



Government of India



# Guidelines for Mitigating Human–Rhesus Macaque Conflict

**Taking a Harmonious–Coexistence Approach**



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**Ministry of Environment, Forest and Climate Change**



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# Abbreviations

BMZ	German Federal Ministry for Economic Cooperation and Development	JFM	Joint Forest Management
CCTV	Closed-circuit television	LTEM	Long-term Ecological Monitoring
CWLW	Chief Wildlife Warden	MoEF&CC	Ministry of Environment, Forest and Climate Change, Government of India
CZA	Central Zoo Authority	NDRF	National Disaster Response Force
DBT	Direct Benefit Transfer	NGO	Non-governmental organisation
DFO	Divisional Forest Officer	NTCA	National Tiger Conservation Authority
DLCC	District-Level Coordination Committee	NTG	National Technical Group
EDC	Eco-development Committee	NWAP	National Wildlife Action Plan
EIA	Environmental impact assessment	OPs	Operating procedures
EWRR	Early Warning and Rapid Response	PA	Protected area
GIS	Geographical information system	PCCF	Principal Chief Conservator of Forest
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	PPE	Personal protective equipment
Gol	Government of India	PRT	Primary Response Team
HRMC	Human-Rhesus Macaque conflict	PZP	Porcine Zona Pellucida
HOFF	Head of Forest Force (in a state)	RFID	Radio frequency identification
HWC	Human-wildlife conflict	RRT	Rapid Response Team
HWC-MAP	Human-Wildlife Conflict Management Action Plan	SDRF	State Disaster Response Force
HWC-NAP	National Human-Wildlife Conflict Mitigation Strategy and Action Plan	SFD	State forest department
HWC-SAP	State-Level HWC Mitigation Strategy and Action Plan	SHG	Self-help group
IFS	Indian Forest Service	SLCC	State-Level Coordination Committee
IUCN	International Union for Conservation of Nature	SOPs	Standard operating procedures
		WII	Wildlife Institute of India
		WLPA	Wild Life (Protection) Act, 1972

# Contents

<b>Abbreviations</b>	<b>iv</b>
<b>1. About the Guidelines</b>	<b>6</b>
1.1 The Overall Context	6
1.2 Purpose and Scope	6
1.3 Approach	6
1.4 Legal and Policy Framework for Implementing the Guidelines	6
1.5 Institutional Mechanism for Implementing These Guidelines	6
<b>2. Context and Situation</b>	<b>7</b>
<b>3. Addressing the Drivers and Pressures of HRMC</b>	<b>8</b>
3.1 Overall Measures	8
3.2 Zonation	8
3.3 Monitoring and Managing Habitat-Related Drivers and Pressures	8
3.4 Measures to Strengthen Cross-sector Cooperation for Effective HRMC Mitigation	9
3.5 Facilitating Capacity Development Measures to Develop the Required Competencies for Addressing HRMC in the Most Effective and Efficient Manner	9
3.6 Measures to Strengthen the System of Knowledge Management in HRMC Mitigation	9
3.7 Systematic Research and Monitoring Addressing HRMC	9
3.8 Effective Garbage Management around HRMC Hotspots	10
<b>4. Deploying Measures to Prevent HRMC</b>	<b>11</b>
4.1 Mapping HRMC Hotspots and Monitoring the Populations at Hotspots	11
4.2 Community Awareness and Communication Measures to Reduce the Risk of Accidental Encounters and Retaliation	12
4.3 Support Farmers in Crop Protection and Other Exclusionary Measures, Taking a Harmonious-Coexistence Approach	12
4.4 Identification of Rhesus Macaque Troops-in-Conflict	12
4.5 Monitor and Document Potential Rhesus Macaques-in-Conflict in the Landscape	13
4.6 Effective Use of Rapid Response System at Each Hotspot	13
4.7 Scientific Management of Rhesus Macaque Population at Interface Areas or Conflict Hotspots	14
4.8 Managing Rhesus Macaques-in-Conflict in Urban/Rural Areas	14
4.9 Managing New Colonising Troops of Rhesus Macaque	14
4.10 Long-Term Measures for Scientific Management of Rhesus Macaque Population	14
4.11 Addressing Zoonotic and Other Emerging Diseases, Taking a One Health Approach	15
<b>5. Addressing the Emergency Situations Arising due to HRMC</b>	<b>16</b>
5.1 Establishment of Emergency Response Mechanism	16
5.2 Intra- and Inter-agency Coordination and Cooperation	16
5.3 Preparedness of Response Teams	16
5.4 Action at the Onset of an Emergency or Specific Situation	16
5.5 Key Response Actions During and After an Emergency	16
<b>6. Reducing the Impact of HRMC on Health and Overall Well-being of Humans Affected</b>	<b>17</b>
6.1 Addressing the Situation of Loss of Human Life/Injury	17
6.2 Addressing the Situation of Crop Damage	17
6.3 Addressing the Situation of Lost Livelihood Opportunities	17
<b>7. Reducing the Impact of HWC on the Health and Well-being of Rhesus Macaques</b>	<b>18</b>
7.1 Overall Measures	18
7.2 Addressing the Health and Well-being of Rhesus Macaques during Capture and Post-capture Operations	18
7.3 Addressing the Health and Well-being of Rhesus Macaques during a Release	19
<b>8. Use of Learnings from the Guidelines to Further Strengthen the Institutional and Policy Framework Related to HRMC Mitigation in India</b>	<b>20</b>
<b>9. Process of Development, Pilot Testing of These Guidelines and Consultation Process</b>	<b>20</b>
<b>10. Monitoring and Evaluation of Guidelines</b>	<b>20</b>
<b>Annexe 1</b>	<b>21</b>
National Technical Group (NTG)	21
Working Group on Pilot Implementation of Guidelines and HWC-NAP	21
Author Group for drafting the guidelines	21

# 1. ABOUT THE GUIDELINES

## 1.1 THE OVERALL CONTEXT

- These guidelines on human–Rhesus Macaque conflict mitigation (HRMC) get the overall context from the Wild Life (Protection) Act, 1972 (WLPA), National Wildlife Action Plan (2017-31)<sup>1</sup>, the Advisory to Deal with Human–Wildlife Conflicts (MoEF&CC 2021) and the National Human–Wildlife Conflict Mitigation Strategy and Action Plan of India (2021–26) (HWC-NAP)<sup>2</sup>. HWC-NAP provides the overall conceptual and institutional framework for implementing these guidelines.
- These guidelines take into consideration the existing guidelines, advisories and good practice documents issued by various state governments and build on them to bring about a more holistic approach to HRMC mitigation.
- In addition to HRMC mitigation, following guidelines provide guidance on other selected species: guidelines for mitigating human–Elephant, –Gaur, –Snake, –Crocodile, –Wild Pig, –Bear, –Blue Bull, –Leopard and –Blackbuck conflicts.
- The following guidelines on cross-cutting issues are to provide guidance on selected issues: Guidelines for Cooperation between the Forest and Media sector in India: Towards effective communication on Human-Wildlife Conflict Mitigation; Occupational Health and Safety in the Context of Human–Wildlife Conflict Mitigation; Crowd Management in Human-Wildlife Conflict Related Situations; and Addressing Health Emergencies and Potential Health Risks Arising Out of Human–Wildlife Conflict Situations: Taking a One Health Approach.

