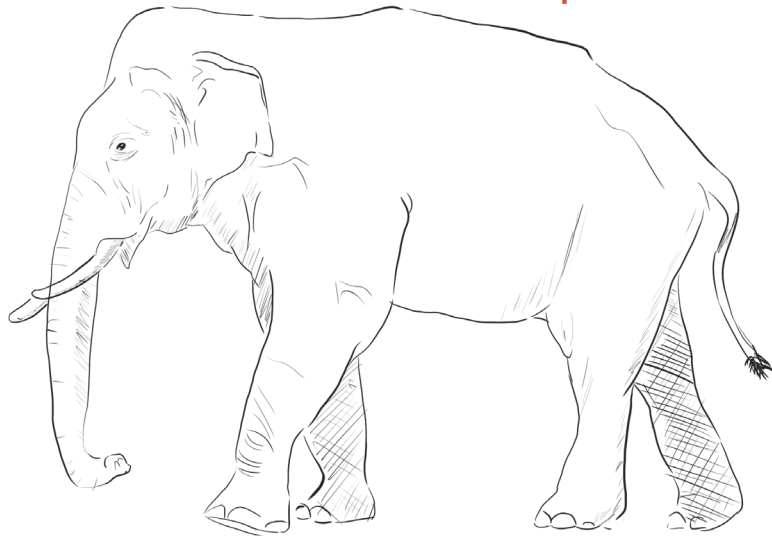
Record the shape as parallel, angled or downward



