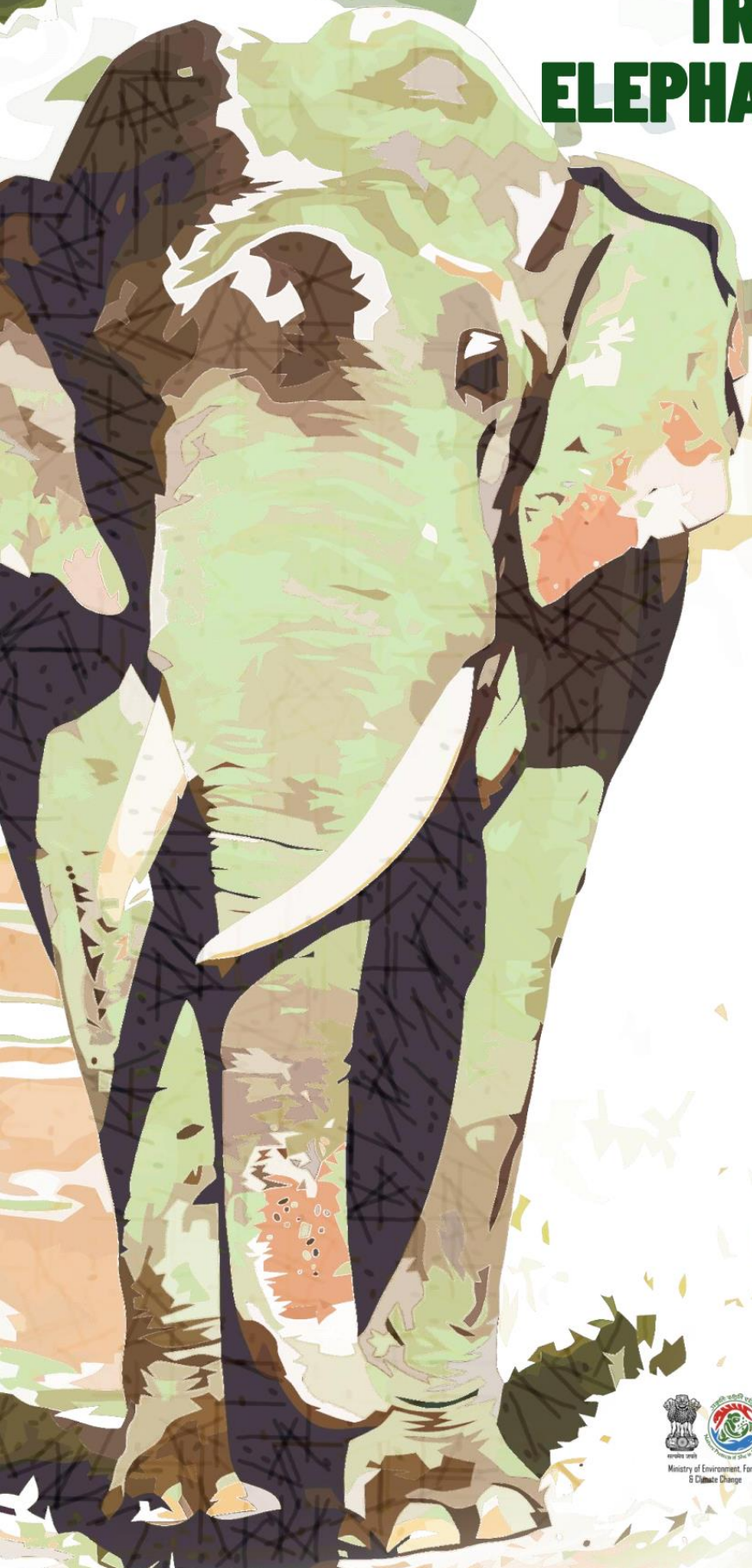


RECOMMENDED OPERATING PROCEDURE CAPTURE AND TRANSLOCATION OF ELEPHANTS IN DISTRESS AND CONFLICTS



भारतीय वन्यजीव संस्थान
Wildlife Institute of India

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PREFACE

Long-term conservation of elephants, in the present scenario rests on effective management of human-elephant conflicts since elephant habitats share a long interface with human-use areas. To mitigate such conflicts a variety of management strategies are used in different contexts. Sometimes, escalated conflict situations may warrant interventions such as capture, immobilization, relocation and translocation of elephants. Further, elephants that are in distress may also require capture and immobilization for medical intervention. Thus, procedures like chemical and physical restraint, relocation, and translocation of elephants are essential components of field management. However, safely carrying out these procedures in the field requires a high level of expertise, experience and usually involves team effort. Since the safety and welfare of both the animal and personnel involved is of paramount importance, continuous training and capacity enhancement are important. Sporadic untoward incidences of serious nature such as deaths and injuries of personnel involved, and the elephants have been reported from across the country emphasizing an urgent need to focus on capacity enhancement. The Project Elephant accorded priority to capacity enhancement of the field veterinarians and frontline personnel and conducted many specific training programs during the last few years. In addition to such training programs, the Project Elephant also underscored the need to have ready-reference documents that can be referred by the field personnel when need arises in the field. During the year 2022, the Project Elephant along with the Elephant Cell at Wildlife Institute of India came up with a comprehensive book “Caring for Elephants” which has chapters specifically on chemical immobilization and transportation of captive elephants. This book is freely disseminated and has now emerged as a standard reference material for captive elephant management.

The essential components of capture, translocation and transportation of wild elephants that the field personnel could readily refer to were still missing. Thus, with an objective of preparing a Recommended Operating Procedure (RoP) for safely carrying chemical restraint, relocation and translocation of wild elephants, the Project Elephant constituted a technical drafting committee. The said committee co-opted three additional members to expand the scope of the RoP. Since inception, the committee has been actively deliberating on matters related to elephant capture, translocation and its administrative aspects.

The RoP comprises 8 technical chapters along with a lucid summary that deliberates on different aspects of wild elephant chemical and physical restraint and translocation options. Chapters 1 & 2 provide an overview on basic elephant biology, its ecological needs and aspects of human-elephant conflicts in the Indian context. Chapter-3 provides insights on the administrative considerations pertaining to elephant capture. Chapter-4 elaborates on the techniques for individual identification of elephants in the field. Chapter-5 is an elaborate account on chemical immobilization techniques relevant to wild elephants. Chapter-6 discusses the range of options to choose from when taking decisions regarding elephant captures. Chapter-7 provides details on the range of human risks possible during an elephant capture operation and options to mitigate the risks. Chapter-8 deals with essential considerations involved in transporting wild elephants.

The drafting committee has put in dedicated efforts in coming up with the RoP, which, I am sure will be an important reference manual for the field personnel. Following the procedures outlined in the RoP can go a long way in enhancing the safety aspects of field operations. I sincerely thank the drafting committee for their earnest efforts, and I am hopeful that field officers will make best use of the RoP.



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PROLOGUE

From a veterinary perspective, due to its massive size and unique anatomical features, an elephant is an intricate animal posing challenges even for well-trained personnel to carry out interventions like chemical and physical restraint, as and when such situations are warranted. Despite an advancement in effective immobilization drugs and remote delivery equipment during the last few decades, there are still many essential field considerations that personnel involved in operations such as capture, and translocation must know for effective planning. An out-of-control operation can have fatal consequences for both the animal and the personnel involved. Thus, any intervention related to wild elephants must be carefully planned by involving competent professionals. Physical and chemical restraint, and transportation of elephants for management purposes like rehabilitation, relocation, translocation and research-related purposes are a combination of art and good science, and further shaped by experience. Since India harbours the largest Asian elephant population in the world, field interventions for a variety of reasons are inevitable. As such interventions are inherently risky, minimizing the operational risks assumes a high priority.

It is thus timely that Project Elephant has taken due cognizance of the vital importance of training of field personnel on aspects related to elephant capture and transportation. As an important step in this direction, Project Elephant constituted a Technical Committee to come up with a Recommended Operating Procedure (RoP) to guide safe field execution of elephant capture and translocation operations. The Committee comprises highly experienced field officers, veterinarians and field biologists. The right composition of the Committee was critical to consider all possible considerations underpinning elephant capture operations. The Committee has been active since day one and there were many formal and informal meetings to deliberate on the chapters and the overall content of the RoP. The Committee members took up responsibility to draft individual chapters, which were all collated and subsequently reviewed by all the members collectively to improve the overall scope. The RoP was further improved based on timely, but in-depth reviews by Dr. Sanjay Srivastava, Former PCCF & CWLW, Government of Tamil Nadu and Dr. Sushant Chowdhury, Former Senior Professor, Wildlife Institute of India. As a chairman of this Technical Committee, I am thankful to all the Committee members for sharing their vast experience and knowledge that proved vital to prepare the RoP.

I am hopeful that the ROP will be widely disseminated for the benefit of field practitioners, who are in the forefront of managing elephants in the field.



Parag Nigam, PhD

Scientist G, Wildlife Institute of India
& Chairman, Committee for Formulating
ROP: Elephant Capture and Translocation



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Chapter-1

Introduction

1.1 The Species

- Elephants are mega-herbivores of the Order Proboscidea and the family *Elephas* (*Elephantidae*). The Asian elephants (*Elephas maximus*) are highly endangered, with a global population of less than 50,000 in the wild. They occur in 13 Asian countries, with India holding more than 50 to 60% of the global population. In India, the current estimated population is nearly 30,000 elephants in the wild in four distinct regions, namely Northern, Northeastern, East-central and the Southern region. Besides, there are also about 2,800 elephants maintained in captivity.
- Elephants are monogastric, hindgut fermenters with a relatively simple digestive system. Being an obligate herbivore, elephants feed on a variety of plant parts, including roots, stems, bark, leaves, fruits, flowers, and buds. They are both grazers (feeding on grass) and browsers (bark and other plant parts). Elephants in Asia predominantly occur in tropical forests and associated ecosystems, where they feed on 100–500 different plant species. Elephants have a relatively poor food assimilation rate of around 40 to 50%. They are bulk feeders and do not possess the foregut fermentation chambers. Instead, elephants use their large intestines and the caecum to ferment food to obtain energy.
- In India, elephants occur in a variety of vegetation types that include tropical dry and moist deciduous forests, evergreen forests, grasslands, dry scrub, and other associated natural vegetation. Elephant home ranges are large, spanning 100–3000 km² with profound inter-seasonal variation in the availability and use of habitats within their home ranges.
- Elephants are sexually dimorphic, with adult males substantially larger than the females. Males and females have diverse life-history strategies. Female herds live in a complex social organization characterized by fission and fusion of groups. Generally, elephant society is multi-tiered, comprising basic family units (mother and its offspring), bond-groups (joint families), and clans (extended family units) forming populations. Males usually disperse from the natal group upon attaining puberty (>10 years). Such dispersing males can associate with other males, forming all-male groups, and eventually establish their home ranges as adult bulls.
- Female elephants start reproducing when they are about 15 years of age and continue to reproduce until they are well into their 60's. Adult females that are not lactating and pregnant, may come into oestrus once every 100 days for a short duration of 3–4 days. In a growing population, more than 30 to 40% of elephants would be adult cows.
- Elephants are deeply ingrained in the Indian culture and are notified as India's national heritage animal.
- Elephants are protected under Schedule-1 of the Indian Wildlife (Protection) Act, 1972 and are listed as "Endangered" in the IUCN Red List.
- Among the myriad conservation challenges facing elephants, human-elephant conflict (HEC) is the most significant. The HEC involves a two-way interaction between elephants and people with potential negative consequences. HEC can pose a serious threat to local livelihoods, which in turn can erode support for elephant conservation, therefore minimizing it is crucial.
- While HEC is widespread across the entire elephant range in India, in certain landscapes, the problem is acute.



1.2 Background for the RoP

The HEC is a longstanding conservation challenge throughout the extant range for Asian elephants. The underlying reasons for HEC are complex and could involve the interplay of numerous factors. Judicious and timely HEC management is critical for ensuring continued support for elephant conservation. While many conflict mitigation options are available to address elephant conflict with people, interventions such as the capture and translocation of elephants often becomes inevitable, particularly when the lives of elephants and people are at risk. “**Capture**” denotes the chemical and physical restraint of elephants. “**Translocation**” denotes the human-mediated movement of elephants from one location to another. Since elephants are large animals with complex social systems and highly specialized anatomical and physiological attributes, operations such as capture, and translocation present a challenge. Further, such intrusive operations pose considerable risks to both the personnel and elephants involved. Minimizing those risks is imperative, underscoring the need for a Recommended Operating Procedure (RoP), which can guide field personnel while carrying out elephant capture and translocation operations.

1.3 Purpose and Scope

The need for capture (chemical and physical restraint) and translocation of elephants from the wild could arise from a variety of circumstances. The RoP would be relevant and useful in guiding decision-making and carrying out the operation. Since elephant capture operations are highly challenging and require the careful consideration of many intricate, technical aspects, it is important to have a ready reference document. Lately, increasing HEC in various landscapes has resulted in many elephant capture and translocation operations. A few of those operations have become untoward, compromising both human and animal safety.

The ‘Project Elephant’ has taken cognizance of the increasing need for a ready-reference manual to guide field personnel and constituted a technical committee comprising reputed veterinary professionals, experienced field managers, and biologists to draft the RoP. The document is a result of numerous structured deliberations by the committee. The committee members contributed individual chapters, which have been collated and succinctly summarized. The overarching purpose of this RoP is to lay down the procedures that will guide the field teams to (i) plan elephant capture or translocation operation in the field and (ii) minimize the risks associated with the operations through careful planning and execution. The RoP is applicable to all field situations involving elephants, capture using chemical or physical restraint, and the translocation of wild elephants, regardless of the administrative jurisdiction of the land.

1.4 Administrative Responsibilities

Permission for the capture or translocation of an elephant is provided by the CWLW on a case-to-case basis under the provisions Section 11(1) (a) of the Indian Wildlife (Protection) Act, 1972, “*capture or translocation can be done if the elephant has become dangerous to human life or is so disabled or diseased as to be beyond recovery*”. Captured wild elephants can be kept in captivity only if the CWLW is satisfied that such animals cannot be rehabilitated in the wild and the reasons for the same are adequately recorded in writing. Thus, adequate documentation of the events preceding elephant capture and translocation is of paramount importance.

In the case of the elephant Reserves, the respective Controlling or jurisdictional officer (CF/CCF) managing the elephant Reserve would be responsible for coordinating the field operations. For the Protected Areas (National Park/Wildlife Sanctuary/Conservation and Community Reserves) and



the Territorial Forest Divisions, the concerned manager or the divisional officer (DFO/DCF/WLW) will be responsible for the operation. For areas with overlapping administrative jurisdictions, such as a PA/territorial division occurring within the ER, a team of officials comprising of respective area managers/ divisional officers led by a chairperson (Controlling/ jurisdictional officer or senior most of the team) will lead the operations.

Essential Considerations

Before embarking on a wild elephant capture or translocation operation, it is pertinent to deliberate on these four questions.

- Is the elephant capture essential?
- Can the operation be carried out safely?
- What could go wrong during an operation?
- Can the required resources be mobilized?

Elephant capture, translocation, and other handling processes involve a substantial risk to the animal, the personnel involved and even to the public. A poorly executed capture and translocation can significantly compromise the welfare of elephants over short-term and in the long-term as well. The success of translocations often depends on a wide range of diverse ecological, technical, and human-related factors and their interplay. Thus, careful consideration of the following points is relevant:

- i. Defining the rationale/justification for carrying out an elephant capture/translocation operation
- ii. Budgetary considerations to be worked out before starting the operation
- iii. Constitution of a competent field team to carry out the operation
- iv. Legal requirements, including necessary permission for capture and translocation
- v. Pre-capture monitoring of elephants
- vi. A thorough assessment of the terrain to take stock of risky areas where untoward incidences are likely
- vii. Reconnaissance surveys involving the entire team and including a mock drill prior to the operation
- viii. Establishment of Emergency Response Mechanism including Mitigation hubs/ Control room/ Helpline/ RRT/ PRT personnel/ ADS Squad/ *Kumki* elephants
- ix. Planning field logistics including food, accommodation and other essentials for the team
- x. Protocol for disease screening, sample collection, and morphological measurement of the captured animal/s, if appropriate.
- xi. Community involvement and fostering better PR management.
- xii. Preparedness for medical emergencies for both people and elephants



Human-Elephant Conflict in India: An Overview

The Human-Elephant Conflict (HEC) refers to a range of negative interactions between humans and elephants that result in adverse effects on each other. From a human perspective, such adverse impacts include human injuries and fatalities, the loss of cultivated crops, livestock, and other property, and numerous forms of indirect losses that affect the economic, social, and emotional well-being of affected communities. Like people, elephants also face numerous adverse effects as a result of HEC that compromise their welfare and also impact their social lives, behavior, and interactions with other species. In India, HEC is attributed to the loss of over 500 human lives annually, in addition to several non-fatal human injuries, emotional trauma and long-term psychological impact. Over 100 elephant lives are also lost to HEC annually, primarily due to crop-guarding measures. Considering the social, economic, political, and ecological effects of HEC, addressing it has gained paramount importance in the country. While there could be several diverse drivers of HEC, the effect of habitat loss (which includes degradation) in determining conflict is often high. In the Indian context, a steady increase in the human population, followed by physical infrastructure development, mining projects, urban development, economic aspirations, and concurrent changes in land use patterns has affected the inherent quality of elephant habitats. Further, elephant habitats are continuously becoming insular due to the loss of habitat connectivity and incompatible land-use areas around forests. Thus, the combined effect of these changes over time has led to an increased human-elephant interface, amplifying the frequency of negative interactions between them. Alongside changing human lifestyles and values, diminishing empathy for wildlife and adverse perceptions about wildlife can compound the problem of HEC. Further to this, development in telecommunications has improved the overall reporting on HEC thereby increasing the perception that the problem is drastically increasing.