## 1.2 PURPOSE AND SCOPE

- The guidelines aim to facilitate a common understanding among key stakeholders on what constitutes effective and efficient mitigation of HRMC in India, leading to co-existence, and to ensure standardisation in performing mitigation operations in the most effective and efficient manner, with minimum damage to humans and Rhesus Macaques.
- The guidelines provide advice on mitigation measures to be used to address HRMC in the long term, as well as facilitate the development, assessment, customisation and evaluation of site-specific HRMC mitigation measures that are effective and wildlife-friendly.
- The guidelines serve as a basis for overall long-term planning and coordination of HRMC mitigation measures at the national, state and division levels.
- In general, the guidelines apply to all stakeholders relevant to HRMC mitigation and are not limited to state forest departments (SFDs).
- The guidelines will be able to bring in more effectiveness and efficiency when fully integrated into the division-level HWC Management Action Plans (HWC-MAP) and state-level HWC Mitigation Strategy and Action Plans (HWC-SAP).

## 1.3 APPROACH

- The development and implementation of these guidelines is driven by a harmonious-coexistence approach<sup>3</sup> to ensure that both humans and macaques are protected from negative impacts of HRMC.
- The guidelines address the issue of HRMC, taking a holistic approach. The holistic approach of the guidelines entails addressing not only the emergency situations arising due to immediate conflict situations but also the drivers and pressures that lead to HRMC; providing guidance on establishing and managing prevention methods; and reducing the impact of conflict both on humans and Rhesus Macaques.
- The development of these guidelines and their intended implementation are driven by a participatory approach. These guidelines are intended to facilitate participatory planning, development and implementation of HRMC mitigation measures with key sectors and stakeholders at the national, state and local levels.
- The guidelines reflect on the need for a landscape approach while formulating solutions for mitigating HRMC to ensure sustainable solutions as unless comprehensive and integrated HRMC mitigation measures are implemented across the landscape, the problem is likely to only shift from one place to another.
- Efforts have been made to forge linkages with plans and guidelines of key relevant sectors for enhancing synergies and eliminating trade-offs at the field level.
- Taking a capacity development approach, the guidelines facilitate the implementers through provision of the *Implementer's Toolkit* to provide operating procedures (OPs), formats, checklists and other field implementation aids.

## 1.4 LEGAL AND POLICY FRAMEWORK FOR IMPLEMENTING THE GUIDELINES

- These guidelines should be read in conjunction with the existing relevant legal and regulatory frameworks, especially the Wild Life (Protection) Act, 1972.
- The following laws are considered directly relevant for conservation when dealing with HRMC:
  - Wild Life (Protection) Act, 1972
  - Prevention of Cruelty to Animals Act, 1960
- Sections 9, 11(1)(a) (2) (3), 12(bb), 29, 35(6) and 39(1)(a) of the WLPA 1972 are especially relevant when dealing with HRMC.
- The Supplementary Framework to HWC-NAP on Legislative Framework for HWC Mitigation in India<sup>4</sup> is to be referred to for more details on the specific legal provisions for HWC mitigation.
- Other important laws that facilitate conservation when dealing with HRMC include the Environment Protection Act, 1986, the Indian Penal Code, 1860, the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, the Indian Forest Act, 1927; the Forest (Conservation) Act, 1980; the Environment (Protection) Act, 1986, the Disaster Management Act, 2005, etc.

## 1.5 INSTITUTIONAL MECHANISM FOR IMPLEMENTING THESE GUIDELINES

- The institutional mechanism outlined in the HWC-NAP will be followed for implementing these guidelines.

1 MoEFCC (2017). National Wildlife Action Plan (2017-35)

2 National HWC Mitigation Strategy and Action Plan of India (2021-26), available from <https://moef.gov.in/wp-content/uploads/2022/01/National-Human-Wildlife-Conflict-Mitigation-Strategy-and-Action-Plan-of-India-2.pdf>

3 'Harmonious coexistence' is defined as a dynamic but sustainable state in which humans and wildlife adapt to living in shared landscapes, with minimum negative impacts of human-wildlife interactions on humans or on their resources and on the wildlife or on their habitats. The mitigation measures designed using this approach maintain a balance between the welfare of animals and humans where both are given equal importance. Overlap in space and resource use is managed in a manner that minimises conflict.

4 Supplementary frameworks to the HWC-NAP: <https://moef.gov.in/wp-content/uploads/2022/01/National-Human-Wildlife-Conflict-Mitigation-Strategy-and-Action-Plan-of-India-2.pdf>

## 2. CONTEXT AND SITUATION

- The Rhesus Macaque (*Macaca mulatta*) is a species of primate that has coexisted with human populations since time immemorial. A number of adaptive traits in macaques have enabled them to provide crucial mandatory ecological services in tropical environments, such as seed dispersal, pollination, and serving as food for top predators, especially hawks, eagles and mammalian carnivores. Rhesus Macaques are worshipped because of their religious and mythological relevance.
- The distribution range of the species in north India includes all the states/Union Territories except certain parts of Gujarat, Rajasthan, Jammu and Kashmir and Sikkim. In central and southern India, the distribution extends to parts of south Gujarat, north and eastern Maharashtra, and central and coastal regions of Andhra Pradesh and Telangana. Estimates of the Rhesus Macaque population across the distribution range in India are not available.
- In rural areas, with an interspersion of agricultural lands and fragmented forests, semi-commensal macaques forage on agricultural/horticultural crops. The generalist and omnivorous habits of the Rhesus Macaque, its adaptable nature and its capability to forage in both urban and rural areas are some of the traits of this macaque that have led to the survival of the species in higher densities within human-dominated landscapes compared with forests, subsequently leading to conflicts between humans and Rhesus Macaques.
- HRMC refers to the negative interaction between humans and Rhesus Macaques, leading to adverse impacts on humans or their resources, such as death and injury, crop damage and loss of property, apart from affecting emotional well-being, and on the Rhesus Macaques or their habitats.
- HRMC is driven by fragmentation and degradation of habitats, expansion of agricultural lands and localised increases in Rhesus Macaque populations. Increased food availability, through crop fields, in human-dominated areas, inadequate garbage management and behavioural factors of the Rhesus Macaque have exacerbated the pressure and resulted in increased HRMC over the past few decades in specific areas. Contrary to popular belief, the macaque presence in human-dominated landscapes is not entirely due to unavailability of food in the forest but due to the adaptive behaviour of the Rhesus Macaque and to the availability of easy and high-energy food and absence of natural macaque predators in such areas.
- HRMC affects human societies in terms of loss of livelihood opportunities, economic losses, negative emotional impacts and human deaths and injuries, while the macaques are affected in terms of the growing intolerance of humans towards Rhesus Macaque leading to retaliatory actions.
- Capture and translocation of macaques-in-conflict have often only resulted in the transfer of the problem to newer areas—the original conflict spot is occupied due to immigration or expansion of neighbouring troops into vacated areas. Rather than being a mitigative measure, translocation has become an HRMC intensifier in most instances. In some instances, the translocated troops have mixed with populations of the endemic peninsular Bonnet Macaque (*Macaca radiata*). Similarly, some large-scale translocations have even led to expansion of the range of the species in peninsular India, thereby increasing the geographic spread of HRMC.
- Further information and data needs to be generated (in terms of numbers and trends in HRMC cases, crop damage assessment criteria, etc.), to ensure the development of effective mitigation measures. Periodic estimation of the Rhesus Macaque population across the distribution range in India is the highest priority. In states where Rhesus Macaques were declared vermin, permitting their hunting as a measure to reduce HRMC, effectiveness of such measures may be studied and further strengthening of these measures may be done; capacity needs assessment of the local community as well as the frontline staff may be done in order to assess the capacity development needs for effective HRMC. Some states have used non-lethal mitigation measures with considerable success, the long-term effectiveness of these measures is yet to be assessed.

