

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI
IN
ORIGINAL APPLICATION NO. 300 of 2024 (SZ)
[Earlier O.A. NO. 1232 of 2024 (PB)]

IN THE MATTER OF:

Tribunal on its own motion *SUO MOTU*
based on the news item in The Hindu dt.
27.09.2024 titled “Munnar Panchayat –
Owned dumping yard continues to be
haunt for wild animals”

...SUO MOTU

WITH

Principal Chief Conservator of Forests (PCCF),
Kerala, Thiruvananthapuram and Ors.
RESPONDENT(S)

...

INDEX

Sl No.	Particulars	Page No.
1.	Counter Affidavit on behalf of the Ministry of Environment, Forest and Climate Change, through its Regional office, Bangalore (Respondent No. 3).	1-5
2.	A true copy of the Guidelines is placed as Annexure-1	6-13
3.	A true copy of ‘Guidelines for Human–Elephant Conflict Mitigation- Taking a Harmonious-Coexistence Approach’ has been placed as Annexure-2	14-41
4.	‘Guidelines for Human-Gaur Conflict Mitigation- Taking a Harmonious-Coexistence Approach’ has been placed at Annexure-3	42-65
5.	A true copy of the said rules is placed as Annexure-4	66-106

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI
IN
ORIGINAL APPLICATION NO. 300 of 2024 (SZ)
[Earlier O.A. NO. 1232 of 2024 (PB)]

IN THE MATTER OF:

Tribunal on its own motion *SUO MOTU*
based on the news item in The Hindu dt.
27.09.2024 titled "Munnar Panchayat –
Owned dumping yard continues to be
haunt for wild animals"
MOTU

...SUO

WITH

Principal Chief Conservator of Forests (PCCF),
Kerala, Thiruvananthapuram and Ors.
RESPONDENT(S)

...

Counter Affidavit on behalf of the Ministry of Environment, Forest and
Climate Change, through its Regional office, Bangalore (Respondent No. 3).

MOST RESPECTFULLY SHOWETH:

I, Praneetha Paul, aged about 49 years, working as Deputy Inspector General of Forest (Central), in Ministry of Environment, Forest and Climate Change, (hereinafter 'Ministry') do hereby solemnly affirm and State as under:


Praneetha Paul
Dy. Inspector General of Forest(C)
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
Integrated Regional Office, Kendriya Sadan
14th Floor, E&F Wings, Bengaluru - 560 034.

1. That I am duly authorized to swear this affidavit and as such I am conversant with the facts of the present case and competent to swear the present affidavit.
2. That I have read and understood the contents of the accompanying reply and state that the same has been drafted under my instructions based on the official records.

STATEMENT OF FACTS:

3. That the Original Application has been registered in exercise *suo motu* on the basis of the news item titled "Munnar Panchayat - owned dumping yard continues to be a haunt for wild animals" appearing in 'The Hindu' dated 27.09.2024. It relates to the issue of wild animals frequenting a waste dumping yard owned by the Munnar panchayat in Kerala, which has become a hazardous site for local wildlife.

REPLY ON MERIT:

4. It is respectfully submitted that the Ministry of Environment, Forest and Climate Change has issued an advisory on 6th February, 2021 to all States/UTs to deal with human wildlife conflict situations. The advisory recommends coordinated interdepartmental action, identification of conflict hot spots, adherence to Standard Operating Procedures, establishment of rapid response teams, formation of State and District level committees to review the quantum of ex-gratia relief, and prompt payment of relief to affected persons, and


Praneetha Paul
Dy. Inspector General of Forest(C)
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
Integrated Regional Office, Kendriya Sadan
IVth Floor, E&F Wings, Bengaluru - 560 034.

sensitization and awareness drives. **A true copy of the Guidelines is placed as Annexure-1.**

5. It is submitted that the Ministry has also issued species-specific guidelines to deal with human-wildlife conflict situations. The Ministry provides technical and financial support to forest departments to manage human wildlife conflict. These include building capacity of the front line staff, through use of early warning systems, modern technology and advanced tracking systems for better management of human wildlife conflict situations in these areas. **A true copy of 'Guidelines for Human–Elephant Conflict Mitigation- Taking a Harmonious-Coexistence Approach' has been placed as Annexure-2, and 'Guidelines for Human-Gaur Conflict Mitigation- Taking a Harmonious-Coexistence Approach' has been placed at Annexure-3.**

6. It is most respectfully submitted that the Ministry of Environment, Forest and Climate Change has notified the Solid Waste Management ('SWM') Rules 2016 in supersession to the Solid Waste (Management and Handling) Rules, 2000 vide S.O No. 1357(E) on dated 8th April 2016. The said rules provide statutory framework for the management of the solid waste in the country. **A true copy of the said rules is placed as Annexure-4.**

7. It is further submitted that the SWM Rules, 2016 *inter alia* provides for:


Praneetha Paul

Dy. Inspector General of Forest(C)
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
Integrated Regional Office, Kendriya Sadan
IVth Floor, E&F Wings, Bengaluru - 560 034.

(a) Criteria for site selection, criteria for development of facilities at sanitary landfill, criteria for pollution prevention including water quality and ambient air quality monitoring.

(b) Standards for processing and treatment of solid waste.

(c) Criteria and actions to be taken for solid waste management in hilly areas.

(d) Local body to frame bye-laws and prohibit citizen from littering wastes on the streets and give strict direction to the tourists not to dispose any waste such as paper, water bottles, liquor bottles, soft drink canes, tetra packs, any other plastic or paper waste on the streets or down the hills and instead direct to deposit such waste in the litter bins that shall be placed by the local body at all tourist destinations.

(e) The duties and responsibilities of local authorities and village Panchayats of census towns and urban agglomerations regarding solid waste management.

(f) Responsibility of the State Pollution Control Board or Pollution Control Committee for the effective enforcement of these rules.

8. It is humbly submitted that the answering Respondent is duty-bound and fully committed to the Conservation of flora and fauna of the country. That in light of the afore-mentioned facts and circumstances it is respectfully prayed that this Hon'ble Tribunal may pass any order as it deems fit.


DEPONENT

Praneetha Paul

Dy. Inspector General of Forest(C)
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
Integrated Regional Office, Kendriya Sadan
IVth Floor, E&F Wings, Bengaluru - 560 034.

VERIFICATION

Verified at Bengaluru on this 16th day of April 2025 that the contents of the above affidavit are true and correct to the best of my knowledge based on records and no part of it is false, and nothing material has been concealed therefrom.


DEPONENT
Praneetha Paul
Dy. Inspector General of Forest (C)
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
Integrated Regional Office, Kendriya Sadan
IVth Floor, E&F Wings, Bengaluru - 560 034.

F.No. 8-60/2020 WL (Part-1)
Government of India
Ministry of Environment, Forest and Climate
Change Wildlife Division

1st Floor, Agni Wing,
Indira Paryavaran Bhawan,
Jor Bagh Road, Aliganj,
New Delhi – 110003.
Date: 6th February, 2021

To
Chief Wild Life Warden
All State/UTs

Sir/Madam,

Sub: Advisory to deal with Human Wildlife Conflicts – reg.

The Standing Committee of the National Board for Wild Life has recommended an Advisory to deal with the Human Wildlife Conflicts in the 60th meeting held on 5th January, 2021.

The Advisory to deal with the Human Wildlife Conflicts is enclosed herewith for information and necessary action.

Yours faithfully,

Enclosure: As above

Rakesh Kumar Jagenia,
Deputy inspector General of Forests (Wildlife)
Email: digwl-mefcc@gov.in

Copy to:

1. The Principal Secretary (Forest), All States/UTs
2. The Principal Chief Conservator of Forests & Head of Forest Force. All States/UTs

Copy also to

1. Sr. PPS to DGF & SS/PSO to ADGF (WL)/PPS to IGF (WL)/PS to JD (WL)

Signature Not Verified

Digitally signed by RAKESH
KUMAR JAGENIA
Date: 2021.02.06 06:17:15 IST

F. No. 8-60/2020 WL

Government of India

Ministry of Environment, Forests and Climate Change

(Wildlife Division)

New Delhi, Dated 6th February, 2021

Background

As per the Constitution of India, it is the duty of every citizen to protect wildlife. The Government is fully committed to protection of wildlife and has put in place institutional and organizational measures to strengthen the protection regime. Yet, incidences of negative interaction have been reported from time to time where wild animals including large mammals such as Nilgai (blue-bull), wild pig, elephant, tiger, leopard, bear etc. that are protected under the schedules of Wild Life (Protection) Act 1972, are involved. Human wildlife negative interaction many a time results in death/injury/permanent incapacitation of human beings/domestic animals/livestock due to attack by wild animals or loss of crops and property.