2.1 Common HEC Situations

Different conflict situations involving elephants may arise in the field. It is important to understand that each situation described below is unique, and that different management interventions may be required. Assessing each situation closely is the first step in conflict management. Some situations may require minor interventions, such as carefully monitoring the elephants. Some of the common situations that may escalate and warrant major interventions in capture or translocation are as follows:

- i. A group of elephants / solitary bulls / all-male group of elephants feeding on agricultural crops in open fields with better visibility
- ii. A group of elephants / solitary bulls / all-male group of elephants feeding on horticultural farms (orchards) / plantations with poor visibility.
- iii. Elephants moving through fields, but not feeding on crops.
- iv. A group of elephants/loners/bull group is in and around the vicinity of human habitations.
- v. Elephants that have strayed into a town/city/densely populated area
- vi. Human injury or death due to elephants in the forest/human habitation/urban areas
- vii. Damage to harvested and stored agricultural crops, often accompanied by damage to the storage facility.



- viii. Damage to property such as sheds, houses, pipelines and irrigation n facilities.
- ix. Death/ injury of livestock and other domestic animals
- x. Injury and death of elephants due to electrocution by power lines or train collision or poisoning mostly caused by a retaliatory action by humans.
- xi. Abandoned/ orphaned elephant calves that are injured and in need of rescue.

2.2 Commonly Used Conflict Management Strategies in India

HEC is a relatively well-researched topic. Consequently, voluminous literature in the form of peer-reviewed publications and reports is available on the different approaches used in resolving HEC in the Indian context. Additionally, the MoEFCC has also issued guidelines and best practices on mitigating HEC from time to time (PE-WII 2022). In particular, the MoEFCC-WII-WWF and MoEFCC-GIZ guidelines on HEC management are available as a ready reference and describe several management options. The broad overview of major HEC mitigation approaches adopted in the country are provided below.

- i. Reducing human impact on elephant habitats to recover natural vegetation and increase ecological carrying capacity through measures such as habitat consolidation, voluntary resettlement of villages from vulnerable/ critical areas, promotion of alternative livelihoods to reduce forest dependence, etc.
- ii. Identifying and restoring elephant corridors, which are narrow strips of land connecting otherwise disjunct elephant habitats. In the absence of corridors, elephants would be forced to use human-dominated areas, perpetuating HEC. Thus, identifying and restoring elephant corridors including the acquisition of private land is an important conflict mitigation strategy.
- iii. Improving habitat conditions through effective management of invasive weeds, regulating forest fires, soil and moisture conservation activities, judicious surface water management, and managing critical microhabitats like swamps and grasslands.
- iv. Judicious use of psychological and physical barriers like solar-powered fences, tentacle fences, rubble walls, and elephant-proof trenches along the interface areas to minimize elephant ingress into human-use areas. In areas where elephants regularly challenge these structures, the use of high-specification barriers such the steel-rope fences, railway line barricades, and concrete structures is being experimented with.
- v. Innovative local repellent techniques like honey-bee boxes, chilly ropes etc. have also been piloted, and customized to enhance their effectiveness while ensuring their wildlife-friendliness. New repellent methods also include the sound of bees/ carnivores/ drones etc. besides deterrents like trip / sensor-based alarm system.
- vi. The use of trained captive elephants called *Kumkis* remains an important and effective conflict mitigation strategy in many States. *Kumki* elephants have proven to be a relatively safe and indispensable asset in managing conflict situations involving guiding elephants back into forests and in capturing elephants in HEC situations.
- vii. Development of village-level rapid response teams to address emergency HEC situations.
- viii. Use of participatory early-warning systems to avert negative interactions between elephants and people. In the human-dominated areas, early warning is an important way of mitigating conflict.
- ix. Monitoring elephants with technological advancements such as radio and satellite collars can provide real-time information on elephant movement besides providing an overall perspective on movement patterns and behavioral aspects of elephants.
- x. AI-based elephant detection cum aerial surveillance using drones. In relatively open habitats, particularly in human-dominated areas, drones can be useful in locating



elephants so that their movements can be tracked. Drones are now used actively by many State Forest Departments in HEC mitigation efforts, as drone tracking has an edge over manual tracking in some situations.

- xi. Reducing the impact of HEC on health and overall well-being of the affected humans by various compensation measures (ex-gratia payment), insurance schemes, conservation linked easement and performance payments etc.
- xii. As an extension of effective land-use planning in conflict management, some of the states have started zonation of the landscape to identify areas to be demarcated as priority areas for conservation, conflict-mitigation, and human welfare, respectively.
- xiii. In the human-dominated areas, adopting effective garbage management practices assume greater importance since elephants can get attracted to these sites to feed on organic waste.
- xiv. Enhancing the institutional capacity to better manage HEC stands important. This also includes strengthening the role of key stakeholders, community awareness, and communication measures to reduce the risk of accidental encounters and retaliation. Similarly, capacity enhancement of field personnel and frontline staff assumes critical importance in improving long-term efficacy of conflict management strategies.
- xv. Systematic research and monitoring of elephant population density, demography, social and ranging patterns, and general ecology in high conflict areas to provide insights useful to management and addressing HEC.



Administrative Considerations in an Elephant Capture Operation

Capturing, relocating, or translocating elephants involves myriad risks and challenges. There are also considerable financial costs involved in the operation. As elephants are long-lived, considerable recurring expenses would be incurred annually for holding and maintaining elephants in captivity. All these should be carefully thought out before taking decisions regarding the capture, translocation, relocation, and retention of elephants in captivity. Additionally, a few essential points need careful consideration before embarking on a capture or translocation operation. Such operations require technical knowledge, administrative efficiency, an interdisciplinary team, and effective coordination on the part of field managers. Some of the key points to be considered are as follows:

3.1 Justification for Elephant Capture

Capturing a wild elephant ought to be the last resort, carried out in inevitable circumstances. The decision to capture or translocate a wild elephant could emanate from a wide range of circumstances. In general, the following causes can be attributed to such captures (besides common HEC situations mentioned in 2.1):

- i. Elephants identified as perpetually aggressive and posing a regular and unmanageable threat to human life may be captured. While property and crop loss due to elephants have some level of local tolerance, human deaths and injuries would require immediate intervention.
- ii. Elephants with debilitating injuries that would require life-long human care may have to be captured in the interests of animal welfare.
- iii. Elephants that are sick and disabled and operate in human-use areas may be captured for treatment. The local management makes an informed decision to intervene for treatment and subsequently releases the animal back in the wild (if the animal is fine) or retains in captivity (if survival prospects for the animal are poor in the absence of human care).
- iv. Elephants exhibiting chronic behavior problems, such as causing property damage in human-dominated areas, frequently entering densely populated human-use areas may be captured after due deliberation with reliable data and facts obtained in the field.
- v. Young elephants separated from the herd, which, despite efforts, do not reunite with the herd (for unknown reasons) and cannot survive on their own, may have to be captured.
- vi. A small, isolated group of elephants occurring in small and insular habitats (criteria for small and insular may be defined based on average elephant home ranges) with poor long-term conservation potential may also be translocated to viable elephant areas.
- vii. In summary, landscapes where elephants do not have good quality habitat and consequently, conflict levels with local people are disproportionately high, capture and translocation may become inevitable. Similarly, in situations where human livelihood concerns and safety take precedence over short-term conservation gain for elephants, capture and translocation may be necessary. Precursors for such capture decisions entail reliable field data and proper appraisal of the site conditions by involving field staff, local villagers, veterinary professionals, biologists, and other relevant stakeholders. Such decisions should also be guided by systematic monitoring, and should not be based on

cursory, unverified reports and claims. The CWLW and the officers nominated by the CWLW are responsible for deciding on elephant capture as a tool to mitigate HEC.

3.2 Administrative Steps Involved in Elephant Capture

Any operation to capture or translocate wild elephant/s from HEC areas comprises of the following:

- i. A field report from the concerned DFO/DCF/WLW of the Forest Division/PA to the jurisdictional CCF/CF amply justifying the need for elephant capture. The justification should be backed by data and facts collected in the field. The field report should also be accompanied by a financial proposal explaining the potential costs involved in the capture operation. If the elephant captured is planned to be maintained in captivity, the annual costs involved in maintaining elephant in the camp may also be indicated.
- ii. Based on the merit of the field report as stated before, the jurisdictional CCF/CF will submit a recommendation to the CWLW of the State.
- iii. Based on the field report prepared by the DCF/DFO and subsequently recommended by the CF/CCF, the CWLW of a state may issue “permission” for the capture of wild elephant/s involved in HEC under Section 11 (1) (a) of the Wildlife Protection Act, 1972.
- iv. In the permission letter, the CWLW would indicate whether the animal earmarked for capture would be relocated, translocated, or maintained in captivity. The process of capture or translocation, of such an elephant shall be done in a manner as to cause minimum trauma.
- v. Along with the mandatory permission, the CWLW may allocate/sanction the necessary budgetary provision under suitable schemes/heads for the capture and translocation of wildlife elephant/s involved in the HEC.

3.3 Constitution of the “Advisory Committee”

Upon receipt of approval for capture from the CWLW, it is desirable to constitute an advisory committee that can guide management actions relevant to execute the elephant capture operation. The Advisory Committee will evaluate the conflict situation at the site and use all reliable information available to come up with the best possible decision to reconcile the interests of human-welfare and elephant conservation. The Advisory Committee should be constituted before embarking on the decision to capture an elephant. The Advisory Committee would also monitor the capture operations daily and submit a detailed report to the CWLW upon completion of the task. The suggested members for the committee are provided below

S.No	Official	Role
1	Jurisdictional CCF/CF	Chairperson
2	Manager of the Protected Area/Jurisdictional DFO/DCF	Member Convener
3	Representative from NGO/Civil Society Organizations with local knowledge	Member
4	Representative of the Local Gram Panchayat	Member
5	Experienced veterinarian with considerable elephant-specific expertise (even if senior veterinarians are not available at the site, it is desirable that every elephant bearing state constitutes a panel of veterinarians for emergency consultation)	Member



3.4 Constitution of the “Field Capture Team”

For carrying out an elephant capture operation, a well-defined team with clearly stated roles and responsibilities would be critical. The “Field Capture Team” is a technical team, which executes the task of capturing and moving elephants on site. The Field Capture Team works under the direct supervision of the Advisory Committee on matters related to administrative decisions. The Field Capture Team may be constituted with the following team members:

S.No	Official	Role
1	Jurisdictional DCF/DFO/WLW	Chairperson
2	Jurisdictional SDO (ACF)	Field Coordinator
3	The jurisdictional RFO/FRO/RO and other sub-ordinate staff	Member
4	Wildlife researcher/biologists (desirable)	Member
5	Local veterinarian, assistants and the entire veterinary unit along with another qualified veterinarian identified by the DFO/DCF from adjoining area for assistance	Members
6	Trained and qualified licensed shooter duly authorized by the CWLW for supporting the veterinarian in darting the animal (need based)	Member
7	Mahout, Kavadi and assistants of <i>Kumki</i> elephants deployed for capture operation	Members
8	Animal keeper from nearby zoo or rescue center with experience in working with elephants (if available)	Member
9	Around 5 to 8 trained/experienced trackers would be required for ground-tracking the elephants. While expert trackers are critical, it is important to include local trackers as well in the team, as they will be familiar to the local conditions	Members

3.4 The Role of Line Departments

To execute elephant capture and translocation operations safely, the involvement of line departments is critical, particularly when the operation is carried out in human-dominated areas. Active inter-departmental coordination can minimize the risks associated with elephant capture operations. Line departments and their potential roles during elephant capture and translocation operations are as follows:

- i. **Revenue Department:** The role of the deputy commissioner/collector or the representatives assumes importance when elephant capture or translocation operations are carried out in human-dominated areas. This includes mobilizing support from other line departments such as the Police, Animal Husbandry, Electricity, Highways, and Fire Services. The role of the collector is also important in alerting Government Hospitals for handling emergency situations.
- ii. **Police Department:** When elephant capture and translocation operations are carried out within village limits, urban and peri-urban areas, the support of Police Personnel is essential in maintaining the overall law and order. Similarly, in sensitive locations with recurrent HEC where people and some vested interest groups could agitate, Police Department should maintain law and order so that the elephant-related operation can be carried out safely. In difficult situations such as elephants entering crowded areas with potential life threats to people, Police could invoke the provisions under section 144 of the Cr. PC to limit needless mobility and crowding of the public to have better control over the



situation. When operations are to be carried out within city limits, the Para-Military Force can assist the Police Department in ensuring the overall law and order situation.

- iii. **Fire-Service Department:** The Fire Department is trained to deal with emergencies. The fire service personnel are also trained and equipped to conduct animal rescue operations. Thus, the role of the fire service is to help the Forest Department during emergencies by arranging equipment like cranes, power ladders, and water hydra pumps and guide the Forest Department in effectively using them in select situations.
- iv. **Electricity Department:** The primary role of the Electricity Department (and agencies under them, including the power distribution companies) is to monitor sagging transmission lines and similar infrastructure in elephant areas. They may have to switch off the supply during capture and transport, as and when appropriate, to prevent the electrocution of elephants and personnel involved in the operation.
- v. **District Disaster Response Force:** This is a special force available in certain states with experience in handling disasters and emergencies. The intended role of the disaster response force is to assist the Forest Department during emergency situations by providing support in evacuating people from vulnerable areas.
- vi. **State Veterinary/Animal Husbandry Department:** The State Veterinary/Animal Husbandry Department needs to be actively involved in elephant capture and translocation. Their role is to help the capture team in all aspects of capture operations since the Animal Husbandry Department usually have qualified veterinarians who can be mobilized during operations that are large-scale in nature. They can also ensure the availability of emergency drugs, restraining equipment, and related supplies necessary for both capture operations and treating injured and sick elephants. Their support can also be crucial in providing palliative care for sick, injured, and weak elephants.
- vii. **The State Health Department:** Medical health service personnel must be briefed beforehand and involved during elephant capture and translocation operations considering potential risks to the personnel involved. The Health Department's role is to ensure the availability of duty doctors, nursing staff, life-saving emergency drugs, ambulances, stretchers, and bed facilities in the local clinics and Government hospitals in the district to deal with emergencies. Such readiness can increase the response time so that critical time is not wasted.
- viii. **Local Bodies and Autonomous Councils:** The local Gram Panchayat President, Gram Panchayat members, Sarpanch, village leaders, farmers' union leaders, autonomous council representatives etc, play a vital role in the management of HEC, and particularly during difficult operations such as elephant capture and translocation. Their primary role is to act as a bridge between the public and the Forest Department so that field operations can be conducted smoothly. They may additionally help in mobilizing resources such as water, fodder, and other local supplies.
- ix. **Production Sectors:** There could be conflicting situations in the landscape involving various production sectors like tea-coffee estates, hydro-thermal projects, mining areas etc. and therefore the presence of personnel from these sectors would be essential in the management of the HEC.

Procedures may be laid down in each forest division/ district to ensure timely coordination amongst the various response teams from the forest department and other line departments and agencies.



3.5 Assessment of Elephant Behavior

- i. Elephants that have moved/strayed into human-use areas with high human densities may be tracked continuously to minimize disturbances, avoid stress in the animal/s and allow it to stay calm. Immobilizing an agitated elephant is always challenging due to altered durations in drug efficacy.
- ii. Elephant associations and movement patterns are important to record. Association patterns entail recording the presence of other elephants along with the target individual. The association data can be very useful in planning elephant capture operations as the target animal may move along with the other elephants. Such a situation would require careful planning while approaching the animal, both for darting and post-induction assessments.
- iii. Elephant dung and urine can be examined to get an idea of its diet, body condition, and hydration levels. It can reveal abnormalities such as gastro-intestinal tract ailments such as impaction, diarrhoea/dysentery, endoparasite load and others.
- iv. General parameters such as sex, age-class, physical condition (healthy/weak), physiological status (musth and lactation), social structure (number of animals in the group, age class), social hierarchies (dominant animals, matriarchs, dependent animals), and unique risks such as long tusks should be recorded.