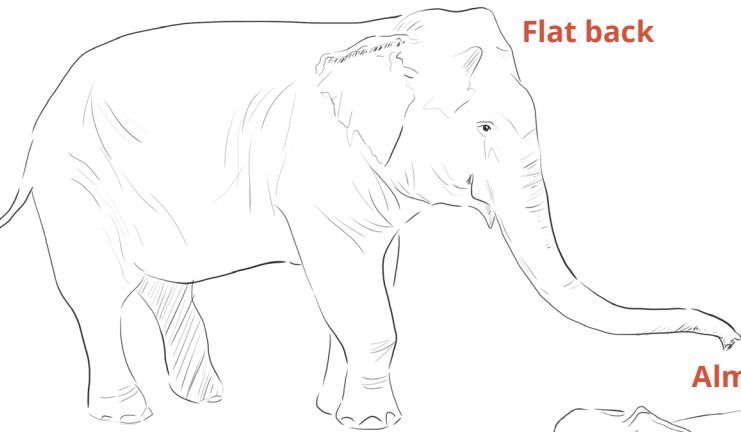
Single peak back



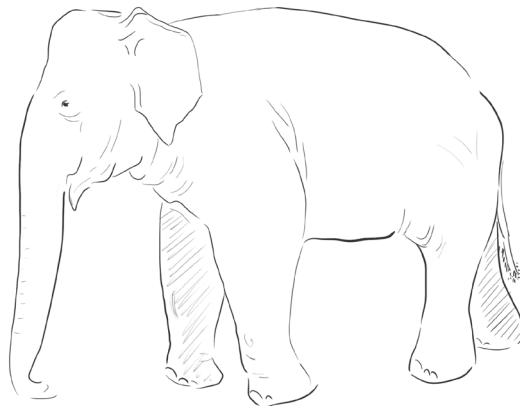
Double peak back



Flat back

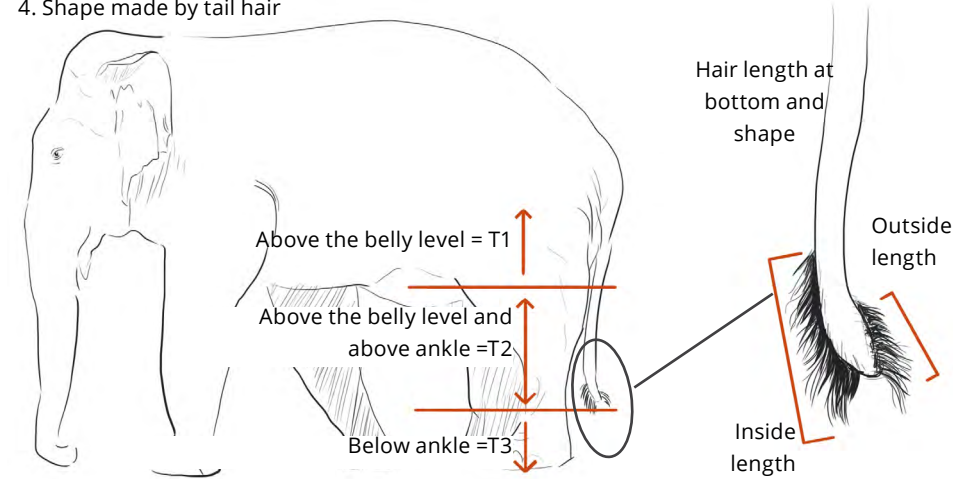


Almost flat back

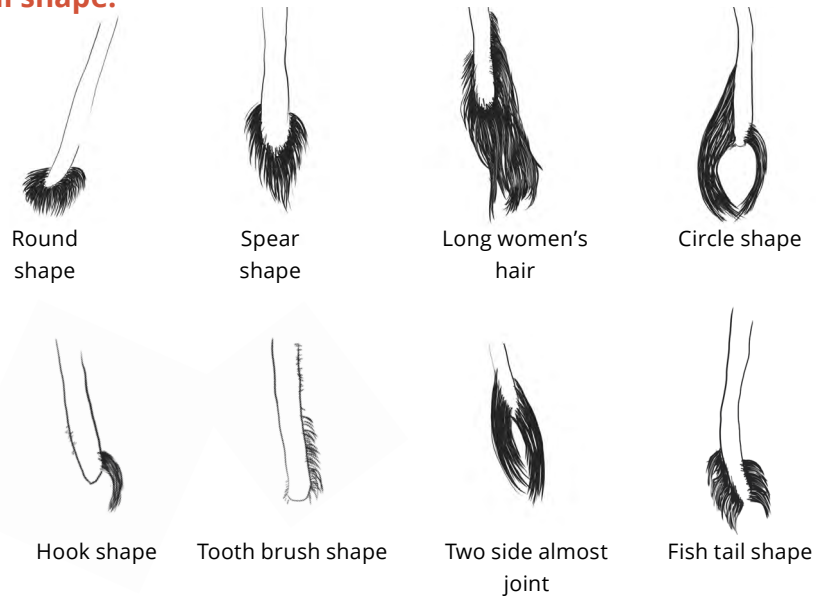


Tail Characteristics:

1. Length (T1 = above belly level; T2 = below belly and above ankle; T3 = below ankle)
2. Hair length – none = no hair; short = less than 1 inch; medium = 1-4 inches; long = more than 4 inches
3. Hair growth – growth inside (leg side) and outside (away from leg) along the tail
4. Shape made by tail hair



Tail shape:



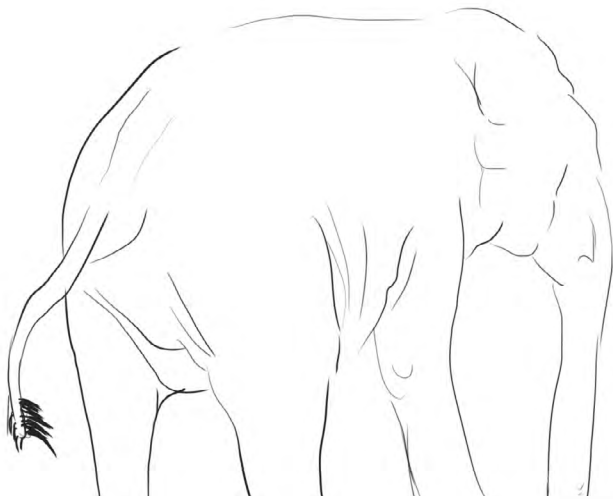
Sex of the elephant

Differences between female and makhna (tusker will be easily identified by presence of tusk)