## 3. ADDRESSING THE DRIVERS AND PRESSURES OF HRMC

### 3.1 OVERALL MEASURES

A major gap involves effective problem analysis to identify drivers and pressures of conflict and thereby select mitigation measures appropriately.

- A systematic analysis of HRMC mitigation methods may be done to assess their effectiveness and wildlife-friendliness in different types of conflict situations. This will facilitate customisation and adaption of mitigation measures or combining two or more mitigation measures to achieve the best possible impacts in the field.

### 3.2 ZONATION

Commensal and semi-commensal macaques come into contact with humans in three basic contexts: crop-foraging, provisioning at religious/tourist sites and cohabitation with humans in semi-urban/urban/rural areas. The distribution, demography and behavioural characteristics determine the zone of influence of macaques. The feasibility of mitigation of HRMC is variable with commensal and semi-commensal macaques, with some situations requiring mild to significant interventions.

Three management zones can be identified on the basis of intensity of conflict and management interventions. Zonation will allow a science-based and pragmatic approach to landscape-level planning for both HRMC mitigation and conservation.

- **Rhesus Macaque conservation zone:** This zone consists of forested areas, wherein resident macaques rarely come into conflict with humans as they are shy and avoid human interactions. Habitat restoration and amelioration activities to address habitat degradation may be undertaken in this zone. Habitat restoration should be based on the native species of the region. No special interventions may be needed for Rhesus Macaque management.
- **Forest-human interface and co-existence zone:** In this zone, macaque conservation and human livelihoods may be balanced and reconciled. This zone consists mainly of community- or privately-managed forest fringes/agricultural areas and supports most of the macaque populations. Agricultural fields, isolated village forests replete with natural food for macaques and waste or unused land also fall in this zone. The activities/behaviour of both humans and macaques can be managed in this zone.

- **Rhesus Macaque management zone:** This zone includes urban and rural landscapes where macaques do not have adequate natural habitats and thus entirely depend on human provisioning, on edible items in houses and on garbage dumps. High levels of macaque aggression towards humans are also quite common in such places, leading to bites and high level of stress, posing risks to both macaques and humans. Major HRMC measures in this zone will call for changes in human behaviour, effective management of garbage/food waste and scientific management of rhesus macaque population.

### 3.3 MONITORING AND MANAGING HABITAT-RELATED DRIVERS AND PRESSURES

Habitat loss, fragmentation and degradation are key drivers leading emigration of forest-dwelling macaque troops to new areas, resulting in HRMC in the forest fringes, agricultural areas and urban areas. As forests support the source population of Rhesus Macaques, whenever a troop in the agricultural interface or urban areas are removed or displaced, new troops from forests may move in to fill the void. Thus, to prevent such unending cycles, it would be essential to prevent any further fragmentation and degradation of natural forest habitats.

Most of the macaque troops involved in HRMC outside the forests or PAs have, however, already adapted to live with humans as commensals, and such troops do not seem to be affected any more by forest loss and degradation.

- Monitoring forest fragmentation and degradation may be carried out by establishing permanent plots for long-term ecological monitoring (LTEM) by the respective SFDs. Long-term monitoring can also be initiated through research institutions and organisations monitoring the effects of climate change and anthropogenic pressures on forests.
- There is a possibility that unsustainable extraction of NTFPs, especially fruits and nuts (natural food items of Rhesus Macaques), leads to a decrease in overall resource availability and to a decrease in the ability of Rhesus Macaques to sustain themselves inside forested habitats. Overexploitation and unscientific harvesting of NTFPs decreases natural forest regeneration and productivity. Not only does this affect the foraging habitat of Rhesus Macaques and other



wildlife and leads to a gradual loss of livelihoods of forest-dwelling communities. The primary objective of any management intervention may be to bring about better livelihood opportunities and reduce the dependence of humans on forest biomass.

### **3.4 MEASURES TO STRENGTHEN CROSS-SECTOR COOPERATION FOR EFFECTIVE HRMC MITIGATION**

Cross-sectoral cooperation for HRMC mitigation entails engaging multiple stakeholders from different sectors and domains at the national, state, landscape and district/forest division levels. The following measures are envisaged:

- State-level Coordination Committees (SLCC), landscape-level multi-stakeholder fora and District-level Coordination Committees (DLCC) may be used to strengthen the inter-agency coordination required for HRMC, and a district-specific operational mechanism may be developed to address specific needs of HRMC mitigation.
- Safety audits may be conducted each year, if feasible, to ensure that all members of the community act responsibly in the case of HRMC and to facilitate inter-agency cooperation.

### **3.5 FACILITATING CAPACITY DEVELOPMENT MEASURES TO DEVELOP THE REQUIRED COMPETENCIES FOR ADDRESSING HRMC IN THE MOST EFFECTIVE AND EFFICIENT MANNER**

To ensure that HRMC mitigation measures are planned and implemented keeping in mind animal welfare and ethical considerations, as well as the safety and health of the response teams and other field personnel, the SFDs may ensure that all response team personnel from forest and other line departments and agencies are brought under a systematic approach to capacity development, in line with the Supplementary Framework to HWC-NAP on Establishment and Capacity Development of HWC Mitigation Response Teams<sup>5</sup>.

- Regular and systematic specialised training programmes may be conducted on critical operations such as rescue, capture and translocation jointly with other key departments in the form of mock-drills and simulation training sessions.

- Advanced training programmes on animal welfare issues may be conducted for all personnel of the RRTs and Community PRTs.
- The competencies of members of RRTs may be reviewed on a regular basis and the curriculum for their training may be fine-tuned and updated regularly, in line with the Supplementary Framework to HWC-NAP on Establishment and Capacity Development of HWC Mitigation Response Teams.