3.6 Assessment of the Terrain

Before starting the elephant capture operation, it is important to assess the terrain features to identify potential areas of risk. Narrow streams with steep banks, precipitous slopes, ridgelines, open water sources, flowing rivers, and very dense vegetation pose an enormous risk to elephants, particularly when narcotic drugs are used as the animals cannot be positioned in sternal recumbency for long. When narcotic drugs are used to immobilize elephants, the ideal posture is lateral recumbency. The field capture team should be familiar with the terrain, mark locations of high risk on the map/toposheet and discuss them with the veterinarians involved in the operation. Some of the risky locations may have to be either cordoned off or adequately manned during the operation.

- i. Elephant locations gathered during the monitoring phase before the start of the operation should be plotted on topographic maps to understand the general patterns of use of the landscape by the elephants. The map should include information on land use, suitable and unsuitable locations such as steep slopes, waterlogged sites, and the presence of tree stumps, etc. Although the elephant may not follow the anticipated path of movement after darting, it is still useful to understand the areas that elephants use regularly.
- ii. The area selected for capture operations should be cordoned off, and outsiders should be prevented from entering the operation site. The ideal site is one that the target elephant visits daily or almost daily. It is also an area where the elephants can be safely approached by the darting team and subsequently monitored until the animal is completely immobilized. Flat areas close to the road, with good access to the road and relatively open areas with vantage points such as watch towers/*machans* etc. are preferred sites.

3.7 Conducting Mock Drills

- i. A mock drill can reveal the response of the team to a field situation. By conducting mock drills, fine-tuning activities assigned to individuals is possible and each member is better informed about the assigned responsibilities. Thus, a mock drill should closely resemble the real situation. Taking elaborate notes during reconnaissance surveys (by the capture team coordinator) and mock drills is critical. The main objective behind



- conducting mock drills is to ensure that the individual roles and responsibilities are clearly spelt out and well-understood by all the team members.
- ii. Season-related factors such as rainfall, flooded rivers, dense bush, slippery surface, leaf litter (which could obstruct foot tracking) oppressive heat, etc. make it difficult to detect tracks and should be recorded during mock drills.
- iii. It is also essential to record sunset and sunrise times so that the duration of the operations and lighting arrangements may be planned. Similarly, forecasts regarding local rainfall should be noted.
- iv. The team should be aware of any local/religious/national holidays around the time of the planned capture and translocation.

3.8 Habitat Evaluation at the Release Site

- i. In areas where HEC is frequent, it is advisable to identify potential release sites for elephants that may have to be captured due to inevitable circumstances. The task of identifying potential release sites can be taken up at the circle level, so that *ad hoc* decisions on translocation can be minimized. The release site should be far from human habitation, and it should be relatively interior in the forest area. Ideally, the release site should be at a sufficient distance (in the order of 200-300 km or greater) such that it is unlikely that the elephant would be familiar with the new site and attempt to go back to the place of capture. The habitat quality, behavioral aspects, demography, and social considerations may form basis for identifying siter for release of the animal.
- ii. The release site should have sufficient fodder, water, and tree cover critical to support the relocated elephant. The identified release site should harbor a residual elephant population to maximize the chances of the released individual/s integrating with the resident elephants/herds.
- iii. There are other major considerations pertaining to elephant demography, behavior and aspects of long-term viability. In areas where HEC is frequent, conducting rapid research to understand the aspects can help in making informed decisions.

3.9 General Logistics Needed for the Operation

In areas where *Kumki* elephants are used for elephant capture operations, a minimum of three to five trained elephants with varied roles can be used. In areas where *Kumki* elephants are not available, equipment and manpower have to replace them. A customized transport truck (ten-wheeler) is required for the transport of *Kumki* elephants and the wild-caught elephants. Each truck can carry just one elephant. Thus, while transporting wild-caught elephants, it is advisable to have a spare truck to carry fodder, and other essentials as enroute supplies. Besides, human resources other equipment and accessories generally required in carrying out an elephant capture and translocation operation are provided in the Table-1 as a ready reckoner.

Table-1: Manpower and materials required in carrying out an elephant capture and translocation operation

SL No	Accoutrements/ Requirements	Purpose	Remarks
1.	Backhoe excavators (JCB)	Useful to clear thorny bush, create roads to inaccessible areas, creating ramps and establishing base camps where required. May be used artfully in areas where <i>Kumkis</i> not available for darting or leading the captured animal	Best to have one or two available on standby for the duration of capture.



SL No	Accoutrements/ Requirements	Purpose	Remarks
		towards transport vehicle from site of capture.	
2.	Cranes	May be used to hoist the captured animal onto transport vehicle.	Minimum capacity of 5-6 tonnes.
3.	Tethering ropes	Ropes made of cotton, jute or nylon (in order of preference) may be used to tie the neck and hind legs of the captured animal for purpose of restraining and leading. Minimum of 4 primary ropes of 100 mts. length would be required	Ensure sufficient length and appropriate tightness to prevent choking/asphyxiation and cutting off of blood supply to extremities.
4.	Metal Chains	Metal interlocking chains are required to ensure safe restraint of animal that may chew/break off the ropes and free itself, especially during transport. A minimum of 2 long chains and 2 short chains is advised.	Ensure chains are of appropriate thickness. Loop the chain over the neck rope to prevent chewing/breaking of synthetic rope. Additional restraint of hind legs with chains with rubber sheathing during transport is advisable.
5.	Water tanker and cans	Large capacity water tanker of at least 1000 Litres to provide water to cool the immobilised animal and drinking water to <i>Kumkis</i> . Water may be distributed in smaller cans and distributed among staff for carrying into site of capture.	Tanker suitable for off road use preferred so that it may be driven as close to the capture site as possible during emergencies.
6.	Knives, machetes, etc.	Sharp machetes to be made available to each group for clearance of bush, cutting ropes and chopping of branches for feeding <i>Kumkis</i> .	Ensure safety at the hands of the carrier. Avoid old, rusty instruments during capture.
7.	Namdha/Gaadhi/ Charpoi/ Cots/ Mattress	<i>Namdhas</i> to be used as primary mattress on elephant back. Provide comfort to both the riders and the elephant	Never use <i>gaadhi/charpoi</i> without a <i>namdha</i> . Do not tie ropes around <i>Kumki</i> elephants without a <i>namdha</i> as it may result in painful bruising, cellulitis and saddle galls.
8.	Trackers	Experienced local trackers numbering 8-10 may be inducted for regular patrolling, locating and Identification of conflict animal.	Every team of trackers may be provided with gunmen for their safety during combing.
9.	Food for <i>Kumkis</i> and staff	It is important to ensure <i>Kumkis</i> and staff are well fed during the operation. For <i>Kumkis</i> dry and green fodder and ration may be provided at the base camp prior to embarking on the operation and before retiring in the evening.	One member of suitable rank may be appointed to ensure logistics of ration provision for the <i>Kumkis</i> and staff.
10.	Drugs and accessories	The veterinarian may oversee arranging or requesting for suitable drugs including emergency medication to be made available for the purpose of safe capture.	Serviced, leak proof syringe projectors/ Dart guns (at least one per team) is advised. Appropriately sized darts and needles measuring 60mm in



SL No	Accoutrements/ Requirements	Purpose	Remarks
			length with or without collar/barb are advised. Scheduled narcotics such as Etorphine may be sourced via proper channel under the authorization from the DFO/CF.
11.	Power Saw	Useful to chop tree stumps and clear bushes. May also come in handy to trim tusks of captured elephant if required.	One or two portable power saws close to the site of capture are sufficient. Ensure availability of fuel to run the saw.
12.	Transport cage	A metal or wood pillared structure, preferably portable or one which can be dismantled and fitted on top of the transport truck.	Provides support in restraining the captured animal. Prevents untoward incidents of truck breakage if animal becomes aggressive. Ensure adequate space for movement of head and limbs of the animal during restraint and access for personnel in the event the elephant assumes sternal recumbency.
13.	Mechanics/ foremen	One or two mechanics or foremen could be part of the team to assist in times of truck breakdown during transport	
14.	<i>Machaans</i>	Portable readymade or wooden log machans are required if the operation requires a wait and dart method of capture. Machaans ensure safety of the staff and prevent stress to the animal during darting.	In states where <i>Kumkis</i> are not available or the terrain prevents approach on foot, machaans are helpful for darting if positioned at strategic locations.
15.	Non conducting poles	Overhanging electrical cables are often a risk to the occupants of the truck especially if they can come in contact with the conductive elements of the vehicle. Tall non-conducting poles at least 20 feet in length may be used to guide such cables away from the vehicle allowing for safe passage.	Despite electricity being turned off by district bodies, overhanging cables continue to be a major risk and require manual removal during transport either to allow passage of vehicle or prevent contact to conductive part of the trucks.
16.	Belts	Four long belts of equal length capable of carrying up to 6 tons body weight.	Useful in hoisting the elephant onto the transport vehicle. Correct placement of the belts is of paramount importance to prevent excess pressure on the chest and should be done under supervision of the veterinarian or experts.



SL No	Accoutrements/ Requirements	Purpose	Remarks
17.	Torches	High power torches for ease of operation during dusk or dawn	One per team member is advised
18.	Collars for elephants	GSM or satellite-based collars with long battery/solar charging for monitoring movement of translocated elephant.	A dedicated team to fit the collar and monitor movements is advised to be present at the site of capture and release to ensure proper fit and functioning of the collar prior to use and after release.
19.	Firecrackers	To scare non-target elephants and wildlife during combing.	One set per team or one set per member should ideally be carried. Use judiciously to prevent incidents of forest fires.
20.	Communication handsets	Long range high frequency communication handsets to maintain contact between teams	8-10 sets per team or one per member advised
21.	Convoy/ spare vehicles	Officers in charge identified to travel with the captured elephant for translocation to ensure safety of animal and personnel, coordination between local police and power board through the journey.	People residing in areas of high conflict may prevent passage or release of captured elephant through their village or wards. A convoy is advised to ensure safe transport and translocation.
22.	Personnel	Adequate number of personnel to be enlisted with specific duties. Avoid overlap of responsibilities to prevent confusion at the time of capture.	Ropers, tethers, mahout, <i>kavaadis</i> , collaring team, etc are to be made aware of their individual responsibilities. The same may be conveyed during mock drills.
23.	Firearms	Usable, working, serviced firearms with adequate cartridge ammunition to be made available to licensed, trained gunmen for safety during operation.	Ensure firearms have been tested and user is experienced in handling the same. Constant communication between teams important to prevent incidents of crossfire.
24.	Geo/ Topographic maps	Topographic sheets are helpful in understanding terrain and extent of area to be combed and should be readily available for planning and execution of strategy.	Topographic sheets and vegetation maps provide important information regarding location of water bodies and cliffs which are important markers for safety of tranquilised animal.
25.	Portable doppler/vital monitors	SpO ₂ , Co ₂ , and vitals are better assessed using portable monitors and their use should be encouraged where possible.	Aids in quick identification of emergencies and reduces response time for veterinary intervention.



SL No	Accoutrements/ Requirements	Purpose	Remarks
26.	Portable Oxygen cylinder	15-20 litres portable cylinder with large mask is encouraged where possible to maintain healthy oxygenation of the animal.	Does not require intubation, may be placed at the trunk opening to ensure constant supply of saturated oxygen.
27.	Axe and spade	2-3 axes and spades are required during emergency situations.	

3.10 Overall Planning and Preparedness

All the logistics and procedures must be in place before capture is attempted. These would broadly include identification of the capture team, consensus on the identification of the target animal, requisite permissions, necessary information on habitat (terrain, vegetation, topography, water bodies if any etc.), availability of capture equipment, veterinary supplies, communication devices, vehicular support, crating and transport considerations, and protocols for post-release monitoring. These animals may pose safety threats to professionals as well as the public. Utmost care is needed to ensure the safety of humans when attempts at capture are made. Safety/emergency protocols/ contingency plans should be integral to all procedures for all such field operations.

3.11 Crowd and Media Management

Crowd-related incidents in HEC situations have been reported regularly from different parts of the country. There are various causes and triggers for the uncontrolled and retaliatory behaviour of the crowd gathered at the conflict site, including elements of curiosity and limited understanding of behaviour and ecology of elephants. Crowd behaviour can be unpredictable, varying from curiosity to see large animals, to demonstrating irresponsible behaviours (getting too close to elephants to click pictures) to very aggressive behaviours (frenzied mob trying to lynch the animal in retaliation). Sometimes, the crowd is hostile and can even harm forest officials/property and the animals, due to panic and stress, especially if there is human death or injury by elephant.

Development of the crowd management plan envisages-

- Threat analysis and risk assessment in crowd management
- Preparedness framework and measures
- Containment measures including control
- Role of Stakeholders in crowd management

Media can play a key role in raising awareness about wildlife issues and can influence and shape the perceptions and opinions of the public. Stories, news, and information about wildlife especially elephants living in natural and human-dominated landscapes, or even elephants that have adapted to living near urban areas, are widely read in newspapers and watched with keen interest when reported by electronic media. The impact of news coverage is magnified to a greater degree in the case of highly sensitive HEC scenarios as a reaction, the public gets polarized, both in the online world and at the community level.

Key considerations in media interaction envisages-

- Identification of the Nodal person from forest department
- Addressing specific challenges that managers/media face on HEC issues
- Avoidance of sensationalism in HEC reporting by the Media
- Key points in communication-message from the managers to the media



3.12 Budgetary Considerations

Wild animal capture operations are resource intensive. Costs broadly include personnel, equipment, consumables, vehicles, food, rations, contingencies, animal handling, drugs etc. The budget must be worked out before starting any operation. If multiple elephants are to be captured and translocated, the operations could last for a longer duration. It is desirable to involve trained accountants to manage expenditure and provide timely updates to the administrative head. Further, if a decision is made to retain the captured elephants in captivity, it is advisable to indicate the annual budget required for maintaining elephants in captivity. For this, costs such as personnel cost (engaging permanent mahout and *kavadi*), elephant maintenance cost (fodder, camp management, accoutrements) and potential health and well-being costs should be considered.



Chapter-4

Identifying Individual Elephants in Field Situations

Some of the wild animal species, like tigers (*Panthera tigris*), leopards (*Panthera pardus*), striped hyenas (*Hyaena hyaena*) and others have distinct, easily identifiable, natural body markings like stripes and rosettes. Thus, a good picture of the flanks can be used to recognize an individual animal. Some species that do not have natural body markings can be artificially marked with paints, rings, and bands if they can easily be physically captured. However, individual recognition of wild animals like lions and elephants that do not possess easily recognizable natural markings and are difficult to capture and handle is challenging. For these animals, it is important to record a variety of individual physical characteristics to tell them apart. Although elephants look similar, closer examination and continuous observation will help recognize elephants distinctly. Using a combination of a variety of body characteristics, such as the shape, formation of tusks, ear pinnae, and others it is possible to reliably recognize an individual elephant. The more characteristics we record for an individual elephant, the better it is for identification. This technique of identifying elephants from field photographs/sketches has been used in both Africa and Asia for the last many decades.

4.1. Morphological Features useful in Individual Identification

- i. **Ear characteristics:** The external, visible part of the ear is called the pinna. Elephant ear pinnae usually have nicks, holes, notches, cuts, and serrations in the margin. Further, there may be folds of varying degrees in the ear margins (ranging from no-folds to rolling folds), which make an individual elephant easy to recognize. Additionally, with good-quality photographs, one can compare the vein patterns, which are unique and thus, serve as a precise means of identification. There is also significant variation in the size, level of depigmentation (which usually increases with age), shape of the lobe etc.
- ii. **Tusk characteristics:** Tusks are modified upper incisors that grow almost throughout an elephant's lifespan. Only male elephants carry tusks. Cow elephants and makhnas (=tuskless males) may have tusks that are rudimentary. The basic features to note in the field are: i) Both the tusks are intact ii) tusklessness (tuskless elephants could be cow elephants, makhnas or even tuskers that once carried tusks but lost them over time) iii) Broken tusks iv) Single-tusked individuals. In addition to the above, there are variations in the tusks which include their arrangement, thickness, length, and angle with respect to the ground (during stable head position). The tusk characteristics are to be recorded for both the left and right tusks individually.
- iii. **Tail characteristics:** Variation in tail length, presence of prominent kinks (abrupt twists in the caudal bone), and patterns of tail brush (tassels in the tail) provide additional keys for reliable identification of individual elephants.
- iv. **Other features:** Warts, lumps, abscesses, scar tissues, deformities, and injuries, may also be of help in the identification of individuals.
- v. **Scoring body condition:** In addition to morphological characteristics, the body condition score of the elephants can also help in their identification (if done in a short period during which the body condition doesn't change drastically). While palpation techniques are



readily available for assessing the body condition of captive and immobilized elephants, for free-ranging elephants, only visual assessments can be made. The downside of using visual assessment is the wide margin of possible errors in assigning scores. There are many visual-based approaches to scoring Asian elephant body condition (included in the reference).

vi.