Slight bulge under the tail (Male)

No bulge under the tail (Female)

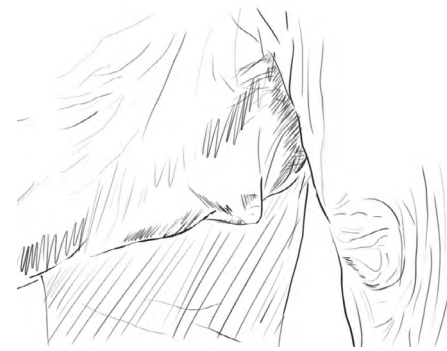


Slight rounded shape between legs (Male)

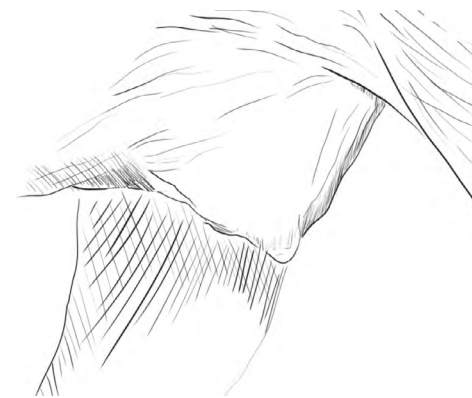
Hollow shape between legs (Female)



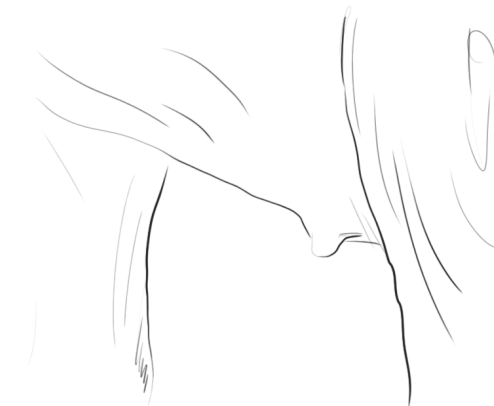
In adults, the presence of developed breasts can help to identify females



Non-lactating female



Lactating female



Adult makhna and tusker (teat it will look like a small protrusion from skin)

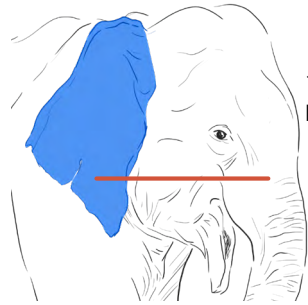
Age class

Major age classes	Height (feet)	Height (m)	Approx. Sub-classes (years)
Calf (0-1 yr)	3-4	0.9-1.2	
Juvenile (1-5 yrs)	4-6	1.2-1.8	1-2, 2-3, 3-5
Sub-adult (5-15 yrs)	5½-7 female; 6-8 male	1.7-2 female; 1.8-2.4 male	5-10, 10-15
Adult (>15 yrs)	>7 female; >8 male	>2 female; >2.4 male	15-20, 20-30, 30-40, 40-50, >50

Table reference: Arivazhagan, C., & Sukumar, R. (2008). Constructing age structures of Asian elephant populations: A comparison of two field methods of age estimation. *Gajah*, 29, 11-16.