Therefore, the need for a separate advisory in this regard. The advisory has been recommended by the Standing Committee of the National Board for Wild Life in its 60th meeting held on 5.1.2021 as per Section 5C(2)(a) of the Wild Life (Protection) Act 1972.

The Advisory

Preamble

Recognising that the factors leading to Human Wildlife Conflict and associated death/injury to humans lives and or crops/scheduled animals, and their remedial measures often concern several departments of the State Governments/ UT Administration, this Advisory seeks expedited inter-departmental coordinated and effective action by State Governments/ UT Administrations on preventing and dealing with Human Wildlife Conflict (HWC) and associated death/injury/permanent incapacitation of human beings/domestic animals/livestock due to attack by wild animals or loss of crops and property and also accidental deaths of wild animals listed in Schedule I to IV of Wild Life (Protection) Act 1972..

Objectives

The following objectives are sought to be achieved:

- i. Improvement in wildlife habitat of such wild animals under Schedule I to IV of Wild Life (Protection) Act 1972 (hereinafter referred to as wild animals) that are commonly involved in HWC by leveraging resources from different departments of the government, so as to provide adequate food and water inside forests and minimise venturing of those wild animals outside forests;
- ii. Ensuring safe passage of wild animals along their scientifically-identified movement routes or corridors outside forests, including improvement of habitat conditions in and along those routes;

- iii. Creation of locally suitable biological barriers on and along the forest-fringe farms, including alteration of crop patterns, under schemes of different departments to deter wild animals from raiding private farms/ villages;
- iv. Ensuring adequate and timely payment of ex-gratia to the persons affected by HWC; and
- v. Creating an intelligent and effective system based on local intelligence and people's participation for preventing wildlife crimes, including killings of wild animals outside forests and trade/ consumption of animal parts, and prosecution of offenders.

Measures

In order to prevent and manage Human Wildlife Conflict, and mitigate the risks and adverse impacts associated with it, including killing of wild animals, the States/UTs should adopt the following measures:

A. MANAGEMENT MEASURES:

1. Inter-departmental Coordination Committees:

Prevention and management of HWC and associated death/ killing of wild animals concerns several government departments, and, therefore, close coordination is required for timely and adequate action. Coordination committees at the State/ UT and district levels should be constituted as follows within three months of issue of this Advisory:

- a. *Co-ordination committee at the State/UTs level (SLCC):*
 - i. State Governments/ UT Administrations of the affected States/ UTs should constitute a State Co-ordination Committee (SLCC) headed by the Chief Secretary with membership of Secretary in-charge of finance, natural resources, infrastructure, home and forest departments of State/ UT, Director General of Police, PCCF-HoFF and representatives of concerned Central Government departments (Railways, Revenue Intelligence, Customs, etc.). The Chief Wild Life Warden is to act as the member secretary of this committee.
 - ii. The committee would meet as many times as necessary, but no later than six months of the previous meeting.
 - iii. Functions of the SLCC:
 - o In furtherance of the objectives of this Advisory, review the required infrastructure, manpower and monitoring systems in the State/ UT, and take necessary measures to strengthen the same;
 - o Monitor the number of HWC cases and their geographical spread, and provide guidance/ instructions to different departments for action to be taken by each one of them in order to minimise/ prevent HWC in those areas;
 - o Review the quantum of ex-gratia relief, issue guidance/ instructions for expedited payments, and work towards providing adequate funds for the same;

- Review the cases of revenge killings of wild animals and other wildlife related crime, and issue necessary guidance/ instructions to the concerned departments/ agencies as appropriate; and
 - Recommend to State Wildlife Board and / or the Government, policy and programmatic measures, including for capacity building, required for fulfilling the objectives of this Advisory.
- b. *District Co-ordination Committee (DLCC):*
- i. On the recommendation of Chief Wild Life Warden (CWLW), the State Government/ UT Administration should constitute an inter-departmental coordination committee in all or identified district(s) of the State/ UT that are vulnerable to HWC to be chaired by District Collector, and comprising of district-level officers of departments/ organisations included in the SLCC. The Wild Life Warden of the District headquarter is to act as Member Secretary.
 - ii. The Committee may also include an Honorary Wild Life Warden residing in the district and up to two non-official expert members on the recommendation of the Member Secretary.
 - iii. The Committee may invite an official from any other department/ organisation or an expert from a reputed State/ national level institute as special or standing invitee to meetings of the Committee.
 - iv. The Committee should meet as often as required but no later than three months of the last meeting.
 - v. Functions of the DLCC:
 - The DLCC would ensure coordinated action by different departments of the government to prevent killing/ injuring/ illegal capturing of wild animals by snaring, use of explosives, poisoning, electrocution, etc. in areas outside forests, and if requested so by the Wild Life Warden, in forest areas also.
 - The DLCC would also ensure coordinated action by different Departments for expeditious payment of ex-gratia to persons affected by HWC.
 - The DLCC may seek assistance of Wildlife Crime Control Bureau (WCCB) or other expert organisations in capacity building for intelligence gathering, investigation and prosecution for prevention and dealing with wildlife crime.

2. **Identification of Hotspots**

- i. The hotspots where human death/ injury or damage to property by wild animals is occurring on a regular basis or death/ injury to wild animals is being caused by use of explosives, snares, traps, poisoning, electrocution or by any other means, may be identified and record of the same should be continuously updated by the concerned Wild Life Warden. A State level inventory of such Hotspots will be maintained, updated and used for planning for reducing Human Wildlife Conflict. The inventory should preferably be hosted on a secure GIS-based MIS platform under the direct supervision of Chief Wild Life Warden, and nodes of the platform may be available to the Wild Life Wardens.
- ii. For the purpose of identification of hotspots, simple mobile-based applications may be developed/used to for collation of geo-referenced HWC data.

3. **Joint Patrolling of Hotspots:**

Whenever solicited by the Wild Life Warden (Divisional Forest Officer) assistance from departments like Police, Revenue, Electricity, Irrigation, PWD, local community representatives etc. shall be provided for joint patrolling and combing operations in and around the hotspot areas or any other area where such operation is deemed necessary.

4. **Adherence to Standard Operating Procedures (SOP) and Guidelines**

The Ministry of Environment Forest and Climate Change, Govt. of India and authorities under it have been issuing SOPs and guidelines to deal with various aspects of HWC which have to be followed while dealing with HWC incidences.

5. **Establishment of Rapid Response Teams (RRT):**

- i. States should establish Rapid Response Teams (RRT) for quick action and management of conflict situations, especially in the hotspot areas. The RRTs should include trained staff with technical knowledge, be well equipped with materials as per local needs. The DLCC should facilitate the involvement and contribution of related departments in the district for establishment of RRTs. The Chief Wild Life Warden will make assessment of RRTs at regular intervals, including men and materials to be made available to RRTs, and take necessary steps for their timely procurement with the help of DLCC.
- ii. Depending up on the severity of HWC, States may establish dedicated circle wise Control Rooms with Public helpline/Toll **free hotline numbers** which could operate on a 24x7 basis.

6. **Provision of financial resources for HWC**

It is to underline that HWC, if not attended properly, may acquire serious proportions, endangering both human life/property and the wildlife. Therefore, each State Government shall endeavour to provide adequate budgetary resources for dealing with HWC, and in particular for Early Warning Systems (EWS), RRT, ex-gratia payment and awareness generation. Measures like establishment of Revolving Fund at the level of Divisional Forest Officer help in timely availability of financial resources for dealing with HWC and expedited payment of ex-gratia.

7. **People's participation in managing HWC**

Local people should be involved in dealing with HWC particularly in the hotspot areas, by formation of teams at village or a group of village level comprising of members of Joint Forest Management Committee (JFMC), Eco-development Committee (EDC), Watershed Committee (WC), etc. to ensure timely communication, coordination and immediate management of HWC. Basic equipment, communication tools and training should be provided to these teams. The State/ UT may also consider providing 'contingency funds' to JFMCs/ EDCs for dealing with contingent expenses in cases of emergency.