Differentiating makhna from female elephant in the field
<p>Confusion may arise during the identification of makhna elephants and females, especially from afar. A few pointers that may aid in identifying differences between the two are listed below.</p> <ol style="list-style-type: none"> 1. If observing the rear quarters, muscles below the tail base appear convex for a bull, while they are either flat or concave for a cow. The perineal swelling (which causes the convex tail base in bulls) could be minimal in young bulls making it difficult to differentiate a bull makhna from a female 2. Muscles between the thighs appear a distinct 'V' shape for males. 3. Mammae are usually well developed for adult females, especially if lactating or have calved before. For nulliparous females, the breast development is less and thus, could be a source of confusion. 4. Musth secretions from the temporal glands are a well-known and easily observable differentiating feature in males. 5. Overall body size, musculature, skull size, base of the trunk, and forehead domes of an adult <i>makhna</i> are bigger than females aiding easy identification. 6. Noting down the social organization/association patterns, posture and behavior also aids in easily differentiating a bull from a cow. 7. There are subtle differences in the vertebral column (sloping for a bull and flat for a cow) and shape of the pelvis (sleek for a bull and wide for a cow), which trained personnel can easily recognize in the field.

4.2 Age-classification of elephants

The elephants are classified into five age categories that include calf (< 1 years), juveniles (2-5 years), sub-adults (5-15 years), and adults (>15 years). Age-classification of elephants can be done based on

- i. **Ear characteristics:** Assessment of lateral folds along with the degree of folds indicates relative ages. With age, the pinnae get thicker, develop depigmentation, and get ragged along the margin.
- ii. **Temporal depression:** A qualitative assessment of temporal gland depression can indicate age, as the temporal depression (the concaveness) gets pronounced in elephants as they become older.
- iii. **Relative height and body length:** A qualitative assessment of relative shoulder height and body lengths can be useful to estimate the age as elephants as they grow almost throughout their life. While shoulder heights stop, the body lengths continue to increase and serve as a good indicator of relative ages.
- iv. **For tuskers, tusk characteristics** like thickness, appearance, and length can be recorded as they indicate age-class of bulls. For adult cow elephants, the extent of sagging of mammae can be noted down. Additionally, for bulls and cows, buccal cavity depression (brought about by molar progression), forehead hump (above the nasal cavity), development of head domes, relative skull size, etc. can be qualitatively recorded to classify the elephants into different age classes.



- v. **Sample of a format for filling various criteria** such as shape of ears and back, sex, age, unique features etc. is provided in the **annexure I** and may be filled and compiled systematically in a searchable manner which can be compared with any conflict animal for identification.

4.3 Photographic profile of elephants for Individual Identification

Ideally, for each elephant, a minimum of four pictures are needed for basic identification: a left side profile, a right-side profile, a head-on picture with ears cocked, and a rear profile showing the rump. It might take multiple discrete observations/photography sessions to reliably identify an elephant. While still photos work better, video shoots are helpful too. Video shoots help us to see the features of elephants in slow motion. If two or more personnel are observing/photographing elephants for identification, then it is better if one of them takes a photo and the other shoots a video. A good camera (with image stabilizer or vibration resistance) with a decent zoom (with a minimum of 100–300mm or equivalent in the case of point-and-shoot cameras) is essential.

4.4 Use of Camera Traps for Individual Identification of Elephants

- i. **Movie/still cameras:** Individuals and herds of elephants can be photographed and identified without the necessity of approaching them at close quarters through automatic camera traps. The camera trap units may be fixed at appropriate distances to clearly photograph elephants. The cameras can be placed in trails that lead to water holes or other microhabitats to maximize possibility of photographing elephants. Since the pictures are needed to unambiguously identify individual elephants through morphological features, it is essential to place the cameras at sufficient heights and distances along the trails. The camera trap should ideally record both pictures and video simultaneously. For placing camera traps, field data from ground staff may be collected, and sites frequented by individuals or herds of elephants may be selected eg waterholes, beat roads, crop raiding trails and others.
- ii. **Advanced infrared cameras** with night vision are now available for visualizing animal movement in the dark. These cameras are also Bluetooth and WiFi enabled, which relay real time messages and short-duration video grabs of individuals captured in the field. Judicious placement of this equipment can provide invaluable insights into behavior and habits of the elephants, along with the required time stamp of their movement.
- iii. **Drone cameras** may be used to capture the presence of herds or individual elephants, especially in terrain inaccessible by foot. Although their use is limited to areas with open grassland, agricultural fields and coffee/ tea estates with less canopy, drones provide high quality, real-time imagery of the animals, information on the terrain features such as the presence of waterholes, steep slopes that may risk the success of operations, human dwellings within forest patches, and the nearest approachable roads to station trucks and cranes. Additionally, drones also provide an accurate measure of distance, which greatly aids in planning a strategic approach before darting the animal.

4.5 Other Essential Considerations

- i. Depending on the landscape, it might be important to identify whether an individual/herd earmarked for capture and translocation is opportunistic or habitual crop raider, which can be made possible through definitive identification and long-term monitoring of the animals. Post translocation success rests heavily on this data.



- ii. Taking multiple pictures of elephants in the group without referring to notes in the field notebook is a major source of ambiguity when assigning the pictures to an individual elephant.
- iii. A photographic profile of each elephant, along with other necessary data, may be maintained and updated to ensure efficiency while matching of the target individual before capture.
- iv. Fecal samples of identified herds/individuals may be collected for DNA analyses (optional).
- v. Blood may be collected from wild-caught individuals and stored in PAXgene blood DNA tubes (Qiagen). Samples may be frozen for long-term storage. Where blood collection is not possible, dung or hair strands with follicles may be stored in airtight zip lock bags.
- vi. All samples require careful and proper labeling with the date, sex, age, and location of the animal where collected.



Chapter-5

Chemical Immobilization of Elephants: Field Essentials

Wild animal capture techniques have evolved over the years to facilitate safe capture of wild animals through physical or chemical means. Despite such advancements, there is always an element of risk to both the personnel and the animals involved during field operations. Those risks can be potentially minimized with adequate training and preparedness. It is thus, critical for the teams undertaking such operations to fully understand the risks involved, and plan for any eventuality that may arise during the operation. Although there is considerable scientific information on the subject, it is essential to synthesize the details in a succinct manner for field managers to easily understand and implement best practices in animal capture and restraint. In this chapter, the field methods for executing a chemical capture of wild elephants are elaborated.

5.1 Technical Team

A designated “Technical Team” comprising technicians and field personnel is essential to carry out the field capture operations. The suggested team composition is as follows:

- i. Team leader who is responsible for logistics, safety of personnel during the entire operation. The team leader will liaise with other departments as well. Generally, the administrative head of the Forest Division where the operation is to be carried out would be the team leader.
- ii. The tracking team could comprise trained (1) *Kumki* elephants, mahouts, and kavadis (if reliable *Kumkis* are available) (2) expert elephant trackers (3) local trackers that are familiar with the terrain, and (4) biologists with field knowledge of elephant temperament and behavior.
- iii. Wildlife restraint team comprising an experienced and well-trained veterinary officer whose decisions are important in safeguarding the life of the animal, safety of personnel and handling “schedule drugs” in the operation.
- iv. Animal restraint technical support team (mahouts, field staff): Elephant restraint and immobilization operations must be supported by well-trained field staff including Range Officers and their frontline staff and mahouts for a variety of essential support such as operational machinery, securing the harness/es and associated aspects of loading/unloading and transportation.
- v. An emergency medical support team (nursing/ medical assistant) would be essential in urgent situations.

5.2 Approaching Wild Elephants for Darting

Darting and capturing elephants calls for a proper understanding of procedures, including a skilled team to manage any eventuality that may arise when attempts are made. Due consideration is to be accorded to human disturbance, topography, terrain, vegetation, nearby water bodies, direction of wind, and weather before attempts for darting and capture are made. The identified animal should be approached without exciting it preferably up to 30 to 40 meters. Approaching an elephant and darting can be done from a vehicle, using *Kumki* elephants to approach the animal up close, on foot and from tree-top hideouts with all necessary precautions and safety plan for the darting team. The elephants can also be lured with baits along its path to the darting point. Darting on foot poses a risk to the personnel however, if skilled sharpshooters are available, darting can be



attempted on foot without compromising the personnel safety. Ideally darting team should have two skilled trackers to assist the sharpshooter and two gunmen for support. Individual elephants may cover long distances after getting darted, and they need to be tracked down. Elephants that move far after darting can be recumbent in a compromised position and likely to be exhausted and thus, need to be attended immediately.

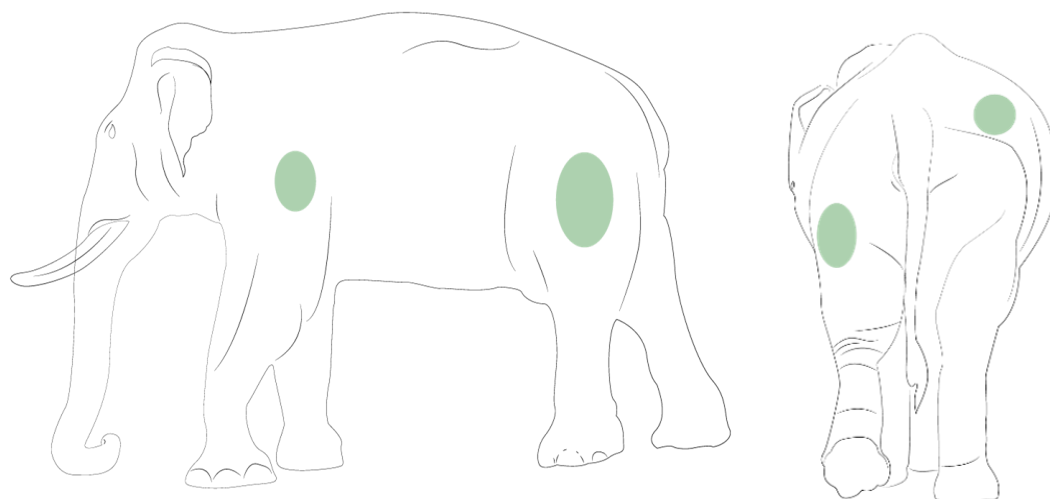
5.3 Drugs and Equipment

5.3.1 Drug delivery system

The long-range syringe projector that works on dry-powder charge system could be chosen to ensure adequate impact, effective skin penetration, and drug delivery (e.g. Dist Inject model 60N/ Capchur). In general, a shooting range of 30 to 50 meters works better for darting. Aluminum darts of 5 ml and 7ml capacity can be used for drug delivery based on the type of drug and its concentration. Needle type, length and strength are essential factors to consider. Reinforced smooth/ collared cannulas suitable for 13 mm anodized aluminium syringes could be used for darting. The outside diameter of the needle should preferably be 4.0 mm with a length of a minimum 68 to 78 mm. A barbed or collared needle would help in identifying the darted animal. Besides the normal terminal bevel, these needles have side openings to ensure unobstructed drug delivery. Alternatively, air-pressurized syringe projectors (e.g. Dan-inject/ Pseudart/ Telinject/ X-Caliber/ Paxarms etc.) with proven use in Asian elephants can also be used. Nylon darts of variable volume, depending on the drug used, and needle length of 60-100mm are recommended. The outside diameter of the needle should preferably be 2.0 mm.

5.3.2 Darting site

The best site for darting includes the thigh or rump due to good muscle mass. However, other sites have also been used by handlers with mixed results. An incorrect injection site may result in the cannula hitting vital body parts (eyes, vertebral column, penis, bony prominences of the body). The dart fixing should be perpendicular to the target site to ensure that the drug is delivered intramuscularly. Angular shots tend to inject drug subcutaneously or into the dermis/fascia/fat leading to improper drug delivery, delayed absorption, and an unpredictable response.



5.3.3 Immobilization drugs

The preferred drugs for immobilization for free-ranging elephants are narcotics or opiates (Etorphine HCl, Thiafentanil, Carfentanil) at appropriate doses, as these have the advantage of higher concentration and thus smaller volume for use and corresponding rapid immobilization



effect. Acetylpromazine/ Acepromazine (ACP) a tranquilizer was used along with the narcotic as ACP reduced the initial excitement and maintained the residual tranquilization effect even after reversal of narcotic. However, its use has been limited owing to reports of photosensitization in elephants (Cheeran, 2002). Immobilization of wild elephants in field can be facilitated with narcotics (Etorphine HCl as primary drug) at required dosages followed by mechanical restraint. Etorphine HCl in an appropriate dose produces lateral recumbency with good anaesthesia, which is safe for carrying out all the procedures including collaring, marking, biological sampling and tying. Once the necessary procedures are complete, the animal can be revived with a suitable reversal agent/ antidote (Diprenorphine/ Naltrexone). More recently, Thiafentanil

Administration of a sedative preferably Xylazine HCl produces standing sedation in elephants. There should be minimum disturbance under Xylazine immobilization as the animal can be explosively roused. Of late, tranquilizers have been effectively used to calm the animals and these can be used to support capture, transport and release. Various short-acting tranquilizers (Acepromazine, Azaperone, Diazepam) and long-acting tranquilizers (Haloperidol, Perphenazine Enanthate, Pipothiazine Palmitate) have been effectively used in elephants.

Table-2 Commonly used elephant immobilization drugs along with their dosages

S. No	Primary drug: Drug concentration and preparation	Antidote: Drug, concentration and preparation	Remarks
1	Etorphine hydrochloride 9.8mg/ml, (Captivion™) Thiafentanil oxalate 10mg/ml (Thianil™)	Diprenorphine (3mg/ml, Revivon™) /Naltrexone (50 mg/ml, Trexonil™) [Naloxone hydrochloride 0.2 and 0.4 mg/ml in one ml ampoule Narcan™ as human antidote]	Preferred drug for capturing wild elephants
2	Xylazine hydrochloride (100mg/ml)	Yohimbine hydrochloride (10mg/ml) Atipamezole hydrochloride (5mg/ml, 10mg/ml)	Primarily used for managing interventions in captive elephants. However, when adequately trained support such as <i>Kumki</i> elephants are readily available, it may be used for wild elephants with utmost care.

The dosages of select drugs are provided in Table 3. However, the choice may be made on the spot taking due consideration of the animal's health and condition, body weight, level of excitement, physiological status, sex, time of the day, ambient temperature besides other parameters as decided by the veterinarian on site.



Table-3: Common elephant immobilization drug dosages and likely effects

S.No	Drug	Dosage	Effect
1	Etorphine hydrochloride	1mg per foot shoulder height/ 1 mg per 450 kg/ 1ml Large Immobilon (2.45mg/ml) per 1000kg BW/ 0.002-0.004 mg/kg	Lateral recumbency (Immobilized elephants suffer fewer respiratory problems when in lateral as opposed to sternal recumbency)
2	Xylazine hydrochloride	0.08 -0.14mg/kg (Doses may vary in captive and wild animals)	Alpha-2 agonist for use in captive elephants (musth / minor veterinary management/ Produces standing sedation)
3	Thiafentanil Thianil	African elephant: Male 15mg total dose/ Female 12mg total dose (15 - 40mg total dose)	Lateral recumbency
REVERSAL			
4	Naltrexone	20 X etorphine dose on mg/mg basis, 10:1 to 15: 1 thiafentanil on mg/mg basis	Reversal (Antidote for Etorphine)
5	Diprenorphine	1.3-2.0mg Diprenorphine produces reversal of the immobilizing action of 1 mg Etorphine/ 2-3 X etorphine dose on mg/mg basis	Reversal (Antidote for Etorphine)
6	Naloxone	0.04-0.07mg/kg on mg/mg basis	Reversal (Human antidote for Etorphine)
7	Atipamezole hydrochloride	1mg per 8-12 mg xylazine, 5-10 mg per 100mg xylazine	Reversal (Antidote for Xylazine)
8	Yohimbine hydrochloride	0.125 mg/kg body weight	Reversal (Antidote for Xylazine)
TRANQUILIZERS			
9	Acepromazine	40-50 mg/1000kg BW	Tranquilization (Avoid exposing animal to direct sunlight for long periods as may cause photosensitization)
10	Azaperone	40-60 mg in initial dart along with narcotic	Short-acting tranquilizer (effective for managing initial excitement phase of drug induction)
11	Haloperidol	40-100mg total dose	Immediate-acting tranquilizer
12	Perphenazine enanthate	200-250 mg total dose	Long-acting tranquilizer
SUPPORTIVE			
13	Hyaluronidase	4500IU per dart	Enzyme facilitating drug absorption

Weight of adult Asian elephants may range from 2300-4500 kg (3700 kg for females and 5500 kg for males) (large bulls and cows may weigh more). Proper assessment of weight is necessary for accurate drug dosage calculation. Although drugs for immobilization and sedation have been more or less standardized, considerable variation exists in their application in the field. A complete



immobilization record particularly of drug(s) and doses given, anesthesia monitoring, physiological parameters assessed, and recovery details needs to be documented. These details can be recorded in the datasheet in the format provided (**Annexure II**).