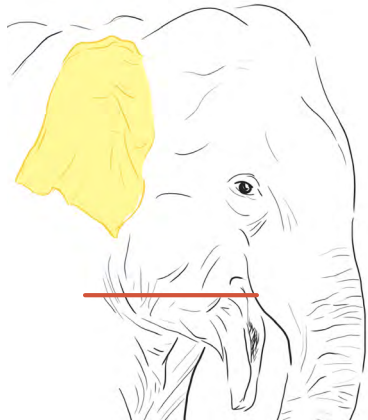
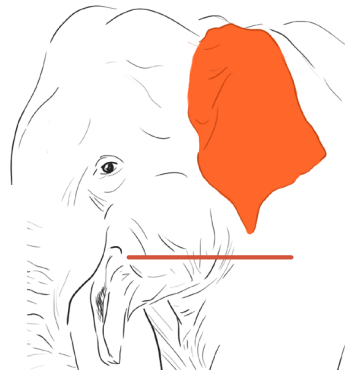
Size of the ear

Size of the ear can be based on the length of the lower lobe (lower tip) in relation to the lower jaw line.



1. Up to the level of the jaw or below the jaw level (Big Ears)

2. Little above the jaw (Medium)

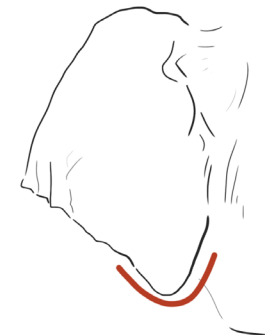


3. Well above the jaw level (Small Ears)

Ear lobe



Angled tip



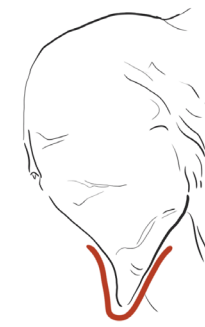
Rounded tip



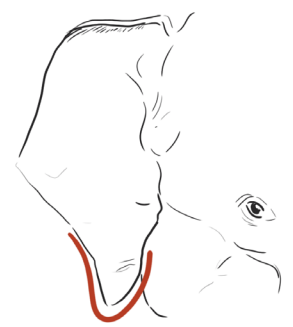
Large rounded tip



Curved tip

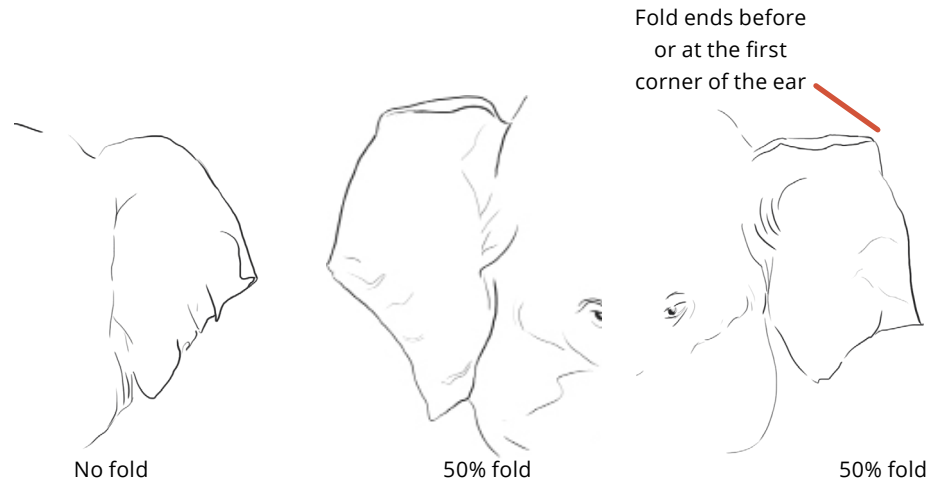


Loop tip

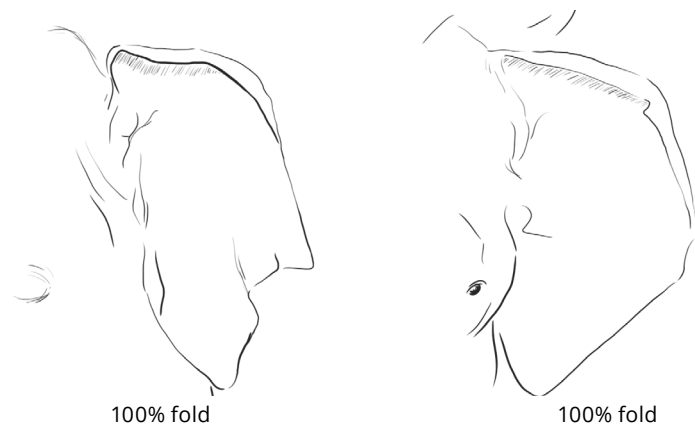


Mix between curved & loop tip

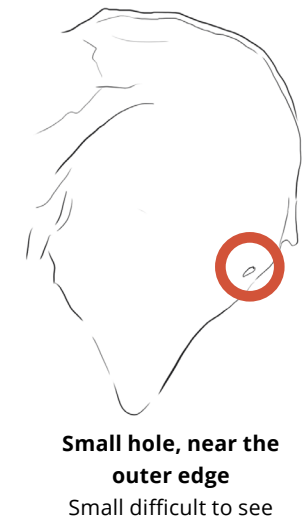
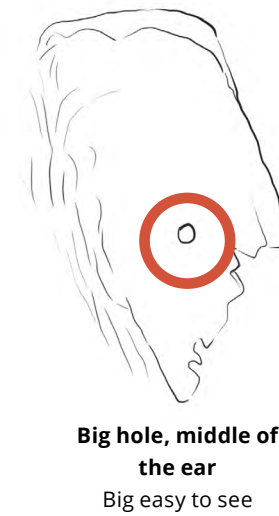
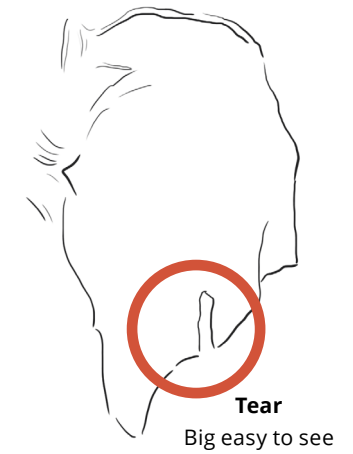
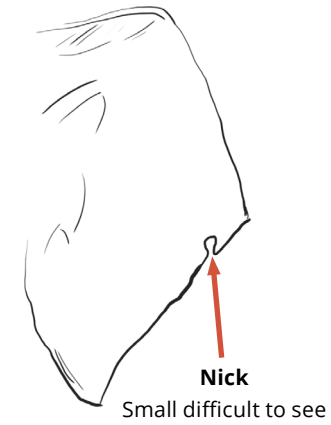
Top edge of ear:



In 100% fold, the fold extends beyond the first corner of the year, as shown in these two images.



Recording marks on ear:



Appendix II: Salient points to be observed/ check list of samples to be collected by the on-site veterinarian during suspected electrocution deaths



Loose ear flap
Big easy to see



Lot of marks easy to
Identify, photograph crucial

1. Determine the source of the electrocution: high tension wire in the vicinity, malicious wire connection nearby, DC current-using generators, leakage from any electrical source nearby like industries, factories, domestic connections, history of lightning in the area recently, etc.
2. Forest Department must create a barrier and cordon off the area to preserve signs of electrocution like singed grass, zig zag marks on the ground during high electrocution in lightning. An area of about 50 feet radius from the carcass should be cordoned off by caution tape and trampling of the ground avoided as far as possible.
3. The points by which electrical charge entered and exited the elephant should be located if possible. The tip of the trunk, dorsal part of the trunk, tongue, foot pads and external ear pinnae are vulnerable areas and should be carefully examined.
4. If any singed area or burn marks are observed, however minute it may be, that area (including both the epidermis and dermis) and the surrounding tissue must be collected together in 10 % formalin for histopathological examination.
5. Metallization of ear pinnae and other parts of the skin should be observed.
6. Singing and peeling off of foot pads are sometimes seen in case of lightning strikes.
7. If lightning strikes are suspected, then signs of damage to nearby trees and other animals should be checked.
8. Signs of instant deaths like forage in mouth, unusual sternal recumbency, adults lying dead over calves should be recorded.