### **3.6 MEASURES TO STRENGTHEN THE SYSTEM OF KNOWLEDGE MANAGEMENT IN HRMC MITIGATION**

To ensure that HRMC mitigation measures are effective and sustainable, it is essential that not only are field experiences, learnings, field-evidence and conceptual advances shared across key stakeholders and landscapes but that such knowledge is also documented for utilisation in future strategies and plans related to HRMC mitigation.

- The National HWC Mitigation Forum, landscape-level multi-stakeholder fora and appropriate working groups may be used to share field experiences and learnings within the forest department, across stakeholders, and across landscapes.
- Measures are to be put in place to systematically document field experiences, learnings, field-evidence and conceptual advances related to HRMC mitigation, to inform future HRMC mitigation strategies and plans.

### **3.7 SYSTEMATIC RESEARCH AND MONITORING ADDRESSING HRMC**

HRMC mitigation is an extremely challenging subject as Rhesus Macaques are very intelligent and learn to adapt to any mitigation method very quickly. In recent times, economic, cultural, ecological and several other parameters have all altered the demographic and population parameters, breeding behaviour and troop dynamics of macaques, including early sexual maturity and increased birth rates.

- Generating information on the status and distribution of the macaques locally and developing an understanding of their interactions with human societies are the basic steps towards HRMC mitigation.

<sup>5</sup> Supplementary Framework to HWC-NAP on Establishment and Capacity Development of HWC Mitigation Response Teams, available from <https://moef.gov.in/wp-content/uploads/2022/01/National-Human-Wildlife-Conflict-Mitigation-Strategy-and-Action-Plan-of-India-2.pdf>

- Studies, surveys and research may be facilitated to generate quantitative information on the use of habitats, ranging patterns, breeding behaviour, etc. of Rhesus Macaques in relation to recent anthropogenic changes and availability of provisioned food, throughout the known distribution range of the species.
- Studies and surveys may be conducted to generate information on the dispersal, survival and mortality factors of adults, juveniles and dispersing individuals. These may include focal status surveys as well as dedicated telemetry and behavioural studies throughout the species' range.
- SFDs may facilitate research institutions, NGOs and experts involved in mitigation of HRMC to carry out result-oriented research on the following:
  - Implications of the release of Rhesus Macaques outside their current known range. As part of earlier mitigation measures, Rhesus Macaques were captured and released outside their historical distributional range at several locations. This has led to an increase in conflicts at such release areas as the Rhesus Macaque is a temperamentally more aggressive species, compared with the native Bonnet Macaques, at the new locations.
  - Impacts of mixed-species troops and hybridisation on potential future conflict. Mixed-species troops do occur, in which both macaque species (Rhesus Macaque and Bonnet Macaque) function as any typical macaque troop. Hybridisation in such mixed-species troops has not been ruled out by primatologists. Regular monitoring at the distribution boundaries of these species and their overlap zones is essential to check for possible hybrids and their behavioural traits.
  - Methods of scientific management of rhesus macaque population need to be standardised, especially the methods of capture, reproductive control, post-surgical rehabilitation and release of these macaques into existing troops in their distribution range.
  - Comparing the differences in ranging behaviour and habitat use of commensal macaques and semi-commensal macaques-in-conflict will help identify drivers and pressures that bring Rhesus Macaques into conflict. Studies on the behavioural ecology of Rhesus Macaques in urban/rural areas may be encouraged to get good baseline data on the species. A good understanding of its ranging and foraging

patterns and the extent of injury and harm these animals cause to humans, their holdings and property can help devise better strategies to handle conflicts.

- Global good practices in mitigating the human-macaque conflict may be compiled, assessed for their feasibility at specific locations, implemented on pilot basis and if found suitable, may be considered for implementation.

### **3.8 EFFECTIVE GARBAGE MANAGEMENT AROUND HRMC HOTSPOTS**

#### **In urban areas**

Garbage bins are the most important anthropogenic aspects of human-macaque interface zones since they are easily accessible, high-yielding, reliable and regularly replenished food sources for macaques.

In urban areas, where natural food is not available, such garbage bins form an important part of the foraging habitat on which macaques are entirely dependent, and these are actively defended territories of Rhesus Macaque troops. These bins tend to be monopolised by a few individual macaques, and naturally, there will be heightened aggressive behaviour shown by the troop members to control and defend these resource patches. Humans also end up at the receiving end of such misdirected aggression. Individuals subdued by dominant macaques redirect their aggression to a lower-ranked individual or to humans present nearby.

Effective garbage management, to ensure that food is not available for macaque troops, is a crucial measure to control the population and behaviour of this species in human-dominated landscapes.

- At all HRMC hotspots, innovative and site-specific designs of garbage bins may be developed to ensure that Rhesus Macaques are not able to access the garbage in these bins.
- In addition to garbage bins, plan other interventions to gradually and strategically move out Rhesus Macaque troops to alternate natural food sources nearby, if any.
- SFDs may coordinate with local municipalities/ sanitation departments to ensure that such measures are implemented widely and in the long term.
- The possibility of installing macaque-proof garbage bins at HRMC hotspots, and implementing other such measures, under the Swachh Bharat Mission may be explored.

### **In rural areas**

- SFDs may coordinate with District Collectors and Panchayati Raj Institutions, especially focusing on cooperation with panchayats of villages that are adjacent to forests, regarding effective garbage management.
- Community PRTs may periodically inspect the forest perimeter near villages/towns to ensure that poor disposal of garbage or food waste, if detected, is brought to the notice of the local authorities.
- Aversion conditioning measures may be implemented in areas where Rhesus Macaques have started foraging in villages and towns in search of food.
- The vegetable and food waste generated at weekly markets in rural India, garbage thrown along roads and railway lines passing through forests and other such food may attract Rhesus Macaques and may

lead to accidental encounters with humans. SFDs may coordinate with the local administration for organizing such markets overall in such a way that garbage is effectively managed and does not attract Rhesus Macaques.

- Awareness-building on macaque behaviour related to garbage availability among local communities may be intensified.
- Signage may be placed along roads, markets, religious places, etc. to reinforce the awareness building measures.
- Effective garbage disposal facilities at the above sites may be supported.
- Routine inspection of roads and other common areas may done by SFDs and associated stakeholders.

## 4. DEPLOYING MEASURES TO PREVENT HRMC

### 4.1 MAPPING HRMC HOTSPOTS AND MONITORING THE POPULATIONS AT HOTSPOTS

Identifying HWC hotspots<sup>6</sup>, which could also provide indicators about the drivers of conflict, is critical to provide site-specific solutions to mitigate HRMC. Conflict hotspots of HRMC can be mapped through geo-spatial assessments, by using both primary data and secondary data, including time-series data. The hotspots can be identified and mapped as follows:

- **Incident hotspots:** Frequency of occurrence of incidences over a specific period, such as 5 or 10 years, mapped over the target area. The data include numbers of incidents of injury and death (of humans or macaques) and, in very rare cases, attacks/killing of small domestic animals.
- **Vulnerability hotspots:** Cumulative index obtained by overlaying past incidents, vulnerability of local community and potential risk of the area.