5.4 Assessment of Sedation and Monitoring of Vital Rates

Health assessment of the immobilized animal is a crucial part of the field operation. It is important to monitor physiological parameters such as pulse, respiration, temperature, color of mucus membrane, hydration level and oxygen saturation etc. to ensure that they are all within acceptable ranges. Drugs induce physiological alterations that can compromise the health of the immobilized animal. It also calls for a detailed physical examination for injuries or disorders.

It generally takes approximately 7-10 minutes for the drug/s to produce the desired effect. However, it can vary with individuals (age, sex, physiological status, inherent disease if any), level of disturbance and situations (ambient environmental conditions). The animal should be given sufficient time for complete induction and approached only when sedation deemed satisfactory for handling is achieved. Assessments can be done by checking for response to noise stimuli or by disturbing with dry wood/ stone and lastly by prodding with the help of a long pole from the back. It is advisable not to approach animals from the front. Other subsequent indicators include responses to stimulation of tail, feet and body. Once the animal is stabilized and the parameters are within the normal limits, further interventions (collaring, tying, transportation etc.) should be initiated under veterinary supervision. Special emphasis should be made to ensure that animal welfare concerns are not compromised, and the animal is subjected to minimal stress. In case of emergent life-threatening situations, efforts should be made to revive the animal immediately, taking veterinary considerations into priority. It is important to ensure that the animal's position is appropriate (lateral recumbency) and supports the normal function of vital organs. Knowledge of necessary corrective procedures are essential to ensure that the animal is positioned in a manner that the airways are patent and respiratory and circulatory functions are not obstructed.

The physiological parameters (temperature, respiration, pulse and color of mucous membrane) need to be simultaneously assessed, as these are likely to be altered during chemical capture based on the drug used (**Table-4**).

Table-4: Physiological parameters and reference values for elephants

S.No	Physiological Parameters	Range
1	Temperature	37-39.9°C (96.3-99.5° F)
2	Respiration	10/min (Standing) 5/ min (Recumbent)
3	Pulse	28/min (Standing) 35/min (Recumbent)
4	Mucus membrane	Rosy pink

Any significant deviation in normal physiological parameters should be dealt with appropriate intervention. A well-anesthetized animal can have a low respiratory rate. However, the veterinarian should assess the quality and rhythm to confirm the well-being and level of anesthesia. A deep and regular respiration is desirable. Elevated rectal temperature should be recorded during immobilization and more so during hot periods of the day. This needs appropriate management as



it may be drug induced. Emergency drugs to support respiratory and cardiac functions should be always kept handy (**Table-5**).

Table-5: Emergency drugs to support cardiac and respiratory functions

S.No	Drug	Remarks
1	Doxapram	Analeptic, 100 mg/1000kg BW IV/IM for respiratory depression.
2	Ephedrine	Sympathomimetic, 200-400 mg/animal IV/IM to reverse Xylazine
3	Prednisolone	Glucocorticoid, 0.33mg/kg for circulatory collapse.
4	Dexamethasone	Glucocorticoid, Dose 1 mg/kg IV for circulatory collapse
5	Atropine	Anticholinergic 40-50 mg/1000kg BW

It is well documented that capture-related stress can compromise the immune status of the animal and necessitates the need for an antibiotic (preferably long-acting preparations) with the dosage being dependent on the weight of the animal. Supportive antibiotics to prevent possible infections secondary to procedures, injectable vitamins, intravenous fluids, eye lubricants, tetanus toxoid may form part of the prophylactic treatment provided to the animal at the discretion of the veterinarian.

5.5 Essential Observations on the Sedated elephants

- i. **Animal positioning:** Considering the weight, lateral recumbency is the safest and most ideal position for immobilized elephants that are sedated using narcotics. However, eventualities could arise, and elephants can get into sternal recumbency, which could result in respiratory arrest due to the pressure of the abdominal organs on the diaphragm. This can be fatal if the animal remains in that position for long. Efforts should be made to pull or push the animal to lateral recumbency within no more than 15- 20 minutes.



- ii. **Respiration:** Majority of the drugs produce respiratory depression. It can get further aggravated in case of over dosage, improper position of immobilized animal or obstruction



of airway. Keeping the head and neck in the straight line with mouth open is beneficial. Respiratory stimulant (Doxapram) has proved to be beneficial in managing emergencies due to respiratory depression.

- iii. **Thermoregulation:** There is a likelihood of rectal temperature readings increasing during immobilization, and more so when captures are done during hot hours of the day. These situations can be managed by spraying water over the body and by provisioning shade/ cover. Water should be sprayed copiously and; thus, it is critical to keep adequate supply of water during the operation. Water cans/pails that could be used to easily carry water should be kept handy. Antipyretics can be used to medically manage the condition when appropriate.
- iv. **Hydration:** There is a likelihood of immobilized animals becoming dehydrated. The veterinarian needs to properly assess the condition and provide fluid therapy if necessary.
- v. **Eye care:** Eyes are generally covered using a blindfold to decrease sensory stimulation. This further helps reduce exposure to the elements. Drying of the cornea and ensuing keratitis can be avoided using neutral lubricant ocular gels (D-Panthenol @ 5% w/w). Eye hydration drops/gels/ointments may be included in the kit to avoid dryness of eye in a sedated animal.
- vi. **Physical injuries:** Animal may sustain injuries during the capture operation. These injuries can range from small wounds resulting from improper darting and bruises to even fatal ones (falling on a tree stump or sharp object on the ground and damaging internal organs). Further to this, the dart site should be thoroughly assessed and cleaned to prevent festering wounds from developing.
- vii. **Renarcotization:** Renarcotization is a potentially life-threatening phenomenon. However, it is seldom seen in elephants, but could still occur if multiple supplementary doses of narcotics are given and appropriate drug reversal is not done.

5.6 Tying Up Elephants

- i. Based on the need, sometimes, the elephants may have to be physically restrained using ropes. Tying elephants for transportation purposes is elaborated in Chapter-8. Nevertheless, whenever situation preempting transportation arises, the following points are to be noted down:
- ii. Ropes need to be tied around the neck and all the four limbs. Jute ropes, ropes drawn from *Sterculia villosa*, cotton ropes, and other ropes that are locally available can be used. Rope burns, particularly in the ankles, take a very long time to heal and hence, ropes of appropriate material that does not cause burns, blisters and cuts should be used. Special focus and care may be required in this regard. Even when nylon and other synthetic ropes are used, padding with coir and other appropriate material should be used to minimize skin burns.
- iii. Neck ropes will have subsidiary ropes on either side of the neck to facilitate securing the animal in the transport truck or while marching on foot. Smaller coir ropes are to be tied in front and back of the knot to secure the knot and avoid slipping. This is important to ensure loosening or tightening of the knots. Wooden wedges are used in the neck ropes to secure the knots in place and to prevent the ropes from constricting the neck when the animal is moved. Knots are made in such a way that untying is easy and simple.



Table-6: Type of emergencies/ complications and their management

Type of emergencies/ Complications	Suggested management action
1. During approach for darting	
1.1. Target animal moved to an unsuitable position/location	This may occur with sudden changes in circumstances. The capture team would get together and decide future course of action immediately. Patience is key under such circumstances.
1.2. The target animal joined by other groups/individuals (unforeseen situation)	If target animal is associated with other animals including big bulls, the <i>Kumki elephants</i> (if they are available) need to be diverted to secure locations leaving the target animal alone for the time being. Visual observation from a distance is to be maintained. Capture team to meet and decide follow-up action.
1.3. <i>Kumki</i> elephants getting out of control by sudden events	This will arise if the <i>Kumki</i> with the mahout is not tried and tested before the actual operation. The operation has to be aborted temporarily; capture team to meet and decide follow up action.
1.4. <i>Kumki</i> engaged in a fight with target animal	Personality and other behavioral attributes of the <i>Kumki</i> should be tested well before the operation. Ideally the <i>Kumkis</i> for the operation should be identified based on experiences and responses.
2. Capture complication (drug delivery)	
2.1. Inappropriate drug delivery leading to inappropriate drug action	Wait at least for 20 minutes after darting. Observe and record induction. In case the induction is inadequate, administer 50% of the initial dosage after 25 minutes. Half sedated animal is difficult to handle in comparison to a deeply sedated animal.
3. Anaesthetic complications post capture	
3.1. When alpha 2 is used alone (Xylazine)	Never recommended for using alone. In the absence of choice, operations should not be carried out. Always keep a ready stock of ideal anesthetics, sedatives and reversals for any emergency.
3.1.1. Bradycardia	
3.1.2. Secondary AV block	
3.1.3. Drooling salivation	
3.2. When Xylazine and Ketamine combination is used	
3.2.1. Ataxia/ increased relaxation of hind quarters leading to abnormal recumbency.	Transient phase, it should pass. Increased relaxation may lead to sternal recumbency and further complications. Hence a belly support strap may be used to maintain animal in standing position during transit.
3.2.2. Drooling salivation	Atropine Sulfate @ 0.001 mg/kg followed by fluid therapy.
3.2.3. Bradycardia	Butorphanol/ Atropine Sulfate at appropriate dosages
3.3. Medetomidine and Ketamine is used	
3.3.1. Deep sedation with sternal recumbence	Positioning the animal, use hydraulic lifters with belly straps to support it. Reverse anesthesia using Atipamezole @ 1mg/mg Medetomidine used
3.4. When narcotics are used	
3.4.2. Animal falling with abnormal neck posture	Reverse the anesthetic effect immediately, ground team with captive elephant support is necessary for appropriate position of the animal. Abort the operation
3.4.3. Bradypnea	Doxapram @ 0.01 mg/kg intravenously,



Type of emergencies/ Complications	Suggested management action
3.4.3. <i>Hypoxemia</i>	Oxygen support (Endotracheal tube may be needed for insufflation in extreme cases, so preparation must be done beforehand as trunk supply may not correct hypoxemia)
3.4.5. <i>Hypotension</i>	IV and per rectal fluid infusions, steroids
4. Anaesthetic complications during transit	
4.1. Increased depth of anesthesia: animal beginning to sit in sternal recumbency	Inject reversal in divided dosage, 50% i/v and 50% i/m, belly support to lift the animal using hydraulic system.
4.2. Animal starting to violently struggle inside transport vehicle	Haloperidol/ Azaperone or Xylazine in small doses to be injected (higher dosage to be avoided if the journey is too short)
4.3 In case of death of the captured animal	A detailed postmortem examination to be carried out by at least three veterinarians with support from veterinary assistants with presence of at least one veterinarian independent of the team



Chapter-6

Taking Appropriate Decisions on the Captured Elephants

Capturing a wild elephant should be the last option, taken after due consideration of all other options. Capture operations can be extremely traumatic for the elephant with potential life-long consequences both in the wild (if released back) and in captivity. Thus, taking informed decisions, considering all the pros and cons, is critical. Before embarking on an elephant capture operation, it is critical to decide whether the elephant (i) would be retained in captivity, (ii) relocated in the wild (capture and release at the same site), and (iii) translocated (moving across to a different area). An informed decision regarding the captured elephant should be based on (i) animal welfare considerations; (ii) social considerations pertaining to local communities; (iii) political considerations; (iv) administrative considerations; and (v) logistic and budgetary considerations. Reliable and timely data pertaining to an individual elephant in conflict, circumstances of HEC surrounding the individual animal, behavioral profile, response of local communities to conflict situations, and habitat conditions, along with an overall understanding of the local elephant population and movement patterns would be critical to making an informed decision. During extreme emergency situations, the local management may not have sufficient information regarding the elephant but may still have to execute a capture.

6.1 Conditions for Bringing Elephants Permanently in Captivity under Human Care

Situations that predispose retention of elephants under human care are as follows (provided in Chapter-III also):

- i. Elephants that pose a regular and unmanageable threat to human life may have to be captured. While property and crop loss due to elephants have some level of local tolerance, elephants causing human deaths and injuries would require immediate intervention.
- ii. Elephants with debilitating injuries that require life-long human care may have to be captured in the interest of animal welfare. Elephants that are sick, entails on the local management to take an informed decision to intervene and the animal may be treated *in situ* or moved to captivity (if survival prospects for the animal are poor in the absence of human care).
- iii. Elephants that exhibit chronic behavioral syndromes like causing property damage in human- dominated areas and frequently entering densely populated human-use areas may be captured based on verification of the reliable data and facts obtained in the field after fulfilling statutory requirements.
- iv. Young elephants separated from the herd, which, despite efforts, do not reunite with the herd (for reasons unknown) and could not survive on their own may have to be captured.

6.2 Housing, Sanitation and Health Screening

- i. In case destined for captivity, the animal should be held in fenced enclosure/ Kraal. This would provide chances for the animal to recover from the residual drug effect, transportation stress, and help the animal to get acclimatized to its surroundings at the new destination and provide opportunities for intensive monitoring and veterinary management.

- ii. The guidelines issued by the PE division, MoEF&CC (No. 9-5/2003-PE dated 08-01-08) on care and management of captive elephants may be referred to.

6.3 Relocation/Translocation of Elephants

Under Provision (2) of Section (11) (1) (a) of the Wild life Protection Act, 1972, the first priority is to rehabilitate the captured elephant in the wild. Retention in captivity is possible only if the CWLW of the State is satisfied that such animal has become dangerous to human life or is disabled or suffering from a chronic ailment and cannot be rehabilitated in the wild and reasons for the same are recorded in writing. Thus, a captured elephant that is certified to be fit and free of chronic problems by a qualified veterinarian can be relocated/translocated, as appropriate. The additional points to be considered are as follows:

- i. Suitable release sites (in the case of translocation) should be available for elephants in the first place. "Suitable" habitats are those that are sufficiently large (>200 km², derived based on average home ranges of elephants), harbor elephant populations, and have adequate year-round water and forage availability. As far as possible, it is advisable to translocate/relocate elephants with satellite/GPS/VHF radio collars. The collars should be pre-tested before being deployed on the animal. A well-trained monitoring team should be constituted. The collared elephant should be systematically and regularly monitored. Physical monitoring of the elephant is essential even if automated collar signals are regularly received.
- ii. While translocating family herds, it is desirable that the entire herd be correctly identified and translocated. A few individuals should not be left behind.
- iii. Determining success/failure of interventions like relocation and translocation of elephants depends on monitoring social behavior of the elephants at the released sites. It is essential to monitor social integration of the translocated elephant with other herds/elephants occurring in the area.
- iv. Elephants, in general, would be highly stressed during capture and translocation process. However, in a suitable habitat, they might settle down and the stress levels would go down eventually.
- v. If field situations permit and such in-situ facilities are readily available, screening for major diseases of concern such as Tuberculosis (*Mycobacterium sp.*), Elephant Endotheliotropic Herpesvirus (EEHV), Anthrax, Hemorrhagic Septicaemia (HS) etc. is advisable.
- vi. States having wild elephant population may envisage at least one captive elephant management facility that should address their basic nutritional, housing, and general welfare needs.

6.4 Post-Release Monitoring

It is important to monitor the elephant's following release. The field staff needs to be adequately trained in collecting information and carrying out basic analysis. The training should emphasize providing an understanding of the protocols and procedures for daily monitoring of translocated/relocated animal/s. There should be periodic reporting of the elephant movement activities and associated details to the divisional head, circle head and the Chief Wildlife Warden of the state. There is no mention of any training on analysis.

Animal tracking essential: Radio-telemetry system comprises of a transmitter worn by the animal, an antenna and Very High Frequency (VHF) receiver used to pick up signals of the animal. Although still widely in use, recently developed satellite collars have an edge over manual radio



tracking as very high resolution, real-time data on animal movement and locations can be obtained over vast spatial scales with minimal effort. The GPS locations collected through telemetry devices can be plotted to compute home ranges, decipher movement patterns and understand habitat-use.