8. Dealing with Law and order situation in HWC cases

It is often seen that in HWC situations, dealing with a large number of people who quickly gather at one place to view wild animals or to prevent them from entering their farms/ habitation, becomes a challenging task that hampers safe passage of wild animals or rescue work. State Governments/ UT Administrations may review the situation devise administrative mechanisms to ensure efficient coordination and cooperation of the law enforcing agencies at such situations to ensure smooth handling of such situations.

9. Adoption of Early Warning Systems (EWS):

The States should endeavour to develop and establish Early Warning Systems (EWS) to manage HWC. This may include:

- i. Seismic waves/IOS Mobile Technology, infrared technology, temperature and movement sensors, in alerting the movement of large herbivores like elephants in and around most vulnerable villages;
- ii. Drones and other systems for tracking movement of wildlife herd in and around Hot-Spot areas such as radio/satellite collars.
- iii. Warning alerts to local leaders /officials/villagers through SMS or through FM Radio/community radio/local TV, etc.

10. Developing ecologically sustainable linear infrastructure:

The guidelines issued by Ministry of Environment, Forest and Climate Change on “Eco-friendly measures to mitigate impacts of linear infrastructure on wildlife” should be followed, and timely creation of Underpasses, overpasses, etc. that facilitate the movement of wildlife in a timely manner by the infrastructure agencies should be monitored and ensured at highest level.

11. Adoption of traditional/common management practices:

i. Creation of barriers:

Barriers that prevents easy movement of wildlife from forest area to human habitations may be considered in certain cases after thorough evaluation about their necessity and effectiveness. These could in the form of:

- Trenches (especially for Elephants)
- Solar-powered electric fences
- Rubble walls
- Other types of fences made from steel channels, rail, wire guide ropes, bars etc

ii. Promotion of appropriate agri-horticulture/ agroforestry around wildlife rich areas that repel wild animal:

It is well known that wild animals get attracted to palatable and nutritious crops grown on crop fields around forest areas. This leads to damage of crops and financial loss and hardship to the farmers who are often poor people from the tribal communities. The concerned departments should promote crops in these fringe areas

which are unpalatable to wild animals. Farming or agroforestry models may include cash crops like chillies, lemon grass, *khus* grass etc. suitably mixed with appropriate tree/ shrub species. A comprehensive long-term plan for alternate cropping should be prepared and implemented by the State Agriculture/ Horticulture department under different schemes in such vulnerable areas.

iii. Augmenting fodder and drinking water in forest areas:

Improving wildlife habitat by management of invasive species, augmenting fodder species and provisioning water for wild animals in lean periods is the key to minimizing HWC, and, therefore, this should be undertaken extensively. Desilting of existing water holes should also be taken on priority basis. All wildlife rich areas and wildlife corridors in and around the Hotspots should be treated on priority. The SLCC and DLCC should review the progress and facilitate mobilisation of necessary resources available in different departments/ organisations for this purpose.

iv Improvement of local livestock

Free ranging livestock becomes more vulnerable to killing by wild animals. The Animal Husbandry department should formulate and implement special plans for improved stall-fed farm animal stock and practices, especially in the Hotspot areas. This will also reduce grazing pressure on native wildlife habitats and improve local economy.

12. Dealing with Wildlife Crime:

- i. Each State/UT should establish a State-level forest and wildlife crime intelligence units/ cells to facilitate collection of information from locals and other informers regarding forest and wildlife crime, including with the help of the existing Police Intelligence network. The Cell should regularly coordinate with WCCB and other neighbouring states.
- ii. The States/UTs should develop a mechanism of rewarding informers for intelligence gathering regarding wildlife crimes. The States/UTs may also issue necessary guidelines/notifications as per the provisions contained in the Wild Life (Protection) Act, 1972 to reward persons who render assistance in detection of offences and apprehension and trial of the offenders, and may also consider establishing Secret Fund at the disposal of Wild Life authorities of the State/UT at the appropriate level on the lines of Secret Fund operated by the State Police Department.
- iii. DLCC should oversee that regular patrolling of vulnerable local markets and food joints is being organised and effective action is being taken against the offenders.
- iv. Capacity building of frontline staff for investigation, forensics and successful prosecution of wildlife cases should be organised at regular interval.
- v. Sensitization and awareness drives involving JFMCs/ EDCs/ WCs through print & visual media in local language should be organised regularly. The DLCC and SLCC may oversee that the Public Relation Dept of the Govt. remains actively involved.

13. Dealing with problem animals

Providing safe passage to the wild animals involved in HWC in human habitations should be the topmost priority, and local administration should ensure better crowd management. If everything else fails, capture and translocation using scientific methods may be resorted with the approval of Chief Wild Life Warden.

14. Involving Gram Panchayats:

Considering the role Gram Panchayats play in community development and conservation of natural resources, the State Chief Wild Life Wardens may utilise the Panchayati Raj Institutions and authorize the *Sarpanch* or any other representative of Gram Panchayat for dealing with problematic wild animals under Section 11(1) (b) of Wild Life (Protection) Act, 1972 .

B. FINANCIAL MEASURES:

1. Ex-gratia relief:

- i. SLCC should review the rate of *ex-gratia* relief at regular intervals with a view to ensure that it is effective both in providing necessary support to the victim and to prevent revengeful action by vulnerable/ affected population. The rates of adjoining States and that of Central Government under various Centrally Sponsored Schemes, whichever is higher, should guide the review.
- ii. A suitable portion of ex-gratia relief should be paid within 24 hours to the affected persons in the case of death and injury to persons.
- iii. SLCC and DLCC should regularly review that ex-gratia, including immediate relief within 24 hours, is being paid in a timely manner, and for this purpose necessary reports/ documents are being made available by police, revenue and medical authorities to the local Range Officer of Forests expeditiously on priority. State Governments may establish a robust procedure with specific timelines for this purpose. Revolving Fund may be established with local Divisional Forest officer for quick payment of ex-gratia and other expenses in dealing with HWC.

2. Crop Insurance:

The State/UT Governments may also utilise the *Pradhan Mantri Fasal Bima Yojana* which provides add-on coverage. With a view to provide an add-on welfare to the farmers, the Ministry of Agriculture and Farmers Welfare has included insurance coverage for crop loss due to attack by wild animals, under the *Pradhan Mantri Fasal Bima Yojana*. This insurance programme would help farmers as means of compensation for their crops that have been damaged due to wild animal attacks.

The Operational Guidelines of the *Pradhan Mantri Fasal Bima Yojana* may kindly be seen at the following link:

https://pmbfy.gov.in/pdf/Revised_Operational_Guidelines.pdf



Government of India



Annexure-2

Guidelines for Human–Elephant Conflict Mitigation

Taking a Harmonious–Coexistence Approach



© Ministry of Environment, Forest and Climate Change, Government of India, 2023

Material from this publication may be used for educational purposes provided due credit is given.

Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhavan, Jor Bagh Road, New Delhi - 110 003, INDIA
Website: www.moef.gov.in

Acknowledgments

The Ministry of Environment, Forest and Climate Change, Government of India gratefully acknowledges the contributions of the experts and field practitioners who developed the guidelines, with support from innumerable contributors, using a participatory approach in workshops and consultations organised under the Indo-German Project on Human–Wildlife Conflict Mitigation in India.

The Ministry acknowledges the technical support extended by *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), in the preparation and pilot implementation of these guidelines.

The Ministry acknowledges the support provided by the Wildlife Institute of India and the state forest departments of Karnataka, Uttarakhand and West Bengal for pilot implementation of the key elements of the guidelines during 2018– 22 and the valuable feedback provided by them for updating the drafts.