Appendix III: Mandatory samples to be collected for all post-mortem for toxicology analysis:

Samples must always be screened for four of the most commonly used compounds: organophosphates, organochlorine, synthetic pyrethroids and carbamates. Other compounds should also be screened as per the laboratory capacity and availability of resources.

1. Stomach content (500 to 1000 gms) in saturated common salt solution in preferably a glass jar (or plastic jar if glass is not available).
2. Intestinal content (500 to 1000 gms) or the loop with both ends sealed with thread in saturated common salt solution in preferably a glass jar (or plastic jar if glass is not available).
3. A piece of liver and kidney (minimum 500 gm) in saturated common salt solution in preferably a glass jar (or plastic jar if glass is not available).
4. For suspected cyanide toxicity, all the above mentioned samples must be stored in glass containers and immediately despatched to the Forensic Laboratory on ice.

Appendix IV: Standard register for the barrier maintenance committee

FUNDS COLLECTION REGISTER						
Village name:				Number of households in village:		
Type of barrier:				Maintenance cost:		
				Frequency of collection:		
Contributions:						
	Name	Land size	Amount contributed	Signature of contributor	Signature of collector	Date
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

Appendix VI: Trench maintenance checklist

TRENCH MAINTENANCE CHECKLIST						
Location of trench:						
Trench set up on:						
Sl no.	Date	Check for vegetation	Actions taken to clear vegetation	Check for trench caving in	Actions taken to repair the trench	Person in charge
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						

Appendix VII: Budget table template

S.No	Component Name	Quantity	Rate	Amount
1	G I Wire and Binding wire			
2	Solar Panel			
3	Battery			
4	Energizer			
5	Gate Spring and Gate handle kit			
6	Double insulated cable			
7	Insulators (Reel and Corner)			
8	Fence Technician			
9	Console box for battery and energizer			
	Total Amount			

List of Abbreviations

A	Ampere - unit of electric current
ACF	Assistant Conservator of Forests
ADS	Anti-depredation squad
Cr.	Crore
CrPC 144	Section 144 of the Code of Criminal Procedure
CWLW	Chief Wildlife Warden
DCF	Deputy Conservator of Forests
DFO	Divisional Forest Officer
DNA	Deoxyribonucleic acid - a self-replicating material that is the carrier of genetic information.
EDC	Eco-Development Committee
HEC	Human-elephant conflict
km	Kilometre - unit of length
m	Metre -unit of length
MoEFCC	Ministry of Environment, Forest and Climate Change
NGO	Non-governmental organization
PCCF	Principle Chief Conservator of Forests
ROP	Recommended Operating Procedure
RRT	Rapid Response Team
V	Volt - unit of electric potential difference

What should we do to deal with human-elephant conflict?

We are facing an HEC-related emergency situation

Recommended Operating Procedure (ROP) for Dealing with Emergency Situations of Human Elephant Conflicts
page 4

Part 1: Emergency field management of human-elephant conflict
page 28

We are working with communities facing chronic human-elephant conflict

Community members are not successfully working together to mitigate conflict.

Part 2: Developing community institutions to manage and reduce human-elephant conflict
page 56

The community(ies) have effective institutions to mobilize against conflict, but they don't have barriers to reduce HEC.

Part 3: Selecting and constructing legal and safe barriers to mitigate HEC
page 72

We are dealing with elephants that repeatedly break barriers, even if they are well-maintained

Part 4: Managing individual elephants engaged in repeated human-elephant conflict
page 90

We are not yet systematically collecting data for every HEC event

Part 5: Data collection for human-elephant conflict
page 115