Radio tracking: In satellite telemetry, a tracking device is mounted on an elephant whose locations are calculated through satellites that orbit the Earth. Selection of GPS collar should be based on satellite coverage of the area. Depending on the size of the batteries, satellite collars can be programmed to record location data at regular intervals. The location details can be downloaded using a computer software at regular intervals. The collar unit comprises of a transmitter mounted on a rubberized belt. The sky orientation of the collar is achieved by using counterweight of appropriate dimensions.

Choice of collars: The users can choose between VHF, satellite and GSM-based collars. Satellite and mobile network coverage, finance, and desired lifetime of the collars should determine the choice of the collars. Data download options and the suitability of the collars to a landscape are also essential to consider. There are many reputed collar makers that manufacture and supply elephant GPS collars. The satellite and GSM collars need to be primed before deployment.



Managing Human Emergency Situations

Ensuring human safety is paramount when working in wildlife habitats and handling animals. Both elephants and the forested habitats they live in can present a variety of potential risks to the personnel involved in operations of capture and translocation. A wild elephant can be extremely temperamental and should never be taken for granted. Further, overt signs of aggressive behavior in elephants are difficult to interpret for those who are not familiar with elephant behavior. Gestures like grimacing and other signs of aggressive behavior are relatively easily interpreted in carnivores but are seldom seen in elephants. For untrained personnel, piled up aggression in elephants is difficult to gauge and there could be explosive demonstration of aggression at close quarters.

Thus, personnel engaged in field operations must acknowledge these risks and then prioritize safety through comprehensive planning and adherence to protocols. Animal handling techniques should be smooth and cause minimal stress to elephants to minimize the likelihood of offensive behavior. Equipment and immobilization drugs should be handled with extreme level of care. Regular risk assessments, emergency response plans, and communication strategies are vital components of ensuring human safety in wildlife-related activities. The potential risks to human personnel involved in the operation can broadly be classified as (1) Risk of injury or death from elephants (both wild and *Kumki*), (2) Risk of injury or death from immobilizing equipment and drugs, and (3) Miscellaneous hazards such as terrain, mobs, etc.

7.1 Risks of Attack by Elephants (both wild and *Kumki*)

Wild elephants are inherently shy, seldom seen as they quietly retire into dense cover in presence of people. They are wary of humans approaching them and often resort to flight response. Sometimes, they might exhibit offense response by responding aggressively to the intruders potentially causing serious injuries and even death. Despite their bulk, elephants are often exceptionally silent in the forest and thus well-trained trackers are inevitably needed, and they must judge the situation appropriately while moving around in elephant areas.

Fatalities from elephant attacks may occur during capture and rescue operations and have occasionally been reported from various parts of the country. Most of these accidents may be attributed to close interactions with an agitated animal, either at times of darting on foot or inspecting the level of drug action post-darting. It is thus important to ensure that the team is well-trained and informed especially in the operations where tying of ropes, hoisting using crane, etc. is essential.

Success in immobilization requires darting to be done at considerably close quarters of 30-50m beyond which there are higher probabilities of missed targets, subcutaneous drug delivery or worse, no drug delivered at all which might not be noticeable over large distances. Hence, extreme caution, physical and mental preparation are essential for safely executing the task on foot. Wherever reliable *Kumki* elephants are available, there is sufficient safety for persons sitting atop and their use should be encouraged during capture operations.

Captive elephants including trained *Kumki* elephants can be as dangerous as wild elephants. Thus, without consulting the mahout, *Kumki* elephants should never be approached casually. Mahout's



presence is critical to approach the *Kumki* elephants. Before embarking on a field operation, it is essential to discuss with the mahouts to understand the temperament of the elephant so that the operations can be planned accordingly.

Options for darting free ranging elephants for chemical immobilization

Approaching wild elephants on foot

With paucity of well-trained *Kumkis* in many parts of the country, approaching elephants for darting is an inevitable option. Approaching elephants on foot requires high level of field skills, alert trackers who understand animal behavior well and can respond to different situations appropriately, and personal fitness and agility on the part of the professionals involved in the operations. Physical fitness, agility, alertness and composed nature are critical virtues of anybody involved in elephant-related operations. Even well trained and confident trackers should take additional care while approaching elephants in unknown terrain. Terrain familiarity is critical for safe tracking of elephants on foot in forested conditions. Thus, engaging local trackers in addition to trackers with elephant-specific tracking skills is essential for the team.

Approaching wild elephants on Kumki

In the states that have well-trained *Kumki* elephants, they are the preferred over approaching wild elephants on foot. Well-trained *Kumki* elephants can deftly move around in the forest, and safely carry the darting team. Post-darting, tracking on *Kumki* back is easier. *Kumki* elephants will also be invaluable in rescuing elephants that are recumbent in undesirable positions. Despite these benefits, use of *Kumki* elephants in wild elephant capture and translocation operations is not without its share of risks. *Kumki* elephants that are not in adequate control of mahouts can be as dangerous as wild elephants. Additionally, some of the temperamental wild elephants may approach the *Kumki* elephants and even chase them. Experienced mahouts with complete control over the *Kumki* elephants are critical to ensure success of the operation.

Approaching wild elephants in a vehicle

In areas with better road network, use of vehicles to safely approach elephants is a preferred option. However, elephants need to be habituated to approaching vehicles, for which skillful driving in consideration of elephant behavior is essential. Good trackers are essential even while darting from vehicle, as the darted animals eventually need to be tracked on foot. Thus, taking skilled trackers along in the vehicle is essential.

Letting elephants approach the darting team

Patently waiting in areas that the elephants frequent is a safe option to quietly dart them. The darting team and trackers can select well-trodden trails and erect *machans* in vantage locations for safe darting of elephants.

Elephant-related attacks on humans may include stomping, trampling, squeezing and crushing resulting in trauma to head, thorax, and vital organs. Prompt intervention can potentially aid in the recovery of victims depending on severity. First aid may be initiated by the physician on call and arrangements for the person to be shifted to the nearest medical facility should be commenced immediately. Care should be taken to not exacerbate damage (fractures to thoracic ribs and vertebrae, collapsed lungs, pneumo or haemothorax, fractures to limbs, crush injuries, internal bleeding) while moving the patient. As elaborated earlier, it is advisable to inform the nearest hospital beforehand about elephant capture operations so emergency advanced trauma life



support systems are in place. An ambulance with necessary basic medical facilities can also be stationed at the nearest possible site or base camp for the duration of the operation.

7.2 Risk of Injury from Immobilizing Equipment

Much of the equipment, if improperly used, can be dangerous to humans. Traditional firearms, remote delivery systems (i.e., dart guns), can cause trauma to humans. Knives, needles, and other sharps can also cause injury. The drugs used for the immobilization of elephants are potent narcotics and sedatives, concentrated for best efficacy in the animals. Specific antidotes are available for humans in case of accidental injections/casualties and must be procured and stored by the respective departments for use in emergencies. Members of the team may be trained in basic CPR methods and the emergency administration of life-saving drugs. Additionally, a first aid kit must be carried along with the equipment and a trained human physician/ physicians' aide should be part of the operation or available on stand-by for immediate medical intervention.

7.3 Accidental Drug Induction

A thorough knowledge of pharmacokinetics and potency of the immobilization drugs used is mandatory before handling any of these drugs. A strict protocol including the drawing and loading into the dart, safety gear to be worn during handling of the chemicals at the time of loading and at time of retrieving the dart from immobilized animal should be followed for the prevention of mishaps. Further, the personnel in the team should be aware of the drugs being used and action to be taken by the identified personnel in case of accidents. In the event of any emergency by accidental exposure to the drug, swift transport must be arranged from the site of the accident for medical intervention. It is important to keep the individual calm and limit the absorption of the drug by thoroughly washing the area of contact. Provision of antidotes and other emergency drugs may be initiated by the physician on field or the trained personnel at the earliest and based on symptoms of toxicity.

Symptoms of Opioid Intoxication in Humans

- Altered mental status, such as confusion, delirium, or decreased awareness or responsiveness. Breathing problems (breathing may slow and eventually stop)
- Acute sleepiness/drowsiness, lethargy or loss of alertness. Nausea and vomiting. Small pupils.
- *Renarcotization*: this is a highly lethal phenomenon, where an overdose patient revived with naloxone can re-enter an overdose state from residual fentanyl in the body. To counter renarcotization, naloxone must be given repeatedly and at significantly higher doses than fentanyl. This approach may be achievable in a hospital; however, renarcotization is often not recognized outside a medical setting and can lead to death.

Cardiopulmonary resuscitation (CPR) is a manual emergency procedure employed to reinstate cardiac activity and respiration in an individual experiencing cardiac arrest. CPR involves the practice of manual chest compressions and, in certain instances, the use of rescue ("mouth-to-mouth") respiration. Proper positioning of the patient (horizontal, sideways or on the back) is necessary to facilitate breathing, prevent choking and initiation of CPR. The mnemonic HAD-ABC is used as a sequence suggested by Morkel, 1993 may be incorporated to deal with emergencies.



H	Help	Immediately call for help
A	Absorption/Antidote	Limit absorption and give antidote if required
D	Drip	Establish drip as soon as possible if indicated
A	Airway	Establish and maintain adequate airway
B	Breathing	Monitor breathing and apply artificial respiration if needed
C	Circulation	Administer cardiac massage if there is heart failure.

A first aid kit comprising of emergency drugs and medical supplies appropriately labelled is mandatory and should be made available to the capture team. A brief list of necessary items to be included is mentioned below.

- i. Emergency drugs: For use against narcotics, 20mg of Naltrexone or Nalaxone along with 250mg Hydrocortisone, 40mg Diazepam, 5mg Atropine and 20mg Adrenaline to be part of the kit and labelled. They should be used judiciously under supervision/ advise by a trained physician.
- ii. Other medical supplies: Stethoscope, Portable oxygen cylinder, portable Defibrillator, Portable multipara monitor, local disinfectant, bandages, antibiotic creams, endotracheal tubes with laryngoscopes, Drip line, IV catheters, syringes with appropriately sized needle, scissors and intravenous fluids

**Table-7: Likely drug accidents during field immobilization and their management
(Adapted from Morkel, 1993)**

Class of drug	Name of drug	Symptoms of poisoning	Prevention and care	Management of accidental poisoning	Remarks
Narcotics (Opioids)	Etorphine hydrochloride, Thiafentanil oxolate	Dizziness, in-coordination, nausea, vomiting, pinpoint pupil, slow, shallow or stertorous breathing, cyanosis of mucous membranes, clammy cold skin, sweating, weak or imperceptible pulse due to fall in blood pressure, loss of consciousness, and	Always handle drug in presence of another person who is qualified to provide first aid in case of accident. Prior to loading of narcotic into the dart, load HCL in a separate syringe to meet any emergency.	Immediately make the second person aware of the problem and ensure medical supervision at the earliest. If narcotic has come in contact of skin or mucous membrane, wash immediately and prepare to use antidote. In case the drug has been absorbed, seek medical attention and if advised inject 0.8 mg Naloxone (2 ampoules of NARCAN) I/M and	Drugs used in wild animals are different from the ones used in human. The medical practitioner may not be aware about these drugs. It is relevant to provide all the information, including package inserts etc.



Class of drug	Name of drug	Symptoms of poisoning	Prevention and care	Management of accidental poisoning	Remarks
		ultimately coma. Note: As little as 0.1 mg of etorphine may be fatal to an adult man. The depressant effect may be enhanced if combined with sedative.		0.8 mg into a vein of the forearm. In case of non-availability of Naloxone, 5mg Naltrexone can give positive results. This may be repeated every three minutes (up to 4 times) until improvement occurs. The patient should be made to lie on his side in a horizontal position. Evacuate patient to nearest medical facility.	
Sedatives Alpha-2-agonists	Xylazine HCL (ROMPUN, XYLAZIL-100) Medetomidine (ZALOPINE, DOMITOR)	Unlikely to be fatal, Symptoms of poisoning include severe hypotension, respiratory depression, unconsciousness, and a slow, irregular heartbeat.	General field precautions as above	Do not use antidotes such as Yohimbine and Tolazoline as these drugs are not pure alpha-2-antagonists, and may cause tachycardia, thus compounding the problem. Seek medical help.	The drugs are less hazardous though potentiate depressant effects of opioids.

7.3 Miscellaneous Hazards

Elephant habitats are primarily forests, often in rugged and difficult terrain. Following wild elephants on such terrain contains inherent risks such as falling in precipitous slopes, falling off trees, slipping down from *Kumki* elephants and myriad such freak accidents that could potentially cause serious injuries and even fatalities, particularly since getting immediate medical help would be difficult. Hilly terrain presents formidable risks for elephants too and thus, judicious collective decision by the team while embarking on operations in these areas is imperative.

There are also other unforeseen risks such as venomous snake bites (including the four medically important snakes; common cobra, common krait, Russell's viper, saw-scaled viper, and many other potentially dangerous snakes like the pit vipers, coral snake, King cobra); bites and stings from



venomous arthropods such as scorpions and tarantulas; painful and potentially lethal insect stings of species such as wasps and bees.

There are also potentially dangerous animals that share elephant habitats such as the sloth bear (*Melursus ursinus*), tiger (*Panthera tigris*), leopard (*Panthera pardus*), and the Indian gaur (*Bos gaurus*). The potential threat of injuries by these animals should always be factored while carrying out any operation in elephant habitats. To minimize the risks, understanding basic animal behavior and learning the art of being safe in the forest are critical and training to be imparted to the field personnel.

In areas of recurrent human-elephant conflict, politically motivated wrong elements in the garb of local villagers can disrupt the government officials from discharging their duties and even pose a physical threat to the personnel involved in the operations. Similarly, an irate mob can be a major threat to both the personnel and the animals. To minimize such risks in vulnerable areas, adequate liaisoning with the Police Department and having a close coordination with the District Administration in identifying habitual offenders and maintaining law and order situation is critical. It is also important to take people into confidence in such areas so that they are supportive of the department's efforts in addressing human-elephant conflict.



Chapter-8

Transportation of Elephants: Essential Considerations

Transport of wild elephants from their capture site to captivity is at times inevitable. However, it is highly challenging, requiring considerable experience and expertise. Lack of experience can cause considerable hardship to the animal and the team involved. Unplanned and poorly executed transportation can cause enormous stress, compromise animal welfare, and even result in fatalities. Botched transportation efforts can also pose considerable risks to the frontline staff, elephant handlers, veterinarians, and other support personnel. To minimize risks to both elephants and the personnel involved, meticulous planning and consideration of a few critical points are essential. As elaborated throughout the document, proper justification of the need to transport elephants is the first crucial step. Equally critical is the need to evaluate the availability of trained manpower with adequate experience and other essential resources to safely transport elephants. Transport of elephants for management-related reasons has become frequent. Yet, precautionary measures to be considered and best practices to be followed to minimize the risks to both the elephants and the personnel involved are not readily accessible for the field practitioners. In this RoP, basic essentials for transporting wild elephants and their care during transit are provided. The steps involved in effective transportation are as follows:

8.1 Constituting Transportation Team

The jurisdictional DCF/DFO can be in-charge of the entire transportation. The following personnel can be included in the team to ensure safe transportation of elephants:

- i. Transportation officer-in-charge (in the rank of a Range Forest Officer)
- ii. An experienced veterinarian and a veterinary unit (comprising of para-vets, loaders, and assistants)
- iii. Senior mahouts and assistants with considerable experience in handling elephants.
- iv. A security team consisting of a forester and a minimum of two forest guards.

8.2 Legalities Involved in Transporting elephants

Legal aspects to be considered during elephant transportation are provided below

Context	Relevant Laws
Conflict-related capture/translocation	Written Order from the CWLW under Section 11 (1) (a) (permitting capture) and Section 48 (A) (for transportation of animals) under the Wildlife (Protection) Act, 1972 besides State specific transit rules.
Rescue of injured/sick animal	- do -
Research related capture, handling and movement of elephants	Written permission from the CWLW of the concerned state under Section 12 (b) of the Wildlife (Protection) Act, 1972 with previous permission of the Central Government



Scientific management (population management) related capture, handling and translocation of the elephants	Written permission from the CWLW of the concerned state under Section 12 (bb) of the Wildlife (Protection) Act, 1972 with previous permission of the Central Government
Use of narcotic drugs for controlling the animals	In this regard, provisions under Section 8 of Narcotic Drugs and Psychotropic Substances Act 1985 to be referred.