Ministry of Environment, Forest and Climate Change



Government of India



Guidelines for Human—Elephant Conflict Mitigation

Taking a Harmonious—Coexistence Approach

Abbreviations

BMZ	German Federal Ministry for Economic Cooperation and Development	IUCN	International Union for Conservation of Nature
CCTV	Closed-circuit television	JFM	Joint Forest Management
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
HEC	Human–Elephant conflict	RFID	Radio frequency identification
HOFF	Head of Forest Force (in a state)	RRT	Rapid Response Team
HWC	Human–wildlife conflict	SDRF	State Disaster Response Force
HWC-MAP	Human–Wildlife Conflict Management Action Plan	SFD	State forest department
HWC-NAP	National Human–Wildlife Conflict Mitigation Strategy and Action Plan	SHG	Self-help group
HWC-SAP	State-Level HWC Mitigation Strategy and Action Plan	SLCC	State-Level Coordination Committee
IFS	Indian Forest Service	SOPs	Standard operating procedures
		WII	Wildlife Institute of India
		WLPA	Wild Life (Protection) Act, 1972

Contents

Abbreviations	iv
1. About The Guidelines	6
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
2. Context and Situation	7
3. Addressing the Drivers and Pressures of HEC	8
3.1 Overview	8
3.2 Management-relevant Response for Addressing the Drivers and Pressures	8
3.3 Institutional Capacity Development for Addressing the Drivers and Pressures	12
4. Deploying Measures to Prevent Human–Elephant Conflicts	15
4.1 Differential Mitigation Approach for Different HEC Location Scenarios	15
4.2 Identification of HEC Hotspots	15
4.3 Effective Use of Early Warning and Rapid Response System at HEC Hotspots	16
4.4 Monitor and Document ‘Potential Elephant-in-Conflict’ in the Landscape	16
4.5 An integrated Approach to Managing Potential Elephants-in-Conflict	16
4.6 Managing Dispersing Elephants	17
4.7 Judicious Use of Barriers, Taking a Landscape Approach	17
4.8 Judicious Use of Other Exclusionary Measures, Taking a Harmonious-Coexistence Approach	18
4.9 Support Local Population in Crop-Guarding Methods	18
4.10 Addressing Zoonotic and Other Emerging Diseases, Adopting a One Health Approach	18
5. Addressing the Emergency Situations Arising due to HEC	19
5.1 Preparedness Measures – Before an Emergency Situation Arises	19
5.2 Measures During an Emergency Situation	19
5.3 Measures After an Emergency Situation	20
6. Reducing the Impact of HEC on Health and Overall Well-being of the Affected Humans	21
6.1 Addressing the Situation of Loss of Human Life	21
6.2 Addressing Health and Overall Well-being of the Affected Humans	21
6.3 Addressing the Situation of Property Damage	22
6.4 Addressing the Situation of Crop Damage and Livestock Injury/Loss	22
6.5 Addressing the Situation of Lost Livelihood Opportunities	22
7. Reducing the Impact of HEC on the Health and Well-being of Elephants	23
7.1 Addressing the Health of an Elephant During Capture and Post-capture Operations	23
7.2 Release Essentials	24
7.3 Rehabilitation of the Captured Elephant	24
7.4 Managing Orphaned/Straying Elephant Calves-in-Conflict	25
7.5 Radio Collaring or Tagging (RFID-Microchip) the Elephant	25
7.6 Health and Well-being of Private and Temple Elephants	25
8. Use of Learnings from the Guidelines to Further Strengthen Institutional and Policy Framework on HEC Mitigation in India	26
9. Process of Development, Pilot Testing of These Guidelines and Consultation Process	26
10. Monitoring and Evaluation of Guidelines	26
Annexe 1	27
National Technical Group (NTG)	27
Working Group on Pilot Implementation of Guidelines and HWC-NAP	27
Author Group for drafting the guidelines	27

1. ABOUT THE GUIDELINES

1.1 THE OVERALL CONTEXT

- The Guidelines on Human–Elephant Conflict (HEC) Mitigation get the overall context from the Wild Life (Protection) Act 1972, National Wildlife Action Plan (2017) ¹, Human–Elephant Conflict Guidelines (2017), Advisory to deal with human wildlife conflicts (MoEFCC 2021) and National Human–Wildlife Conflict Mitigation Strategy and Action Plan (HWC-NAP) ². HWC-NAP provides the overall conceptual and institutional framework for implementing the guidelines.
- This document takes into consideration the existing guidelines,³ advisories and good practices on HEC mitigation ⁴ issued by Project Elephant and various state forest departments and builds on them to bring about a more holistic approach to HEC mitigation.

1.2 PURPOSE AND SCOPE

- These guidelines aim to facilitate a common understanding among key stakeholders on what constitutes effective and efficient mitigation of HEC 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 Elephants.
- These guidelines provide advice on mitigation measures to address HEC in the long term, as well as facilitate the development, assessment, customisation and evaluation of site-specific HEC mitigation measures that are effective and wildlife-friendly.
- These guidelines serve as a basis for overall long-term planning and coordination of HEC mitigation measures at the national, state and division levels.
- In general, these guidelines apply to all stakeholders involved in HEC mitigation and are not only limited to state forest departments (SFDs).

1.3 APPROACH

- The development and implementation of these guidelines is driven by a harmonious-coexistence⁵ approach to ensure that both humans and Elephants are protected from the negative impacts of HEC.
- The guidelines address the issue of HEC, adopting a holistic approach. The holistic approach of the guidelines entails not only addressing the emergency situations arising due to immediate conflict situations but also addressing the drivers and pressures that lead to HEC; providing guidance on establishing and managing prevention methods; and reducing the impact of the conflict on both humans and Elephants.

- The development of these guidelines and the intended implementation are driven by a participatory approach. These guidelines are intended to facilitate participatory planning, development and implementation of HEC mitigation measures with key sectors and stakeholders at national, state and local levels.
- The guidelines reflect on the need for a landscape approach while formulating measures for mitigating HEC to ensure sustainable solutions as unless comprehensive and integrated HEC 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 implementation through provision of *Implementer's Toolkit*, which includes 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 HEC:
 - 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 HEC.
- The Supplementary Framework to HWC-NAP on Legislative Framework ⁶ for HWC Mitigation in India is to be referred to for more details on the specific legal provisions related to HWC mitigation.
- Other important legislations that facilitate conservation when dealing with HEC include the Environment Protection Act, 1986; Indian Penal Code, 1860; Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006; Electricity Act, 2003; Railways Act, 1989; National Highways Act, 1956; and Disaster Management Act, 2005.

1.5 INSTITUTIONAL MECHANISM FOR IMPLEMENTATION OF THESE GUIDELINES

- The institutional mechanism outlined in 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 MoEFCC (2008). Guidelines for care and management of captive elephants. 8 January 2008. Project Elephant Division, Ministry of Environment, Forests and Climate Change, New Delhi. [http://moef.gov.in/division/forest-divisions-2/project-elephant-pe/new-guidelines/MoEFCC \(2017\). Guidelines for Management of HECs. 2017. Project Elephant Division, Ministry of Environment, Forests and Climate Change, New Delhi. http://moef.gov.in/wp-content/uploads/2019/08/01-HEC-guidelines.pdf](http://moef.gov.in/division/forest-divisions-2/project-elephant-pe/new-guidelines/MoEFCC%20(2017).Guidelines%20for%20Management%20of%20HECs.2017.Project%20Elephant%20Division,Ministry%20of%20Environment,Forests%20and%20Climate%20Change,New%20Delhi.%20http://moef.gov.in/wp-content/uploads/2019/08/01-HEC-guidelines.pdf)

Standards/ Norms for Recognition of Elephant Rehabilitation/ Rescue Centres under Section 42 of Wildlife Protection Act, 1972 (F.No. 2-5/ 2006-PE [Vol. II]), Government of India, Ministry of Environment, Forest and Climate Change, Project Elephant Division. 29 Sept 2017. <http://moef.gov.in/wp-content/uploads/2019/08/02-Standards-Norms-for-Elephant-Rehab.-2_compressed.pdf>

4 MoEFCC (2020). Best Practices of HEC Management in India. 2020. Project Elephant Division, Ministry of Environment, Forests and Climate Change, New Delhi. <http://moef.gov.in/wp-content/uploads/2020/08/Best-Practice-Man-Animal-Conflict.pdf>

5 '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 interaction 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 that of humans in which both are given equal importance. Overlap in space and resource use is managed in a manner that minimises conflict.