Hotspots, or conflict-prone sites, may vary or shift, depending upon the season and crop rotation pattern. A baseline of population can be developed at the hotspots. Later on, all incidences of conflict over a year may be recorded in detail in the databases. This helps in enriching the database, using which the ecological aspects can be analysed to determine the resting places, movement routes into human areas and seasonal changes in these patterns.

- Mapping can be done on the basis of the existing data relating to crop damage, encounters with humans and injury or death of humans or macaque. The conflict type can be classified according to the different mitigation measures, while conflict zones can be separated as low- or high-conflict zones. Heat-maps (showing areas with a high probability of HRMC) can be created using GIS tools.
- A risk zonation map showing low- to high-conflict areas can be prepared using these data, and regular updating will help create a more dynamic (spatio-temporal) map of the conflict zones.

### 4.2 COMMUNITY AWARENESS AND COMMUNICATION MEASURES TO REDUCE THE RISK OF ACCIDENTAL ENCOUNTERS AND RETALIATION

Local communities are one of the most important stakeholders in HRMC mitigation. Other important stakeholders are the private sector, plantation owners and workers, farmers, tourism-sector organisations, industries, the transportation sector, local businesses, law enforcement agencies, local primary health centres and other government agencies. To facilitate effective engagement of local communities and various stakeholders in mitigation of HRMC, it is extremely important to plan and implement awareness and sensitisation measures, taking a participatory approach.

- Appropriate community awareness and communication measures may be implemented at HRMC hotspots, and their impacts may be assessed periodically to ensure that the awareness and communication measures are locally customised.
- Tools for developing, implementing and customizing community awareness and communication measures may be developed.

### 4.3 SUPPORT FARMERS IN CROP PROTECTION AND OTHER EXCLUSIONARY MEASURES, TAKING A HARMONIOUS COEXISTENCE APPROACH

Most of the communities at the rural village–forest interface experiencing HRMC have developed indigenous methods of deterring Rhesus Macaques. The successful ones among these may be identified, studied and customised to enhance their effectiveness and wildlife-friendliness.

Site-specific deterrents for Rhesus Macaque may be explored from the following five categories:

- **Acoustic (hearing):** High-pitched ultrasonic monkey repellers have been used as effective means of repelling macaques in certain countries and in a few places in India.
- **Visual (vision):** Visual stimuli, such as cloth curtains and models of predators (Leopard/Tiger) have

<sup>6</sup> “HWC hotspots” are areas with actual or predicted repeated occurrences of HWC incidents resulting in crop-loss, human death and injury, and wildlife death and injury over temporal and spatial scales. Such hotspots can be static (in the same place or time) or dynamic (shifting in space and time over years). In addition to count the statistics, the magnitude of the incidents is subjected to interpolation or extrapolation techniques to define the hotspots in space and time.

been designed, primarily to repel macaques from agricultural fields and orchards. Spotlights, flashing lights and strobe lights have often been used to repel Rhesus Macaques.

- Taste: Food items despised by macaques can be used for conditional taste aversion. These food items should not harm the macaques.
- Olfactory (smell): Substances that give off strong odours can also be used as repellents. Such agents can also be mixed with aversive agents to elicit a conditioned aversion.
- Tactile (touch): Power fences with oscillating currents deter macaques and may be erected as barriers.
- Behavioral conditioning: Continuous guarding of crops by farmers and using non-lethal methods to drive macaques away, each time they enter the field, is likely to condition the behaviour of macaques and reduce the occurrences of them entering the crop fields in future.
- Beating of drums or tin cans and shouting are the most common repellent measures, with varying degrees of effectiveness in different situations.
- Community-based institutions may be engaged by the SFDs together with wildlife experts/organisations in motivating, training and hand-holding the community, in the development of innovative and locally-customised exclusionary measures that are effective and wildlife-friendly.

It may be considered that physical deterrents may not succeed for long due to the ability of macaques to learn, adapt and avoid them. Therefore, these measures need to be constantly customised and adapted to ensure their effectiveness even while ensuring that these remain wildlife-friendly.

#### **4.4 IDENTIFICATION OF RHESUS MACAQUE TROOPS-IN-CONFLICT**

- Rhesus Macaques-in-conflict, individuals or groups, can be characterised as semi-commensals, casual (opportunistic) groups or commensals that are repeat (obligatory) crop-foraging individuals.

The following steps may be taken to identify the Rhesus Macaques that are most likely to come into conflict with humans.

- The ranging and foraging behaviour of the Rhesus Macaques in their territories (feeding from croplands/ kitchen gardens and on food waste) may be identified, mapped and tracked.

- Observe and pick out unique morphological identification features, assess the troop hierarchy and follow the troops as they traverse human-dominated areas.
- Investigate all conflict-related incidents that take place when they move along the fringes of forest and in human-use areas.
- Deploy a number of CCTV cameras at strategic locations to cover the predicted movement routes of particular troops.
- Analyse the data relating to their ranging and foraging behaviour and the intensity and nature of the conflicts.

#### **4.5 MONITOR AND DOCUMENT POTENTIAL RHESUS MACAQUES-IN-CONFLICT IN THE LANDSCAPE**

- Before initiating conflict mitigation, it is essential to know the demography and population status of the target macaque population. Population changes, measured via annual population estimation, could be the major deciding factor in the scientific management of rhesus macaque population. Regular population estimation every 5 years across the habitat can help monitor the macaque population at the state level. For monitoring populations at individual hotspots, annual monitoring may be conducted within a designated month (i.e., same month each year) to avoid the effect of breeding season variability on the estimate.
- Monitoring populations of Rhesus Macaques may have a focus on the human-use landscapes as the species is more common in such areas. Agricultural and revenue departments, being key stakeholders in HRMC mitigation, could be involved in such population estimation.
- Monitoring of individual macaques or troops can be conducted by tracking known individuals/troops, on the basis of distinct morphological features, and associations and hierarchies in troops.
- It may be useful to create individual identification profiles of alpha males, adult females and breeding adults and juveniles in the troop, producing a database of identified macaque individuals or troops that are in high conflict, with their respective territorial areas of operation. Local universities and other organisations may be engaged for such monitoring to ensure efficiency and sustainability.
  - Initially the focus can be on building identification profiles of macaque troops that get involved in conflicts.

- Data may be gathered on not-in-conflict troops occurring inside forests that are not exposed to food provisioning and associations with humans.
- A conflict, ranging and habitat use profile can be developed for all identified Rhesus Macaques/ troops.
- The following studies/assessments may be conducted in forest–urban–rural interface areas for devising mitigation strategies:
  - Population estimation, monitoring and carrying capacity assessments
  - Resource use patterns of macaques
  - Factors explaining macaque presence in forest–human interface areas and factors that correlate and facilitate macaque persistence in the urban/ rural landscape
  - Estimation of ranging patterns and predicting the conflict probabilities within and between habitats.

#### **4.6 EFFECTIVE USE OF RAPID RESPONSE SYSTEM AT EACH HOTSPOT**

Guarding crops during the daytime from vantage points is one of the most effective early warning and deterrent techniques.