8.3 Vehicle Selection

In areas where transporting elephants is frequent, it is handy to design a few elephant-specific trucks with low chassis. Low chassis vehicles are relatively safe, easy to load, and offload elephants. When low chassis trucks are not available, then the trucks selected for transport should be carefully examined for the following:

- i. The flooring of the truck is preferably wooden.
- ii. The sidewalls or flaps of the truck should be at least seven feet in height on either side, with the walls having wooden planks.
- iii. The truck should have a drain to let out urine and water. The dung should be removed periodically.
- iv. The lighting in the truck should be adequate. The rear and sidelights of the trucks should be bright, not obscured by dirt, and in good working condition.
- v. The fitness, build, and working conditions of the trucks should be pre-checked. The air pressure in the tyres should be kept to a minimum. Engine condition, brakes, and emissions should be thoroughly checked before loading elephants. The sidewalls of the flaps should have sufficient openings for ventilation and also for emergency darting.
- vi. The floor of the vehicle should be thoroughly cleaned and disinfected a few days prior to loading the elephants. This takes care of potential contaminants/microorganisms causing foot infections in elephants.
- vii. The protruding nails in the wooden floor and the sidewalls, rusted hinges and keels, and all other sharp metal objects should be removed or set right.
- viii. An adequate quantity of water is to be provided for the elephant.
- ix. It is advisable that each side wall of the truck should have at least two windows to facilitate examination of the animal and provide any medical assistance including darting.
- x. Fuel should be filled up before the operation. It is desirable that the truck or the convey vehicles is equipped with siren and public address system.

8.4 Reconnaissance Survey of Routes

- i. Define the travel route beforehand and send a pilot vehicle a few days in advance to check the road condition, any road works underway to avoid unnecessary diversions.
- ii. The pilot vehicles should check for potholes and low hanging wires on the route. If there are many potholes, then it is advisable to find alternative roads. Underpasses, if any, should be checked for their height to avoid any accidents.
- iii. If there are low hanging wires, the DFO and other competent authorities should report them to Electricity Board and get the sagging wires fixed.
- iv. Wherever possible, it is advisable to avoid passing through major towns and crowded villages.



- v. It is advisable to avoid peak traffic hours when passing through towns and cities. Peak traffic hours in the towns and cities usually last between 8 AM to 10 AM and 4 PM to 7 PM and therefore, entering towns in those hours should be avoided. The occurrence of local functions and festivals may be noted to avoid traffic jams. Railway gates, rail timings, railway underpass need to be noted.
- vi. It is advisable to avoid passing through narrow, village, and dirt roads.
- vii. As far as possible, it is advisable to use National and State Highways even if these roads are a few kilometers longer.
- viii. The stopover locations to meet the forage and water needs of the elephants should be planned in advance.
- ix. It is important to have a pilot vehicle (lead vehicle) in the front with the officer-in-charge of the unit and a surveillance vehicle with veterinarians and necessary drugs, equipment moving up and down the convoy of trucks.

8.5 Instruction to Truck Drivers Carrying elephants

- i. Drivers with prior experience driving elephant-laden trucks are advisable to be engaged. Newly caught wild elephants may (rarely) try to break out of truck, causing the vehicle to sway. Drivers should not panic in these circumstances.
- ii. The speed of the transport truck should never exceed 50 km per hour. Instructions are given to the driver to moderate the speed according to road conditions. In the interest of elephant foot care, the absence of which can cause long-term debilitation, the prescribed speed limits should never be exceeded, even if the road condition is good and traffic is minimal.

8.6 Animal Restraint During Transportation

- i. Restraining elephants for transportation is one of the most difficult tasks that requires highly skilled personnel who understand elephants and have prior experience in the task. Effective restraining of elephants during transport is essential for the safety of elephants, their handlers, and the entire unit. Handlers and mahouts engaged in the task of restraining elephants in the truck should be well versed in roping, particularly putting knots, hitches, and splices. This task requires not only expertise but also speed in execution.
- ii. The legs may be tied with ropes passing through the holes in the platform to the bottom line (chassis). Neck rope is also tied either in the sidewalls or, preferably to the bottom. Manila hemp, *Sterculia villosa*, jute ropes or other appropriate ropes can be used. Since improper roping can cause skin burns, blisters and festering wounds that compromise the welfare of the elephants, ropes that are safe must be used.
- iii. Elephants should not be allowed to lie down in the vehicle while being transported. During the entire transportation period, the elephant should be made to stand comfortably.
- iv. The elephant should be made to stand on a platform close to the rear wheels, where the weight of the truck is usually optimal. Wooden logs should be placed horizontally across the sidewalls of the truck, one in the rear and one in the front, near the trunk. The logs should be secured with heavy-duty bolts and nuts.
- v. The wooden log in the front should be placed above the chest and below the eyes of the elephant. During transportation, elephants may put their trunks on the log.
- vi. It is essential to plan the distance and travel time involved. It is advisable not to transport the elephants for more than 15 hours a day.
- vii. Food, water, and other provisions required for elephants and the team should be planned and carried along with the entourage.



8.7 Occupational Health and Safety (OHS) Measures during Handling and Transport

Following measure may be implemented for avoiding, reducing, or eliminating exposure to hazards/risks:

- i. Avail the services of veterinarians with knowledge and competency on capture, immobilization and translocation of elephants.
- ii. Animal handling during rescue operation should follow the hygiene protocol; and animal transportation to be done using appropriate vehicle with provision of food and water and maintain slow constant speed to avoid any injury to the animal.
- iii. Ensure all field personnel are in good physical and mental condition with preventive vaccinations and other prophylactic measures; and personnel should be familiar with emergency procedures and co-ordinate with appropriate public health, veterinary, medical, and emergency services.
- iv. Personal protective equipment should be worn to avoid any injury/infection and use equipment that is well maintained for smooth performance.
- v. Some zoonotic diseases can be prevented by appropriate immunizations or vaccinations; wearing gloves and protective clothing when handling species with zoonotic disease potential; participate in medical consultations and surveillance; avoid high-risk animals and situations.
- vi. Follow strict protocols for handling and transport of animals; collection and handling of samples; Personal Protection Equipment (PPE); disinfection; decontamination; proper training in use, handling, maintenance and disposal of equipment, firearms, chemicals, and drugs involved in the HEC operations; protocols of vaccination and prophylactic measures.
- vii. Participate in training programme on animal handling, personal hygiene, disinfectants use, basic first aid and cardiopulmonary resuscitation (CPR), bio-hazardous waste management, equipment maintenance and safety devices, emergency procedures, reporting protocol of accidents and exposures to zoonosis and conduct hands-on practical and mock drills.

8.8 Public safety

Elephants generally attract crowd. Curious onlookers, villagers and others may mob around elephants and this may result in an untoward incident. Wherever necessary, the support of Police, District Administration and the Local Administration should be obtained for mob/crowd management.

Summary: Key Steps in Operation

Capturing and translocating elephants in cases of human-elephant conflict is a critical process that requires careful planning, expertise, and adherence to ethical and safety standards. **Table-8** below details the key steps in the operating procedure

Table-8 Key Steps in Capture and Translocation as a tool for Managing Human-Elephant Conflict

S.N.	Main Operational Head	Sub Operational Head	Recommended Action
1	Pre-Capture Preparations	Assessment and Planning	<p><i>Conflict Assessment:</i> Evaluate the extent and nature of the human-elephant conflict</p> <p><i>Feasibility Study:</i> Determine if translocation is the best solution compared to other conflict mitigation strategies</p> <p><i>Site Selection:</i> Identify suitable release sites that have adequate habitat, food, water, and low human density</p>
		Team Formation	<p><i>Qualified Personnel:</i> Form a team including wildlife veterinarians, biologists, experienced elephant handlers (mahouts), and support staff</p> <p><i>Training:</i> Ensure all team members are trained in the specific tasks they will perform during the operation</p>
		Equipment Preparation	<p><i>Capture Equipment:</i> Prepare tranquilizer guns, darts, ropes, chains, and transport vehicles</p> <p><i>Safety Gear:</i> Equip the team with protective clothing, first aid kits, and communication devices</p> <p><i>Medical Supplies:</i> Ensure availability of veterinary drugs, antidotes, and medical supplies for emergency situations</p>
2	Capture Operation	Locating the Elephant	<p><i>Monitoring:</i> Use tracking devices, cameras, or local knowledge to locate the elephant</p> <p><i>Behavior Assessment:</i> Observe the elephant's behavior to plan the best capture approach</p>
		Darting	<p><i>Sedation:</i> Administer tranquilizers using dart guns under the supervision of a veterinarian</p> <p><i>Safety:</i> Ensure the safety of the elephant and team during sedation; keep a safe distance until the elephant is fully sedated</p>
		Securing the Elephant	<p><i>Restraint:</i> Once sedated, secure the elephant using ropes or chains, ensuring minimal stress and physical harm</p> <p><i>Health Check:</i> Conduct a quick health assessment and provide any immediate medical care if necessary</p>



S.N.	Main Operational Head	Sub Operational Head	Recommended Action
3	Transportation	Loading the Elephant	<i>Transport Vehicle:</i> Use a specially designed vehicle with adequate space and ventilation <i>Loading Method:</i> Use cranes, ramps, or other appropriate methods to safely load the elephant into the vehicle
		Monitoring During Transport	<i>Health Monitoring:</i> Continuously monitor the elephant's health and stress levels during transport <i>Hydration and Feeding:</i> Provide water and, if necessary, food during long journeys
		Minimizing Stress	<i>Quiet and Smooth Transport:</i> Ensure a smooth ride and minimize loud noises and sudden movements
4	Release at New Site	Site Preparation	<i>Habitat Assessment:</i> Ensure the release site has been assessed for suitability <i>Acclimatization:</i> Allow the elephant to acclimate to its new surroundings if necessary
		Release Procedure	<i>Gradual Release:</i> Open the transport vehicle slowly and allow the elephant to exit at its own pace <i>Monitoring Post-Release:</i> Monitor the elephant's adaptation to the new environment for an extended period
5	Post-Translocation Monitoring	Short-term Monitoring	<i>Health Checks:</i> Conduct regular health checks and observe behavior to ensure the elephant is adapting well <i>Conflict Monitoring:</i> Ensure the elephant is not causing new conflicts in the release area
		Long-term Monitoring	<i>Tracking:</i> Use GPS collars or other tracking devices to monitor the elephant's movements <i>Ecological Impact:</i> Assess the ecological impact of the elephant in the new habitat
6	Evaluation	Documentation and Reporting	<i>Detailed Records:</i> Keep detailed records of the capture, transport, release, and post-release monitoring <i>Reporting:</i> Share findings and results with relevant authorities, conservation organizations, and scientific communities
		Review and Evaluation	<i>Review Process:</i> Conduct a thorough review of the operation to identify successes and areas for improvement <i>Policy Updates:</i> Update policies and procedures based on lessons learned from each translocation operation

Following the above recommended operating procedures, ensures the safety and well-being of both the elephants and the human communities involved, promoting successful conflict resolution and conservation efforts.



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Annexure I

ELEPHANT IDENTIFICATION PROFILE DATA REPORT

Date			
Staff/Team			
GPS			
Location Details	Division: Range/Village: Beat: Habitat Description:		
Sex			
Height	Forefoot Circumference:	Estimated Shoulder Height:	
Estimated Age-Class	Calf	Juvenile	Sub-adult Adult

1) Tusk/ Tushes (Refer to Key for details)

	<i>Right</i>	<i>Left</i>
(i) Arrangement		
(ii) Direction		
(iii) Length		
(iv) Thickness		

2) Ear (Refer to Key for details)

	<i>Right</i>	<i>Left</i>
(i) Size		
(ii) Fold orientation		
(iii) Fold type		
(iv) Fold extent		
(v) Ear lobe shape		
(vi) Tears, holes, and cuts		
(vii) Depigmentation		

3) Tail (Refer to Key for details)

a. Length	
b. Brush	
c. Kink	

4) Wounds



5) Notes

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6) Photos (of specific interest)

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Left Profile Picture

--

Right Profile Picture

--

Frontal Picture

--

Rear Picture

--

**Elephant Unique
Identification**

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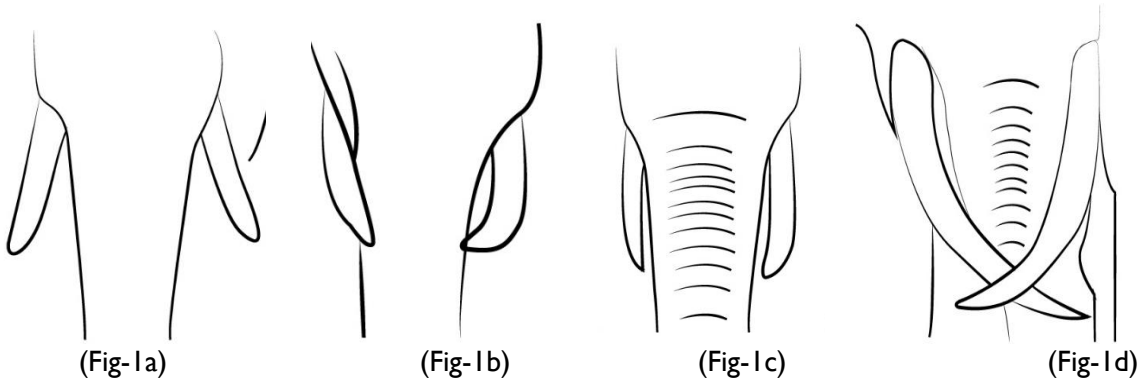


KEY FEATURES USED FOR IDENTIFYING ELEPHANTS

I. Tusk Arrangement

Generally, the front profiles of elephants are used for determining tusk arrangement, which can be categorized as:

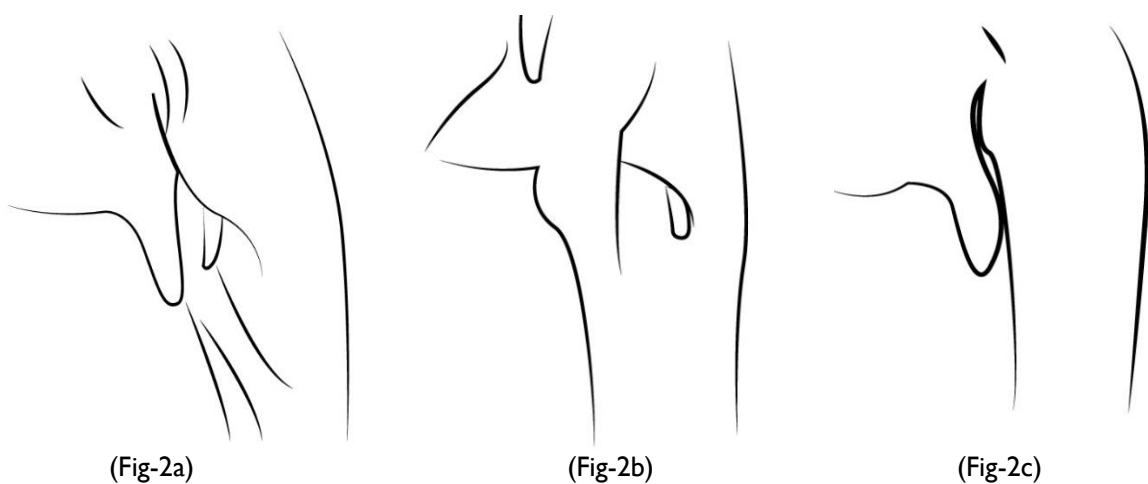
- Divergent: Tusk growing outward with respect to the trunk (Fig-1a)
- Convergent: Tusk growing inward with respect to the trunk (Fig-1b)
- Parallel: A tusk growing parallel to the trunk (Fig-1c)
- Crossed: Tusks crossing over each other (Fig-1d)



2. Tushes in cows and *makhnas*

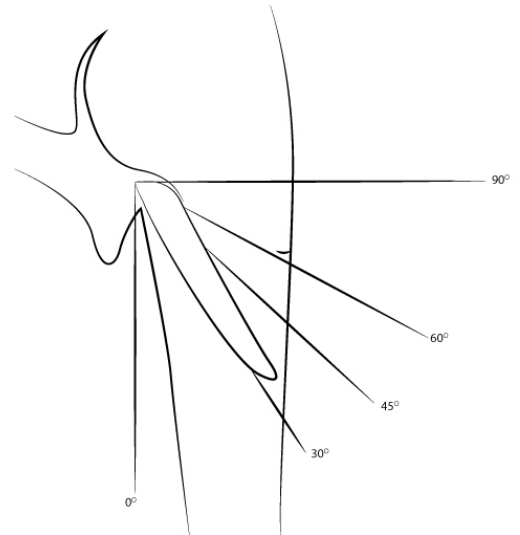
Tushes can be categorized as follows:

- Prominent: Tush growing beyond the lip line (Fig-2a)
- (ii) Visible: Tush growing below the lip line (Fig-2b) and
- (iii) Absent: A tush is either absent or not externally (Fig-2c)