6 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 Indian Elephant (*Elephas maximus*) is a keystone species affecting habitats and ecosystems in significant ways, ensuring ecological balance and resulting ecosystem services for human well-being. Elephants are referred to as ecosystem engineers due to their transformative role in the ecosystems where they create water holes that are also used by other wildlife for their survival during dry season, clear understories to promote new plant growth in forests, and facilitate seed dispersal of several important tree species, due to their highly mobile nature.
- The Elephant is recognised as a National Heritage animal and is deeply rooted in our culture. India holds by far the largest number of wild Asian Elephants, estimated at about 29,964 ⁷, this is nearly 60% of the population of the species. The Elephant is placed under Schedule I and Part I of the Indian Wild Life Protection Act (1972), which confers it the highest level of protection. However, Elephants and humans are now often in conflict in our country because of varied reasons.
- HEC refers to the negative interaction between humans and Elephants, leading to adverse impacts such as injury or loss of human lives, crop, livestock and other properties, or even their emotional well-being, and equally negative impacts on the Elephant or its habitats.
- The general drivers of HEC include a human population increase, changing lifestyle and economic aspirations, reduced appreciation of wildlife, climate change, disasters, land use change, policies in linear infrastructure, mining, urban development, habitat fragmentation, loss and degradation including local overabundance of Elephants. Among these, the increase in human population, land use change, changing lifestyle and economic aspirations, policies in linear infrastructure, mining, habitat fragmentation, loss and degradation have the greatest impact.
- The intensity of HEC is highly variable, ranging from very occasional to chronic, and depends on the density of Elephant populations; the nature of the interface between human areas and Elephant habitats; an irregular and diffuse boundary with a long perimeter; highly fragmented Elephant habitats interspersed with human-use areas; dispersing herds; railway tracks passing through forests with sizeable Elephant populations; etc.
- HEC is prevalent in many states and is particularly high, relative to the number of Elephants involved, in areas where Elephants have dispersed and areas that Elephants have colonised. It is estimated that approximately 500 persons and more than 100 Elephants are killed annually. Nearly 0.8 to 1 million ha of agriculture land may be impacted by crop damage due to Elephants, and nearly a million families are adversely affected due to HEC. The challenge extends to the transboundary Elephant populations of Bhutan, Nepal and Bangladesh.
- HEC mitigation so far has largely focused on the use of barriers, short-distance drives, and ex gratia payments or compensation for loss and damages. While these efforts have helped contain HEC, the problem continues to grow as a holistic approach has not been incorporated into the mitigation effort.

⁷ MoEFCC (2017). Synchronized Elephant Population Estimation India 2017. Project Elephant Division, Ministry of Environment, Forests and Climate Change, New Delhi

3. ADDRESSING THE DRIVERS AND PRESSURES OF HEC

3.1 OVERVIEW

A major gap involves effective problem analysis to identify drivers and pressures of conflict which would allow appropriate selection of mitigation measures.

- An assessment of long-term outcomes and implications of all mitigation methods is needed to identify effective and Elephant -friendly mitigation measures to address HEC. For this, a systematic analysis of HEC mitigation methods should be done to assess their effectiveness and wildlife-friendliness in different types of conflict situations.
- This will facilitate the necessary customisation and adaption of the mitigation measures/combining two mitigation measures to achieve the best possible impacts in the field.

The HWC-NAP recommends a holistic approach to HWC mitigation by considering and addressing the thematic triangle of drivers–prevention–damage mitigation, these guidelines are prepared in line with the recommended holistic approach to bridge the current gap.

- The need to identify Elephant range areas and corridors in a state is the first step. Thereafter, in and around all such areas the drivers as aforementioned should be identified and addressing these drivers should be a priority in the state-level planning in order to avoid future impacts. Similarly, at the district-level planning, the impact of these drivers to be ascertained to avoid escalating HEC in the area.

Addressing the drivers and pressures includes responses that are directed towards:

- Management-relevant response for addressing the drivers and pressures
- Institutional capacity development for addressing the drivers and pressures

3.2 MANAGEMENT-RELEVANT RESPONSE FOR ADDRESSING THE DRIVERS AND PRESSURES

3.2.1 ZONATION IN ELEPHANT RESERVES

- The current land use and land cover and inherited land use changes have caused Elephant habitats to become habitat islands of various sizes within a sea of human-use areas, thus creating areas where Elephants and humans compete for space and resources inside Elephant reserves.

- Elephants, because of their adaptability, have also exploited opportunities to occupy plantation crops such as tea and coffee and thus overlap with humans in human use areas. Elephants have also adapted to fragmented landscapes by transiting through human-use areas to use spatially separated habitat patches. Some have adapted to using small habitat patches, a few hectares in extent, as daytime refuges to forage on the agricultural crops in the surrounding areas at night.
- All these factors have created different types of conflict situations between humans and Elephants; such situations have varying degrees of management feasibility, viz, sometimes these are easily manageable, sometimes situations require significant intervention and sometimes there are situations where keeping Elephants in unviable habitat patches is not possible for various reasons.
- Zonation, a management entity, takes into consideration the fact that resources available are limited and if these are not prioritised and optimally used, the conflict will intensify and the overall conservation benefits will be minimised. Zonation will allow a science-based and pragmatic approach to landscape level planning for conservation and HEC mitigation. Zonation should be based on Elephant population viability analysis in each prescribed zone. The zonation suggested in these guidelines reinforces the recommendations made by the Karnataka Elephant Task Force (appointed by the Karnataka High Court) and can be as follows:
 - **Elephant Conservation Zones**, where primarily Elephant conservation takes priority over competing livelihood goals (a smaller subsection of our forests where human presence and resource extraction are absent): Areas where there is adequate habitat to support a viable Elephant population with no human settlements, and communities have no rights or dependencies on the forest. If any minor dependencies exist along the interface area, they should be such that they can be easily settled through negotiations.
 - **Elephant–Human Coexistence Zones**, where Elephant conservation and human livelihoods have to be balanced and reconciled (which would constitute the bulk of the forests): Areas where there is adequate habitat to support a viable elephant population where the movement of the Elephants is restricted to the interface area. There may or may not be human settlements inside the

forest, but communities have rights to resource extraction from the forests. The extraction of resources from the forests should be sustainable so that it does not degrade the Elephant habitat and escalate HEC.

- **Elephant Exclusion Zones**, areas where Elephants do not have adequate natural habitats and are dependent on crops for survival, and hence effective conflict mitigation would not allow Elephants to survive in such areas. In such areas concerns of human safety and livelihood take precedence over competing conservation concerns about Elephants, as Elephant populations in such areas may not be viable in the long term. Elephants in such areas need to be translocated, and after translocation, further colonisation of such areas should be stopped through proper HEC mitigation strategies.

3.2.2 MONITORING AND MANAGING HABITAT-RELATED DRIVERS AND PRESSURES

- There is a clear need to have a more holistic understanding of HEC and its implications for humans and Elephants. Monitoring and addressing habitat loss, fragmentation and degradation may play an important role in understanding and mitigating HEC. Therefore, the following measures should be envisaged:
- Mapping of existing drivers and pressures of conflict such as linear infrastructure, mining, encroachments, settlements within forests, and resource use by local communities.
- Ensuring that all forest boundaries are clearly demarcated and patrolled on regular basis including monitoring deemed forest areas, forests on revenue land and private forest areas that form part of the Elephant range.
- Managing Elephant habitats in regions where the bulk of the forests are under the management of district councils and local bodies (where the SFDs have restricted control) requires active participation of communities and proper land use planning by:
 - Mapping the Elephant distribution and numbers in community forest areas with a population and habitat viability analysis to determine where and what can be conserved
 - Mapping land tenure and identification of communities who are stakeholders in the land
 - Consultation with local communities to facilitate Elephant conservation

- Engaging various line departments who can facilitate in enhancing or improving livelihood options that reduce the extent and intensity of slash and burn agriculture and thus bring about Elephant-compatible land use
- Facilitating capacity development of the forest department, line departments, local communities and all key stakeholders
- Preparing, implementing and periodically updating long-term perspective plans such as state-level human-wildlife conflict mitigation strategies and action plans (HWC-SAP) and division-level HWC management action plans. A common framework for developing these plans is provided in the supplementary frameworks to the HWC-NAP⁸.
- Developing synergies and facilitating integrated land-use planning for effective implementation of planned measures, through the State-level Coordination Committees (SLCC), Multi-stakeholder Fora at the state level, Joint Working Groups with key departments and agencies at the landscape level, and the District-level Coordination Committees (DLCC).
- Developing innovative firefighting strategies and equipment, using RS technology, etc. and engaging the local community, especially the community-level Primary Response Teams (Community PRTs).
- Facilitating long-term studies to understand the impact of these measures in addressing the drivers in the landscapes

3.2.3 HABITAT RESTORATION AND RECLAMATION OF DIVERTED FOREST LAND

- Habitat restoration requires that the driver of habitat degradation be first addressed so that the process of degradation does not continue. The following measures are envisaged:
- SFDs should prioritise restoration in and around vulnerable areas and HWC hotspots.
- In highly degraded habitats the process of regeneration may be accelerated by interventions such as gap planting with native species, controlling soil erosion, ground water recharging, restoring grasslands and tree cover, etc.
- Many Elephant ranges have large monoculture plantations. They may not be optimal habitats for wildlife, and therefore the native vegetation needs to be restored by preparing ecologically sound plans in the interest of habitat improvement and HEC mitigation.