Most often, HRMC does not necessitate immediate action by specialised response teams, as required for incidents with other species-in-conflict. However, in a few instances, where there are sporadic incidents of aggression and recurrences, the situation may demand immediate action. RRTs/Community PRTs may respond quickly to address the situation, including driving the macaques away from the incident site. Therefore, the RRTs and PRTs may also be trained in HRMC mitigation measures in such situations.

- The responses of the RRTs, in such cases of HRMC, may be focussed on driving the macaques away or capturing and translocating them, after proper planning, with adequate personnel, veterinary support, vehicles and equipment. The Community PRTs can support the RRTs in certain aspects of this operation, such as crowd management and dissemination of information to the public.
- Apart from addressing emergency situations, such rapid responses may also facilitate aversion conditioning in macaque troops. With constant denial of access to food waste or other anthropogenic food items, and constant interventions from RRTs and/or the people, the macaques' behaviour will change to the point where they no longer enter such households/shops or crop fields.

#### **4.7 SCIENTIFIC MANAGEMENT OF RHESUS MACAQUE POPULATION AT INTERFACE AREAS OR CONFLICT HOTSPOTS**

A local overabundance of wildlife, including Rhesus Macaques, could be due to a reduction in carrying capacity of the natural habitat of the source population, brought about by habitat loss and degradation and fragmentation of natural habitats. It could also be due to an exponential growth in the population of macaques, or it could be a combination of the two. It is therefore important to determine which factor is driving the overabundance so that the appropriate interventions can be selected.

- Managing local overabundance requires good knowledge and data on population size, dynamics, ranging of various clans, habitat variables, HRMC, etc. SFDs may work towards building both internal capacity and collaborations with research institutes and researchers to achieve the high standards of data collection and analysis needed for scientific management of Rhesus Macaque population.
- SFDs may adopt a robust population monitoring protocol and implement it using trained field staff, or in collaboration with research institutes or local universities/colleges.

#### **4.8 MANAGING RHESUS MACAQUES-IN-CONFLICT IN URBAN/RURAL AREAS**

In areas with severe HRMC, especially the rural–forest interface, the following three options may be explored for scientific management of rhesus macaque populations:

- Capture and translocation of macaque troops-in-conflict to suitable habitats: When Rhesus Macaque troops are non-commensal, they leave their forest habitats and migrate into the rural/urban landscape. Such troops may be identified before they get habituated to human provisioning. Such macaque are normally small and do not cause severe incidents resulting in damage to crops and property and injury to humans. They may be promptly captured and released in their habitat and monitored.
- Large troops of commensal/semi-commensal macaques in the rural/urban landscape that are habituated to provisioning of food may be captured according to the protocol and taken to mass sterilisation centres. Reproductive control measures may be initiated and the macaques subsequently released in the same habitats.

- Capturing and retaining macaque individuals/troop in a rescue centre for lifetime care: Injured and disabled animals are not to be released. They may be kept in a lifetime care facility. There are several states that have created such lifetime care monkey rescue facilities, with the permission of CZA.

#### **4.9 MANAGING NEW COLONIZING TROOPS OF RHESUS MACAQUE**

Rhesus Macaques living inside forests are non-commensal populations that forage and breed within forests. They form self-sustaining stable populations. These forest residents may, for some reason, venture into the adjoining agricultural landscape in search of new areas to colonise. Once there, they start feeding on edible agricultural produce and adapt to this new environment.

- Such populations are to be quickly identified, monitored and captured for translocation back into the forest areas before they get habituated.
- Long-term studies may be conducted to understand the changes in the ecological and behavioural parameters of these macaques. These dispersing populations may be captured and returned back to their natal ranges after population–habitat viability analyses.

#### **4.10 LONG-TERM MEASURES FOR SCIENTIFIC MANAGEMENT OF RHESUS MACAQUE POPULATION**

Various short-term deterrence methods provide immediate mitigation at local sites of conflict and are often useful. However, such deterrents may not succeed for very long because of the macaques' ability to learn, adapt to and avoid/circumvent these deterrents. Moreover, there may be opposition on ethical grounds to the use of lethal methods to control macaque populations. In many high-conflict areas, short-term deterrence has worked during the initial phases but has quickly lost its effectiveness.

The following scientific population management methods may be useful at HRMC hotspots.

- Surgical sterilisation of male macaques by thermo-cauteric coagulative vasectomy and of female macaques by endoscopic thermo-cauteric tubectomy are generally practiced. The main advantage over the newer developments is that the sterility caused is permanent. After the specified recovery time, the macaques may be released within the same area where they were trapped.

- Non-surgical contraception. Another method that is being tried for long-term population control is immuno-contraception using certain chemicals, hormones and vaccines e.g. the porcine zona pellucida (PZP) contraceptive vaccine. The efficacy of this method with free ranging macaques should be determined.

#### **4.11 ADDRESSING ZONOTIC AND OTHER EMERGING DISEASES, TAKING A ONE HEALTH APPROACH**

The response teams and other stakeholders at HWC hotspots are vulnerable to a variety of zoonotic diseases that can be transmitted from different animals. There is also a risk of disease transmission between domestic animals and wildlife and a risk of disease transmission between humans and domestic animals:

- Veterinary capacities and infrastructure may be upgraded, to facilitate disease monitoring in rhesus macaques for both Rhesus Macaque conservation and to prevent zoonotic diseases from spreading to livestock and human populations.
- A well formulated Wildlife Health Management and Disease Surveillance Plan may be in place at every division/protected area.
- All the personnel involved in capture operations may be trained, vaccinated and equipped.
- The basic approach may be to integrate the concept of 'One Health'<sup>7</sup>, which links human and animal health in a shared environment, into all the operations and HRMC mitigation measures in the field.

<sup>7</sup> One Health is a collaborative, multi-sectoral and trans-disciplinary approach—working at the local, regional, national and global levels—with the goal of achieving optimal health outcomes, recognising the interconnection between people, animals, plants and their shared environment.

## 5. ADDRESSING THE EMERGENCY SITUATIONS ARISING DUE TO HRMC

HRMC is continuous in space and time as macaque populations inhabit urban and rural areas, taking refuge in both small forest patches and buildings, holding distinct territories and having movement routes. Driving the macaques away may not always be effective as even if they move from one area to another they return to the location from where they were driven.

There could be HRMC situations that result in human injury and loss of life (rare cases) or property. If provoked by human action, there are aggressive mass retaliations by entire troops. These have the potential to escalate into serious conflict situations, leading to human injury and (rarely) death and require immediate intervention.

An indicative list of the potential emergency situations<sup>8</sup> is provided here in decreasing order of priority:

- A Rhesus Macaque has injured a person.
- A Rhesus Macaque has entered a building and is posing a risk or threat to humans.
- Rhesus Macaque troops have entered a farmer's fields and are damaging horticultural and other crops.
- A Rhesus Macaque is injured

Key response procedures are to be established and actions promptly implemented/undertaken for addressing emergency situations. Detailed step-by-step guidance may be developed as "Operating Procedures for Addressing Emergency Response Situations".