3. Tusk Angle

For ascertaining tusk angle, side profile of the elephant with normal head position is used. The angles can be ascertained by placing a protractor in a picture horizontally to the lip line (Fig-3)

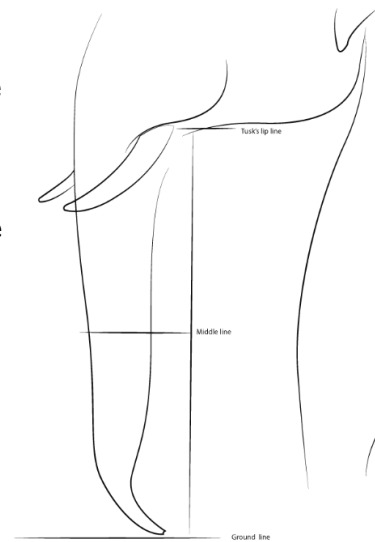


(Fig-3)

4. Tusk length

The tusk lengths (illustrated in Fig-4) are as follows:

- Long: If the length of the tusk is more than half the distance from the lip line to the ground
- Medium: If the length of the tusk is less than half, but more than a quarter from the lip line to the ground
- Short: The length of the tusk is less than a quarter from the lip line to the ground
- Stumpy: If the tusk barely protrudes out of the pre maxilla

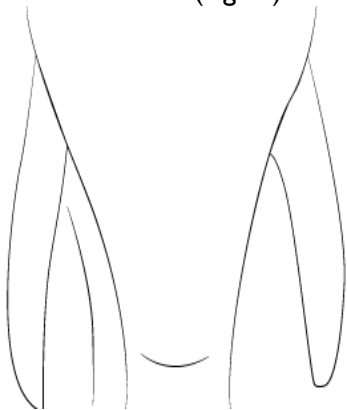


(Fig-4)

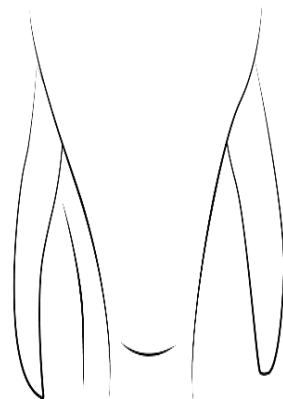
5. Tusk thickness

The thickness of the elephant tusks can be classified as follows

- Thick (Fig-5a)
- Intermediate (Fig-5b)
- Slender (Fig-5c)



(Fig-5a)



(Fig-5b)



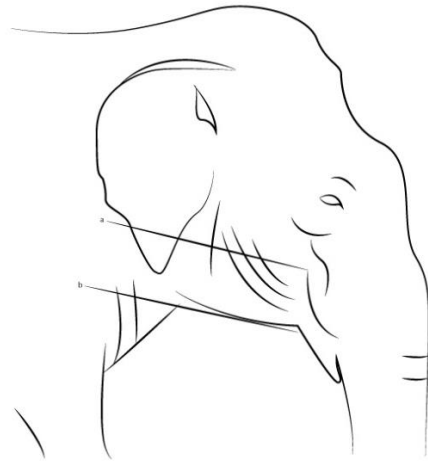
(Fig-5c)



6. Ear Size

The side profiles of the elephants are used to determine the size of the ear pinnae. For this, photos of the ears held against the side of the head are used. The size is Categorized as follows:

- Small: the tip of the ear is above the line-a featured in Fig-6
- Medium: When the tip of the ear is between line-a (lower jaw) and line-b (upper lip line) in Fig-6
- Large: If the tip of the ear is below the lower jaw



(Fig-6)

7. Ear Fold Orientation

Photos of the ears taken from the side and front are used to assess the folds of the ear pinnae. These are classified as follows:

- Top inward: If the top margin of the ear pinnae is folded inwards (Fig-7a and Fig-7c)
- Top outward: If the top margin of the ear is folded outward (Fig-7b)
- Side inward: If the side margin of the ear is folded inwards (Fig-7c)



(Fig-7a)



(Fig-7b)



(Fig-7c)

8. Ear fold Type

The different fold types include:

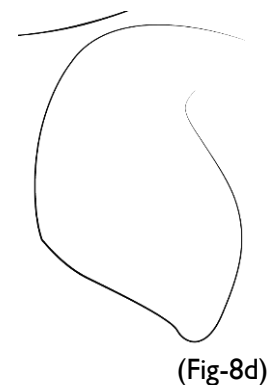
- Complete fold: The top margin of the ear pinnae is completely folded inwards (Fig-8a)
- Partial fold: If a fraction of the top margin of the ear is folded inwards (Fig-8b)
- No fold: There are no folds in the top margin of the ear pinnae (Fig-8c)



(Fig-8a)



(Fig-8b)



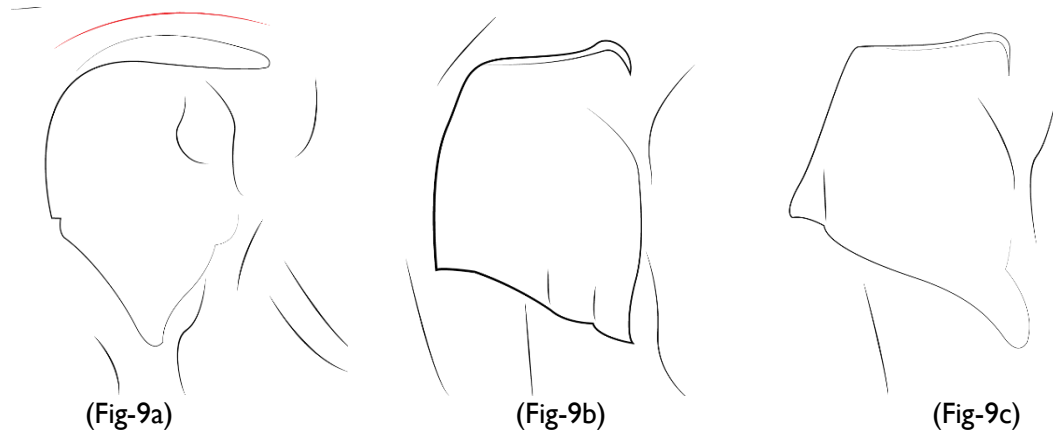
(Fig-8d)



9. Ear-fold Extent

Ear folds can be categorized as follows:

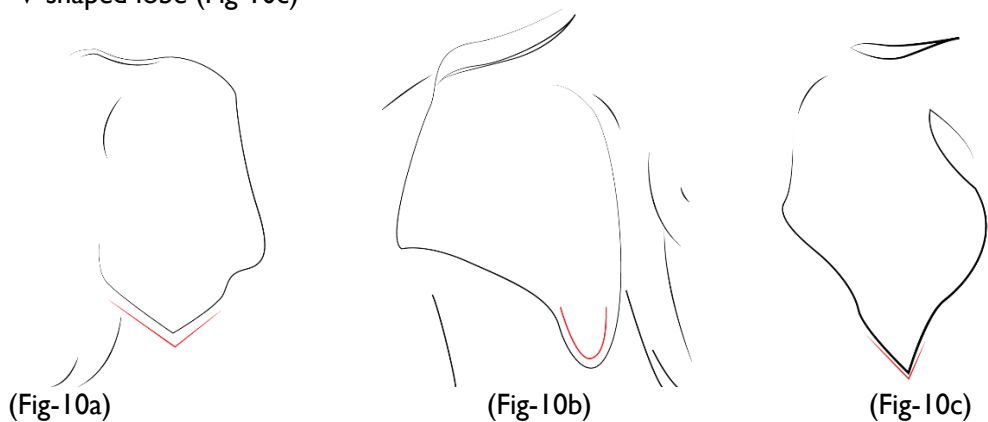
- 100% of top margin: If the entire top margin of the ear pinnae is folded (Fig-9a)
- 50% of top margin: If the fold spans over half of the extent of top margin of the ear pinnae (Fig-9b)
- <50% of top margin: If the folds spans over less than half of the top margin of the ear pinnae (Fig-9c)



10. Ear-lobe shape

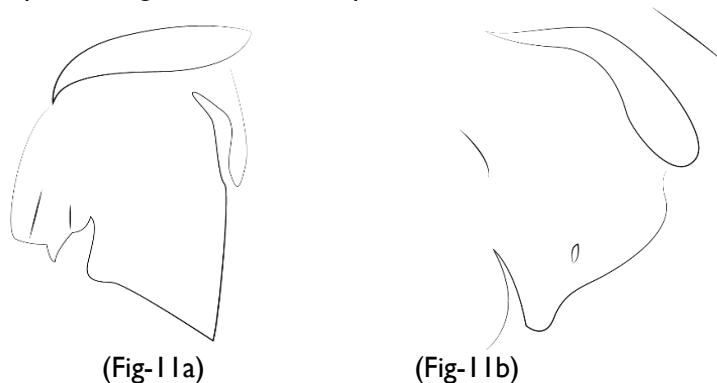
Lobe is the part of the ear pinnae that is lowest to the ground. The lobes can be classified as

- L-shaped lobe (Fig-10a)
- U-shaped lobe (Fig-10b)
- V-shaped lobe (Fig-10c)



11. Additional characteristics of ear pinnae

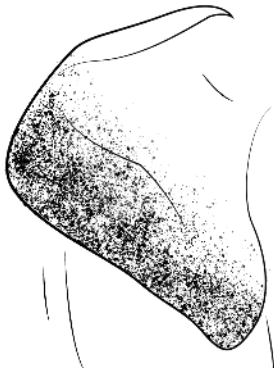
In addition of ear folds, size and shape of the ear, additional features such as cuts (Fig-11a) and punch-holes (Fig-11b) in the ear pinnae can be descriptively noted as they can aid in individual identification of elephants. Big: If the holes are prominent and are about an inch or more in size



12. Ear Depigmentation

For ascertaining the level of depigmentation, photos of elephants that have just come out of water are used. Following are the different depigmentation levels:

- Prominent: Depigmentation covering $1/4$ " or more of the ear (Fig-12a)
- Medium: Depigmentation covering $1/8$ " to $1/4$ " of the ear (Fig-12b)
- Slight: Small patches of depigmentation covering less than $1/8$ " of the ear (Fig-12c)



(Fig-12a)



(Fig-12b)



(Fig-12c)

13. Tail Length

Photos of elephants taken from the side with the tails held vertically downward are used to describe tail length (Fig- 13a). Based on this criteria, following are the categories of tail length:

- Long: If the length of the tail extends till or below the tarsal
- Medium: If the length of the tail extends below knee but much above the tarsal
- Short: If the length of the tail extends below anus but above the patella
- Stumpy: If the tail terminates near the anus



(Fig-13a)



In addition to the tail length, the features of the tail brush (hair bristles in the end of the tail) needs to be described. The tail brush can aid in individual identification (Fig-13b).



(Fig-14b)

Scars, Wounds, Warts and abscesses

Scars, wounds, warts and abscesses may be temporary, last a few years or some cases may remain even permanently. They can be classified as:

- Scars: Scars are marks of previous injuries that have healed
- Wounds: Wounds include lacerations, cut and tears to the skin and other bleeding injuries
- Warts: Warts are lumps (small or large) without pus or blood oozing from the surface
- Abscesses: Abscesses are lumps with pus or blood oozing from the surface
- Other deformities



Annexure II

Data Sheet for Recording and Monitoring Immobilized Animal

Date

AREA

Area/location/ Beat/Range

Brief Description

GPS location.....

Ambient temperature Day (cloudy, bright)

ANIMAL ATTRIBUTES

Species

Purpose of capture

In herd or alone (Composition)

Physical conditionEmotional state (before drugging)

Sex Breeding status

Age Weight (Estimated).....

Identification features (Marks)

IMMOBILIZATION DETAILS

Details of immobilizing drug(s)

Name of Immobilizing Drug(s)	Time of Injection	Total volume	Route & site	Mg used
1.				
2.				
3.				

Behaviour at the time of darting (running, walking, standing, excited)

.....

Induction time: Incoordination (Ataxia).....(Standing).....(Sternal)..... Lateral.....



Approach time & observations

Animal Monitoring and activities					
Time	Detailed observations	Respiration Rate/ Quality	Pulse	Temp	Mucus membrane

DRUG REVERSAL

Name of reversal Drug Time administered

Time	Sequence of events

Other supportive drugs

Sr. No.	Name of drug	Details (Trade name/ Company/ Volume/ Dosage)

Biological Sampling

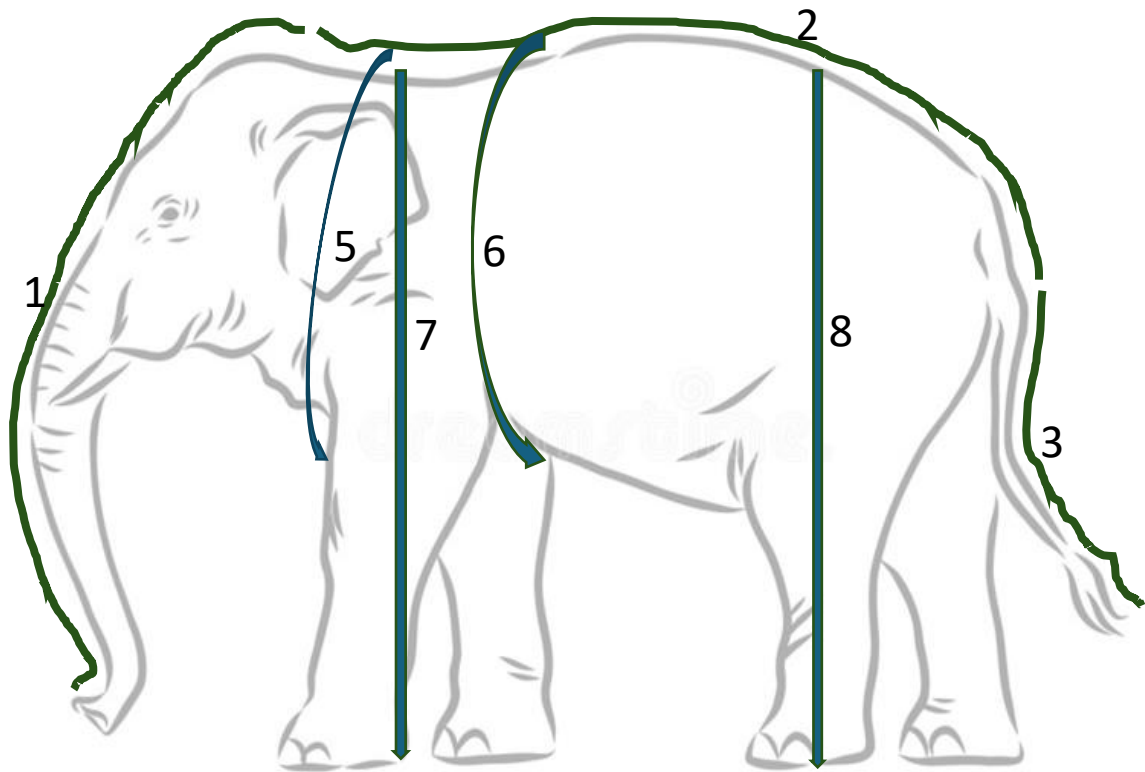
Sr. No.	Sample	Preservatives	Examination required/Custodian

Any other comment:

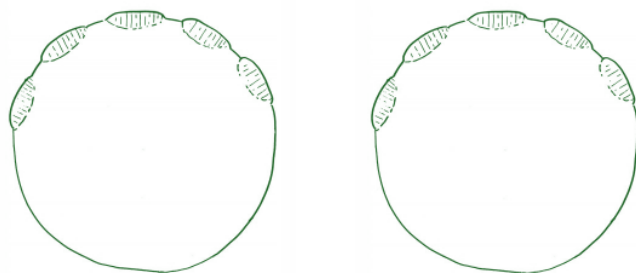
Team :



BODY MEASUREMENTS



- | | |
|--------------------------------------|---|
| 1) Trunk tip to base of Occiput..... | 2) Base of occiput to base of tail |
| 3) Tail Length..... | 4) Tail Description (Full/ broker/ kinked) Tail tip |
| 5) Neck Girth..... | 6) Chest Girth |
| 7) Shoulder Height | 8) Hind limb length |
| 9) Circumference of front foot..... | |



Weight (Kg)=12.8 (G +Ng)-4281 [G =chest girth in cms, Ng=neck girth in cms]

Weight (Kg) (Male)=18 (HG)-3336 [HG=heart girth in cms]

Weight (Kg) (Cow elephant) =15 (HG)-2562 [HG=heart girth in cms]

Weight (Kg)= 1010 + 0.036 (LXG) [L= Body length (cm) from base of forehead to the base of tail, G= Chest girth (cm) measured just caudal to elbow]





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