⁸ 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>

- SFDs may work with mining project proponents to reclaim and restore old mining sites.
- In many regions across India, tea, coffee, rubber and cardamom estates within Elephant landscapes are unutilised; such areas can be restored/reclaimed for Elephant conservation.

3.2.4 REMOVAL OF INVASIVE PLANT SPECIES IN AND AROUND HEC HOTSPOTS INCLUDING VISTA CLEARANCE

There may be suppression and reduction of indigenous plants due to the presence of invasive alien species in the area resulting in decreased habitat quality, leading to increased movement of Elephants outside the forested landscapes, subsequently leading to increased HEC. The following measures may be implemented:

- Mapping invasive species cover and abundance in the landscape and the herbivore use of the landscape and accordingly implementing habitat management plans.
- Exploring the use of remote sensing data for mapping and managing invasive species.
- Prioritising sites for intervention based on hotspots of invasive species spread, areas critical for the Elephant (and other herbivores) and conflict hotspots, to ensure efficient mitigation, given the scale of the problem, and the challenges involved in containing and eliminating invasive species over large landscapes.
- Clearing vistas along the boundaries of forests in close proximity of the habitations for avoiding accidental encounters.
- SFDs may facilitate Panchayats in making the HEC hotspots adequately lit, by installing street/solar lights.

3.2.5 SECURING ELEPHANT CORRIDORS

Elephants have large home ranges, often with clear seasonal ranges and migration paths and fragmentation or blockage in their movement path will result in disruption causing conflict. In the document titled “Right of Passage – Elephant Corridors in India”, 101 corridors have been listed; however, there are likely to be additional corridors that need to be identified.

Hence, SFDs may start planning corridor conservation by taking into consideration the following:

- Initiate landscape level assessment of all constrictions in habitat and obstructions caused by linear infrastructure, using GIS and remote sensing tools to identify any new corridors. This should be supported by verification on the ground using the field staff.
- Corridor management strategies should be developed and incorporated into the working/management plans

and into the HWC Management Action Plans at division levels.

- Threats to the physical integrity (land use changes) of the corridor and to the free movement of Elephants (disturbances, degradation, etc) within the corridor should be identified and addressed.
- Corridors through tea/coffee estates which connect two or more large habitat patches should be secured.
- Restoration of habitats within the corridors, where possible, should be carried out.
- Support should be provided to PRTs and RRTs during the migration season.
- The feasibility of establishing community reserve or private conservancies should also be explored, with greater participation from community-based institutions and key stakeholders.
- In the case of private lands, the villagers may be incentivised to allow movement of Elephants.
- Awareness about Elephant ecology, behaviour and suitable mitigation measures to humans living in and around the corridor areas may be imparted, regularly.
- Address the issues of land tenure and land use in the corridor and existing linear infrastructure within the corridor area in order to secure its legal status and physical integrity.

3.2.6 REDUCE LIVELIHOOD DEPENDENCE OF HUMANS ON FORESTS

Communities living in proximity to the forest are dependent on forest biomass (fuel wood, NTFP, livestock grazing, etc), which is the primary reason for them to enter the forest. Accidental encounters of humans with Elephants inside forest areas can be prevented to a large extent by reducing the dependence of humans on forests. The following indicative measures may be implemented:

- Facilitate management interventions for better livelihood opportunities through community-participatory approaches including various eco-development measures and livelihood improvement programmes.
- Reduce the dependency of fringe forest communities on forests (e.g., cattle grazing, fodder collection, fuelwood collection, non-timber forest produce (NTFP) collection, right of way) by participatory forest management.
- Improve animal husbandry practices (promoting stall-feeding practices or incentivising improved livestock breeds)
- Address livelihood needs of communities by skill development, poverty alleviation and alternate income generation schemes of the government.

- Facilitate cross-sector linkages for community development (coordination and cooperation with line departments).
- Facilitate cooperation to integrate HWC mitigation planning at the district level, through measures including, but not limited to, dovetailing HWC mitigation measures with schemes relevant to community development.

3.2.7 SCIENTIFIC POPULATION MANAGEMENT AT INTERFACE AREAS OR CONFLICT HOTSPOTS

A local overabundance ⁹ of wildlife including Elephants could be due to various factors including habitat loss, degradation and fragmentation, and an increase in population. The Elephant population in fringe forest areas have become habituated to humans and therefore there may be a proper understanding of the spatio-temporal distribution, foraging and ranging patterns and use of human-dominated landscape. The following measures are envisaged:

- Implementation of a robust population monitoring protocol at HEC hotspots, using trained field staff or in collaboration with research institutes or local universities/colleges.
- The dispersing Elephant population that has colonised new areas may be assessed for impacts on the well-being of the people and the Elephants.
- Understand the population dynamics of Elephant herds in the tea estates and coffee plantations, which continue to remain there as resident populations, and changes in their behavioural attributes.

3.2.8 MANAGING TRANSBOUNDARY AND INTERSTATE ELEPHANT MOVEMENT

- Some Elephant populations are known to regularly cross international and state boundaries. This occurs regularly on the international boundary with Nepal, Bangladesh, Bhutan and Myanmar. Elephant populations regularly cross interstate boundaries in many Elephant states such as Goa, Maharashtra, Northern Andhra Pradesh, Madhya Pradesh, Chhattisgarh, Bihar, Himachal Pradesh, Haryana, Manipur and Mizoram and within southern states. The following measures are envisaged:
- Within India, states sharing the Elephant landscape should meet at least annually and share information and plan for management of Elephants under the aegis of the National HWC Mitigation Forum using a common framework/approach to implement a coordinated strategy.
- As to the transnational management and conservation of Elephants between neighbouring countries, the states sharing international boundaries should follow the protocol as agreed between the nations and communicated by the MoEF&CC.

3.2.9 EFFECTIVE GARBAGE MANAGEMENT AND SAFE SANITATION AROUND ELEPHANT HABITATS

Garbage is known to attract Elephants, and when garbage dumps are on the periphery or inside a village/town they create potential for accidental encounters between humans and Elephants. Unmanaged garbage may also habituate Elephants to moving and foraging in human-use areas, and as a consequence there may be high levels of conflict.

The vegetable and food waste generated in weekly markets in rural India and garbage thrown along roads and railway lines passing through forests attract Elephants. With a large number of humans moving around on foot or on two-wheelers, particularly in the evening after the rural markets, and Elephants also moving into the same area in the evening, accidental encounters happen. Accidental encounters also take place when truck drivers pass through forests, and also when they (truck drivers), and local people go into the forest for defecation, especially at dawn and dusk.

⁹ Local overabundance refers to occurrence, in a habitat, excessive number of individuals of a species beyond the normal population density, due to a variety of factors.

The following are indicative measures to address the situation:

- Ensure sustainable and ecologically sound waste- and garbage disposal by town municipalities and village panchayats bordering Elephant habitats
- Undertake periodic inspection of the forest perimeter near villages/towns to ensure that poor disposal of waste and garbage is detected early and brought to the notice of relevant local authorities. Volunteers can be engaged for this.
- Aversion conditioning measures may be implemented, in areas where Elephants have started foraging inside the boundary of villages and towns in search of forage and have grown accustomed to feeding on garbage.
- Community awareness including signages etc should be implemented to facilitate effective participation from local communities in garbage management.
- SFDs may also coordinate with municipalities/panchayats on garbage management and explore the possibility of building toilets under the Swachh Bharat Mission to prevent accidental encounters at HEC hotspots.