- The key emergency response procedures are presented in the following sections.

### 5.1 ESTABLISHMENT OF EMERGENCY RESPONSE MECHANISM

- HRMC may not require an emergency response, unlike conflicts involving other animals. However, sometimes the situation develops into an emergency when the (probably provoked) Rhesus Macaques become violent and aggressive, injuring humans, usually in a retaliatory fashion or the Rhesus Macaque is injured. In such rare cases, a quick response from community-level PRTs/RRT is necessary.
- A mechanism is required at each division for communicating with key officials and for communicating information for initiation of appropriate response actions at the site of the incident.
- Establishment of 24\*7 Toll Free number for soliciting help of Rescue Teams; and establishment of / use of existing Rapid Response Teams, well equipped with vehicles, human resources and equipment, and trained using competencies-based training measures. Hubs may be in place for receiving the information and transmitting it onwards for quick responses. The hubs may be set up in easily accessible locations.

### 5.2 INTRA- AND INTER-AGENCY COORDINATION AND COOPERATION

- Procedures may be laid down in each division, in line with these guidelines, to ensure timely coordination amongst the response teams as well as with key stakeholders such as local NGOs and the animal husbandry, agriculture and health departments, under the DLCC.

### 5.3 PREPAREDNESS OF RESPONSE TEAMS

- Operating procedures may be laid down in detail to ensure that the capacities and capabilities of the various response teams (Community PRTs, RRTs) are established and their capacity development is facilitated through training programmes and other measures, including training sessions on occupational health and safety.
- Operating procedures may be laid down with specifications to ensure that each response team is sensitised and equipped with appropriate and adequate response equipment and personal protective equipment (PPE kits), in view of effective zoonotic disease and pandemic prevention, management and control.

### 5.4 ACTION AT THE ONSET OF EMERGENCY OR SPECIFIC SITUATIONS

- Operating procedures are to be laid down to receive, channelise and disseminate information at the onset of any emergency, from the site of the incident to related forest officials and the HWC Mitigation Hub and to disseminate the information to requisition related response actions at the emergency site.

### 5.5 KEY RESPONSE ACTIONS DURING AND AFTER AN EMERGENCY

- Operating procedures may be laid down for step-wise key actions (media engagement, crowd management, addressing health emergencies, and post-response operation for management of animals) for all emergencies. This includes ensuring the animal's health and safety during capture and transport to a translocation site and monitoring the animal after it is released safely back into the wild.

<sup>8</sup> Emergency or crisis situations can be defined as situations that are sudden, unexpected, have the potential to be serious/are serious in nature and therefore require immediate intervention in time and space, from concerned stakeholders, to minimise the loss of lives and assets.



## 6. REDUCING THE IMPACT OF HRMC ON HEALTH AND OVERALL WELL-BEING OF HUMANS

Most urban and rural communities have co-existed with Rhesus Macaques for years. But the recent situations where new hotspots of HRMC are formed due to either translocation of Rhesus Macaques to new areas or range expansion by the macaques require innovative mitigation measures.

Humans living in Rhesus Macaque territories in urban and rural areas are familiar with their habits and behaviour. They largely avoid the macaques, but any stimulus may excite the animals, leading to injuries to either or both parties. The fear psychosis among the public leads to decreased tolerance levels and retaliatory actions against the macaques. This further exacerbates the specific interaction, which may be controlled.

### 6.1 ADDRESSING THE SITUATION OF LOSS OF HUMAN LIFE/INJURY

- Loss of human life due to negative interactions with Rhesus Macaque is very rare. Nevertheless, there can be provisions of *ex gratia* to the family of a victim.
- The Rhesus Macaques in urban and rural areas beyond SFD jurisdictions may also interact aggressively, leading to injury and, rarely, death of humans. In such cases, the district administration or municipal councils may provide *ex gratia* payments as relief for the losses.

### 6.2 ADDRESSING THE SITUATION OF CROP DAMAGE

Assessing the long-term impacts of crop damage is complex. Payment of inadequate *ex gratia* to farmers will lead to resentment among the people, leading to adverse impacts on wildlife conservation due to retaliatory action. Payment of *ex gratia* is equally challenging as it might also lead to laxity in crop protection and inhibit the process of finding innovative ways of crop guarding.

- Collaborative efforts can be made to promote market-based arrangements for alternate crops, wherever feasible. Community PRTs may be engaged to facilitate this process in their respective villages/areas of operation.
- The process of settling *ex gratia* payment for crop or property loss should be transparent and simplified. Mobile apps may be used for collecting the information and processing the claims of farmers related to crop damage caused by Rhesus Macaques

to ensure that there is efficiency and transparency in the system.

- Farmers may be encouraged and facilitated through community-based institutions to explore solutions such as changes in cropping patterns and the use of crops that are non-palatable to Rhesus Macaques.
- Site-specific studies may be conducted in collaboration with agricultural research institutes to find appropriate crops that are non-palatable to Rhesus Macaques.
- The Ministry of Agriculture and Farmers Welfare has included crop depredation by wild animals under its flagship scheme, *Pradhan Mantri Fasal Bima Yojana* (PMFBY). This scheme can be used as an important HRMC mitigation instrument.
- Dialogue may be initiated with the insurance sector for providing insurance cover for damage due to HRMC. Insurance can be considered for damage to standing crops besides injuries/loss of life sustained by human beings. The modalities may vary for such insurance from place to place according to the assessment of risk by the insurance companies. The feasibility at the state level may also be explored.

### 6.3 ADDRESSING THE SITUATION OF LOST LIVELIHOOD OPPORTUNITIES

Abandonment of farming practices in high-HRMC areas is a critical issue that can be addressed through cross-sector cooperation. The following may be implemented:

- Systematic assessments of the extent and scale of lost livelihood opportunities and other indirect impacts due to HRMC may be conducted.
- Development of skills for alternative non-land/non-farming-based income generation opportunities.
- Self-help groups (SHGs) facilitating small businesses in the adoption of non-land/non-farming-based alternatives.

## 7.

# REDUCING THE IMPACT OF HRMC ON THE HEALTH AND WELL-BEING OF RHESUS MACAQUES

## 7.1 OVERALL MEASURES

- All care should be taken to address the issues of animal welfare and animal rights as enshrined in the Constitution (Article 48A and 51A(g)) and as per the statutory provisions of the Indian Penal Code (Sections 428 and 429), the Prevention of Cruelty to Animals Act of 1960 (Section 11(1)(h) and Section 11(1)(d)), the Motor Vehicles Act, 1978 (Transport of Animal) Rules, 2001) and guidelines issued by the MoEF&CC.
- The use of mitigation measures that are harmful to macaques may be discouraged by educating local communities and farmers, and safe deterrents may be recommended.