3.3 INSTITUTIONAL CAPACITY DEVELOPMENT FOR ADDRESSING THE DRIVERS AND PRESSURES

3.3.1 STRENGTHENING THE ROLE OF KEY STAKEHOLDERS

Local communities bear the direct brunt of loss of crops and human lives and other economic losses as a direct or indirect result of HEC. This has a direct impact on the wildlife and its habitat. The long-term engagement with local communities and other key stakeholders can be institutionalised and continued by adopting the following measures:

- Facilitate the establishment and effective steering of State-Level Coordination Committees (SLCC), a landscape-level multi-stakeholder forum, and District-Level Coordination Committees (DLCCs) to strengthen the inter-agency and cross-sector coordination and engagement of key stakeholders required for HEC.
- SFDs may support the community-level (village/ward) Primary Response Teams (PRTs) as the entry point for all community engagement work. Establishment and developing the capacity of PRTs should be in line with the Supplementary Framework to HWC-NAP on Establishment and Capacity Development of HWC Mitigation Response Teams.

- Establish a platform where all community members, people's representatives and government agencies can interact and find solutions to mitigate conflict.
- Briefing of forest user groups, workers of tea and coffee plantations before every work season about Elephant risk and safety issues
- A campaign for creating awareness of Elephant may be instituted and communities also need to be educated to take responsibility in managing HEC. There is also a need to extend educational and awareness programmes for the development agencies, railways, power, irrigation, highways, mining companies, tourism industry, district administration, etc
- Plan and implement training programmes and other capacity development measures, extension programmes with school and college students, engage with women's self-help groups, Village Forest Committees (VFCs), Eco-development Committees (EDCs), Large Area Multipurpose Society (LAMPs), forest user groups, etc The EDCs/VFCs formed by the SFD in villages abutting the forest area in the periphery and zone of influence may be made functional and their sustainability ensured by accrual of benefits and incentives.
- Carrying capacity studies may be conducted to assess the tourism potential in the HEC hotspots.
- HEC mitigation measures should be developed with an inclusive and participatory approach.
- Ensure the participation of key stakeholders to ensure integration of traditional and local knowledge and experiences into the development of division-level HWC Management Action Plans (HWC-MAPs).

Tools for stakeholder engagement may be developed.

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

Encounters with Elephants often take place in low light conditions, early in the morning or late in the evening, or when people enter the forests for NTFP or firewood collection, or Elephants enter the crop fields or get attracted by country liquor stored in houses. Knowledge of these factors can help prevent such encounters.

To facilitate effective engagement of local communities and various stakeholders in mitigation of HEC, 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 HEC hotspots, and their impacts may be assessed periodically to ensure that the awareness and communication measures are locally customised.
- The local communities at HEC hotspots may be advised to store grains in the granaries in pucca or underground structures. If necessary, communal granaries can be opted for.
- The local communities at HEC hotspots may be advised to avoid brewing indigenous liquor, which attracts wild Elephants to villages. Appropriate measures may be devised, together with the local administration, to implement this measure.
- Tools for developing, implementing and customising community awareness and communication measures may be developed.
- A standardised criterion for assessing the effectiveness and wildlife-friendliness of mitigation measures should be developed and used.
- The following research areas may be given higher priority for research and monitoring at HEC hotspots and the results from such studies may be consolidated at the national level to support further revision of these guidelines and strengthen the HEC mitigation measures:
 - Elephant responses to land use changes (mining, linear infrastructure) inside the forest
 - Elephant responses to changing cropping patterns and land use changes outside the forest
 - Differences between crop-foraging and non-crop foraging Elephants to understand what factors influence crop foraging behaviour
 - Status of Elephant populations along with demographic parameters
 - Impact of local overabundance on the habitat, population and HEC and impacts on other species
 - Efficacy of HWC mitigation tools and Elephants' responses to different methods (RRT/PRT interventions, barriers/deterrents, habitat interventions, etc)
 - How different mitigation measures impact Elephants (change in resource use, health and HEC)
 - Monitoring the efficacy of community capacity building exercises and how the threat perception has changed.

3.3.3 SYSTEMATIC RESEARCH AND MONITORING ADDRESSING HEC

HEC mitigation is a challenging issue, especially when adequate data on Elephant population density, Elephant demography, social and ranging behaviour of Elephants and its ecology are not available. Currently the data for assessing the impact of HEC are limited to the number of compensation claims paid, number of humans killed or injured, and the number of Elephants killed. There is, therefore, a need to constantly develop a knowledge base of subjects such as habitat usage, habitat connectivity, corridors, preferred or suitable habitat, home range, behaviour, attractions along the habitat and their movement paths.

Therefore, the following research topics are prioritised, which are expected to answer the existing management questions:

- Data on indirect costs of HEC (for example, abandoning agriculture due to HEC or human well-being, including stress, fear and restrictions on normal daily activities) may be gathered.
- Recording and analysing the data on long-term adverse impacts of HEC on Elephants (in terms of stress, reduction in reproductive fitness, loss of genetic diversity, etc.) and socio-economic impacts on families and communities may be done.
- SFDs may involve research institutions, non-governmental organisations (NGOs) and experts in carrying out result-oriented research on HEC status and mitigation measures besides undertaking in-house research.

3.3.4 FACILITATING CAPACITY DEVELOPMENT MEASURES TO DEVELOP THE REQUIRED COMPETENCIES FOR ADDRESSING HEC IN THE MOST EFFECTIVE AND EFFICIENT MANNER

Facilitating capacity development of SFDs, other line departments, local communities and all key stakeholders to ensure that a holistic approach can be followed.

Training of the field staff and response teams

- The SFDs should 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*¹⁰

10 Supplementary Framework to HWC-NAP on Establishment and Capacity Development of HWC Mitigation Response Teams available from <https://moef>.

- Arrangement for deployment of personnel and quick action on cognizance of conflict cases may be strengthened in each division
- The SFDs may sensitise all response teams and relevant personnel from forest and other line departments and agencies to the One Health approach, which can be used for planning and implementing measures related to occupational health and safety and humane treatment of animals in conflict.
- Regular and systematic training programmes on critical operations such as rescue, capture and translocation should be conducted jointly with other key relevant departments, in the form of mock-drills and simulation trainings.
- Advanced trainings on animal welfare issues should be conducted for all personnel of the RRTs.
- Competencies of members of RRTs to be reviewed on a regular basis and the curriculum for their training to 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.
- The arrangement for deployment of personnel and quick action on cognizance of conflict cases may be strengthened in each division.

Training and support to mahouts and assistants

- SFDs may build the capacity of mahouts, incorporating learnings from Elephant behavioural studies for guiding *koonkie* Elephants in dealing with conflict mitigation.
- Trainings for mahouts from different states may be conducted, preferably in local languages, and developing trainers.
- States conducting regular trainings can act as regional hubs for imparting training to the other states in training the mahouts of *koonkie* Elephants.
- A database of experienced mahouts of *koonkie* Elephants may be developed and linked to the National HWC Mitigation Database.
- Steps may be envisaged for improving the service conditions of mahouts.

Training and support for daily wage workers/anti-poaching watchers

- SFDs may provide appropriate support and systematic training to daily wage workers and anti-poaching watchers on key HEC operations handled by them.
- Steps may be taken to improve their service conditions.

Support the local population in human safety by preventing accidental encounters with Elephants

- SFDs may facilitate, encourage and seek support from local NGOs, volunteers, schools, etc to implement safety measures, aiming at preventing human–Elephant encounters. These measures may include guiding people to watch for signs of Elephant presence during crepuscular period (around dawn and dusk), and how to respond when they encounter an Elephant. Regular trainings in local schools and colleges, and also possibly during village meetings at HEC hotspots, can be organised to train people on such safety measures.
- Tools for such safety measures may be elaborated.

3.3.5 MEASURES TO STRENGTHEN CROSS-SECTOR AND INTER-AGENCY COOPERATION FOR HEC MITIGATION

Cross-sectoral cooperation for HEC mitigation entails that multiple stakeholders from different sectors and domains be engaged, at national, state, landscape and district/forest division-levels. Key stakeholders for HEC mitigation may include State Forest Department, and other line departments, viz., Agriculture, Revenue, Animal Husbandry, Police, Public Works, Health and Family Welfare, Education, Electricity Boards; private sector (tea or coffee plantations), and agencies viz., Railways, National Highway Authority of India, as well as wildlife conservation and development NGOs, farmers' cooperatives and agricultural research institutions are relevant when dealing with conflict and conflict mitigation

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 inter-agency coordination required for HEC, and district specific operational mechanism may be developed to address specific needs for HEC mitigation.