## 7.2 ADDRESSING THE HEALTH AND WELL-BEING OF RHESUS MACAQUES DURING CAPTURE AND POST-CAPTURE OPERATIONS

- The incomplete capture of a macaque troop leads to disruption of the social dynamics and group bondings. So this may be avoided during a capture operation.
- When capturing using cages, the following is to be considered:
  - The design of cages and their transportation is vital for ensuring the well-being of the captured individuals.
  - Captured individuals may be allowed to settle down and remain calm and undisturbed. They may be protected well from direct sunlight, environmental extremes and predators. Utmost care should be taken to avoid undue stress or injury to these individuals.
- Post-capture health examination and monitoring of captured Rhesus Macaques should be done by veterinarians. The physiological parameters (temperature, respiration, pulse rate and colour of mucous membrane) may be monitored constantly.
- Any significant deviation from normal physiological parameters may be medically dealt with appropriately.
- After capture, more detailed examinations may be carried out.

- There are various options for crating and transporting captured macaques. These include transporting the animals in specially designed vehicles or large containers, if the distance is great, and on foot, if the distance is small.
- Major concerns in the design of transportation vehicles include adequate ventilation options (containers) and provision of drainage to facilitate disposal of wastes.
- Transportation from the capture-site to the sterilisation centre/holding facility may be completed quickly and with minimal stress. Individual cages should be of adequate size to allow a macaque to turn around and adjust its posture. The cages may be slightly elevated above the ground to allow the passage of urine and faeces. They may be protected from environmental extremes for the duration of the transport period.
- To avoid trauma during transport, macaques should be not be caged together, except for known family groups, mothers and infants, and young animals. Aggressive males to be housed separately to avoid infighting and injuries due to transport stress.
- Injured individuals may be given basic on-site treatment. Unconscious individuals may be placed in a lateral or sternal recumbent posture and shifted to a transport container immediately.
- Rhesus Macaques anaesthetised after major injuries may be transported only after they have fully recovered. Partially anaesthetised macaques can easily trip over themselves inside a cage. This may lead to respiratory obstruction and eventually death. Inhalation of vomit or regurgitated stomach contents/food in cheek pouch can also occur in an anaesthetised or partially anaesthetised macaque during transport, leading to respiratory obstruction or inhalation pneumonia.
- A macaque may be regularly monitored by an experienced veterinary professional for signs of discomfort or stress during the entire journey.
- It is better to avoid provisioning feed and water during transport. Efforts may be made to reach the destination (sterilisation facility/holding facility near release site/rescue centre) as soon as possible, taking due care of the vehicle speed and halting stations. When a single stretch of a journey is more than six

hours long, especially during hot days, water may be also be kept ready and handy to control possible hyperthermia of recumbent animals.

- Opportunities for establishment of need-based multiple Monkey Rescue Centers with health care facilities / life-time care facilities, may be explored.

### **7.3 ADDRESSING THE HEALTH AND WELL-BEING OF RHESUS MACAQUES DURING A RELEASE**

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- The health of a captured/immobilised macaque may be monitored after sterilisation as welfare and well-being are most important aspects during translocation and release at suitable sites.
- The release sites may have proper off-loading facilities, and the release may be done with the least possible stress to the macaques.
- In case the animals should be kept in captivity, they may be held in a rescue facility. This will provide the animals the chance to recover from anaesthetic drugs besides helping them to get acclimatised to their surroundings at the new location. This will also provide opportunities for the authorities to undertake intensive monitoring and veterinary management schedules.
- In case a Rhesus Macaque is to be kept in captivity, the space provided to the macaque should be as per the CZA guidelines<sup>9</sup>.
- Proper sanitation and hygiene should be maintained to avoid chances of infections and any zoonotic diseases.
- Adequate, balanced food and water may be made available, along with mineral and vitamin supplements, according to the health status of the macaques.

## 8. USE OF LEARNINGS FROM THE GUIDELINES TO FURTHER STRENGTHEN THE INSTITUTIONAL AND POLICY FRAMEWORK RELATING TO HRMC MITIGATION IN INDIA

These guidelines are expected to serve as a capacity development instrument, given that a robust and structured feedback mechanism will be put in place to document the feedback arising from their implementation.

- The feedback arising from the use of these guidelines may, therefore, be consolidated to form the basis

for fine-tuning these mitigation measures and for understanding capacity needs for effectively implementing the mitigation measures.

- In the long term, the consolidated feedback may also be used in further reviewing the capacity development strategies, HWC-MAPs, HWC-SAPs and HWC-NAP.

## 9. PROCESS OF DEVELOPMENT, PILOT TESTING OF THESE GUIDELINES AND CONSULTATION PROCESS

- A dedicated framework of experts (Annexe 1) was formed that consisted of independent wildlife policy experts and representatives of Government agencies, SFDs, research institutions, civil society institutions and international organisations. The experts were a mix of scientists, wildlife managers, policy experts and capacity development experts.
- A common understanding was developed on the overall purpose, scope, approach and methodology<sup>10</sup>. The experts played different roles in the drafting and editing process (Coordinating Lead Authors, Lead Authors, Contributing Authors, Review Editors). The Author Group worked on developing these guidelines between July 2019 and August 2021, during which time they consulted a larger group of experts and stakeholders via workshops, meetings and consultations. The authors reviewed the existing documents and guidelines available from the MoEF&CC and different states, and relevant information and recommendations were brought into the new document. A National Technical Group (NTG), consisting of experts from MoEF&CC, Wildlife Institute of India (WII) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and independent wildlife and

policy experts, was formed for the overall steering and facilitation of the process. A 'Working Group on Pilot Implementation of Guidelines and HWC-NAP' was formed to facilitate the planning and implementation of the pilot testing, consultations and final editing of the draft guidelines and the HWC-NAP. Detailed terms of reference were provided, and meetings and workshops of the author groups were facilitated under the Indo-German Cooperation Project on Human–Wildlife Conflict Mitigation.

- The draft guidelines and HWC-NAP were pilot tested at selected HWC hotspots in India to receive feedback on the feasibility and acceptability of the recommendations expressed in the guidelines, using structured processes and tools. On the basis of the feedback received during fortnightly meetings and one-to-one consultations with managers, the draft of the guidelines was revised.
- A Committee was constituted by MoEFCC in December 2022, consisting of officials from MoEFCC, and the state forest departments of Bihar, Haryana, Karnataka, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal to review and finalize the guidelines.

## 10. MONITORING AND EVALUATION OF GUIDELINES

- This set of guidelines is not a static document; rather, it is a living document. It will keep abreast of the various developments in field implementation methods and wildlife research. For this to happen, the feedback from field practitioners and other wildlife experts may be analysed to assess the specific elements and sections that need to undergo changes. A review of the guidelines is planned to take place every 5 years from

2023 onwards. However, a mid-term review process may be desirable in 2024. In the long term, the review cycle of these guidelines can be aligned with that of HWC-NAP.

- The mechanism, templates and guidance for collating information and feedback on the use of these guidelines may be developed.

10 Approach paper: <https://indo-germanbiodiversity.com/pdf/publication/publication19-04-2021-1618808050.pdf>

# ANNEXE 1

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