- Safety audits may be conducted each year, if feasible, to ensure that all members of the community act responsibly in case of HEC, and to facilitate inter-agency cooperation.
- Maintaining information and data on HEC cases with reference to the developments in the area that may have bearing on conflict cases, may be used for discussions in the DLCC.

3.3.6 MEASURES TO STRENGTHEN THE SYSTEM OF KNOWLEDGE MANAGEMENT ON HEC MITIGATION

To ensure effective and sustainable HEC mitigation measures, it is essential that field experiences, learnings, field-evidence and conceptual advances are not only

shared across key stakeholders and landscapes, but such knowledge is also documented to be utilised for future strategies and plans on HEC mitigation.

- National HWC Mitigation Forum, Landscape-level multi-stakeholder forum, and appropriate Working Groups may be used to share field experiences, learnings, evidence and conceptual advances, within the forest department, across stakeholders, and across landscapes.
- Measures may be put in place to systematically document field experiences, learnings, field-evidence and conceptual advances on HEC mitigation, to inform the future strategies and plans on HEC mitigation.

4. DEPLOYING MEASURES TO PREVENT HUMAN–ELEPHANT CONFLICTS

4.1 DIFFERENTIAL MITIGATION APPROACH FOR DIFFERENT HEC LOCATION SCENARIOS

HEC can be effectively addressed by understanding the type of conflict, the site of occurrence, and its overall impact on humans and Elephants.

4.2 IDENTIFICATION OF HEC HOTSPOTS

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

Identifying conflict hotspots that could also provide a direction towards the drivers of conflict, is critical to provide site-specific solutions to mitigate human–Elephant conflict. Conflict hotspots of HEC 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 hotspot:** Frequency of occurrence of incidences over past specific years such as previous five or ten years, mapped over the target area. The data include number of incident of injury and death, attack/ killing of domestic animals.

- **Vulnerability Hotspot:** Cumulative index by overlaying past incidents, vulnerability of local community and potential risk of the area.

The following assessment are envisaged:

- Database to be created by involving frontline SFD staff, researchers, research institutions, veterinary professionals and others for the identification and assessment of the hotspot.
- Predictive modelling based on the field data and Geographic Information System (GIS) analysis, may be carried out by trained personnel.

4.3 EFFECTIVE USE OF EARLY WARNING AND RAPID RESPONSE SYSTEM AT HEC HOTSPOTS

Since it is inevitable to prevent the wildlife and humans from using the same space in many situations, early warning systems and rapid response teams are important for timely action to prevent the conflicts and to reduce the impacts due to such incidents. However, with Elephants, some conflict situations require high intensity interventions.

A system of “Early Warning and Rapid Response (EWRR)” should be established and used to enhance the overall efficiency of mitigation efforts in the field. EWRR is a set of tools, processes and personnel competencies needed for the timely and meaningful generation and dissemination of alert information to individuals, communities and establishments at risk, for optimal preparedness and response and at the appropriate time to reduce the likelihood of injury, death or crop damage.

EWRR would structurally include an HWC Mitigation Hub/ Control Room, and a system of three-tiered response teams, viz, Division-level Rapid Response teams (Division RRT), range-level Rapid Response Teams (Range RRT) and village/ward level Primary Response Teams of local community (Community PRT). The following steps should be taken up under the EWRR system, in line with the *Supplementary Framework to HWC-NAP on Establishment and Capacity development of HWC Mitigation response Teams*¹¹.

The system of early warning and rapid response can be used for detecting early conflict case with Elephants and for ensuring appropriate response in cases of HEC.

4.4 MONITOR AND DOCUMENT 'POTENTIAL ELEPHANTS-IN-CONFLICT' IN THE LANDSCAPE

Potential Elephant-in-conflict is/are individuals/ herds that are likely to enter in a HEC situation, owing to their movement pattern/ other behaviour.

Monitoring of potential Elephants-in-conflict in the forest-agriculture interface area can be carried out, as a preparedness and prevention measure, to ensure that their movement in the human-dominated landscape does not lead to an emergency situation. Following are some examples of such monitoring methods:

- Monitoring the movement of potential Elephants/ herds-in-conflict in the landscape, by recording direct observations, indirect evidence such as hoof prints and dung (to generate presence-absence data), and foraging signs in crop fields. Interviewing local villagers can reveal Elephant presence and movement patterns.
- Spatial and temporal movements, and behaviour of straying individuals from known Elephant herds monitored using camera traps and radio collars.
- Updates on the status of Elephants in potential conflict areas, especially on migration/ movement patterns, collected.
- SFDs may develop an identification database of identified individual and known herds of Elephants, their movement pattern within human-dominated landscapes, and the conflict that is thereby generated; this will help identify aggressive and individual Elephants with high potential for conflict

4.5 AN INTEGRATED APPROACH TO MANAGING POTENTIAL ELEPHANTS-IN-CONFLICT

There are three key elements in most HEC situations: the Elephant, humans (settlement) and the attractant for the Elephant (such a palatable crop). Sometimes removal of one of these elements in the conflict is required to resolve an intractable situation.

- Addressing high conflict Elephant/s: Male Elephants in particular are prone to higher levels of conflict and some of them become habituated to humans and the different methods they use to protect crop. The following measures are envisaged:
 - SFDs may develop an identification database of identified individual and known herds of Elephants, their movement pattern within human-dominated landscapes, and the conflict that is thereby generated; this will help identify aggressive and individual Elephants with high potential for conflict. SFDs should identify the high conflict individual/s from this database.
 - SFDs should test aversion conditioning to train habituated males who have the ability to breach barriers to avoid human use areas through radio collaring of such males so that systematic intervention is possible.
 - Necessary capture, translocation (if required) to be carried out as per the Guidelines and OP with related monitoring protocols. Translocation is one of the tools available for addressing high conflict individual or even pocketed populations. Animals which are captured may be rehabilitated in a suitable habitat or to be brought into captivity depending upon the situation.
- Addressing settlements inside the forest in HEC hotspots: When settlements inside the forests face very severe HEC and also have other problems based on the remoteness of their location, they may be willing to be resettled outside the forest in order to avoid HEC and to have access to a better livelihood and living conditions. In such situations the SFDs should facilitate voluntary resettlement, as per the protocols of the Government of India.
- Addressing the attractant for Elephants:
 - Identification of non-palatable crops by the farmers / agriculture department with due consideration to their socio-economic-cultural aspects

11 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>

- The low economic return from non-palatable crop may be addressed by facilitating assured pricing mechanism, value addition and marketing linkages.

4.6 MANAGING DISPERSING ELEPHANTS

Elephants which have strayed out of the forest and have been driven back to their natural habitat and also Elephants which colonise new areas, pose a very significant challenge to the managers. The following measures may be envisaged:

- Such Elephants should be monitored based on individual identification and tracking through radio-telemetry.
- Population-habitat viability analysis should be conducted for long-term scientific population management and HEC mitigation.
- Evaluation of the outcome of past dispersals is necessary to determine the effectiveness of the mitigation measures.
- Ensure regular monitoring and review by the Chief Wild Life Warden of the situation in all potential HEC conflict hotspots.

4.7 JUDICIOUS USE OF BARRIERS, TAKING A LANDSCAPE APPROACH

Barriers are primarily used to regulate the movement of Elephants, and poorly designed barrier can have adverse impact on conservation. Barriers are not fool-proof, so there may be breaches and occasionally some Elephant may be able to overcome them and enter human use areas.

Following principal types of barriers are currently used to prevent Elephant entering human-dominated areas:

- Elephant Proof Trench (EPT)
- Solar powered electric fences
- Rubble walls
- Other types – railway girders / tracks, steel channels / ropes / bars etc

When planning and establishing barriers, following to be considered

- Adopting a landscape approach during planning and execution so as not to disrupt natural movement of the Elephants in the landscape. This may be applicable to the following situations

- Construction of barriers around forest areas to keep Elephants inside the forest. Such barriers are not advisable around small forest blocks (few sq. km in size) because such forests cannot provide all the space and food requirements and confines the Elephant population, compromising their long-term genetic viability. It may be moderately useful around large forest blocks but extremely difficult to completely encircle forest blocks.
- Barriers constructed across the landscape between two states / districts / countries. It is rather impossible to create effective barriers at landscape-level ensuring movement of the Elephants across ecological landscapes and not be confined to administrative units.
- Barriers constructed around the settlement to be protected such as village / enclave. This would be most effective for protection of crops but it can be used only in specific situations wherever there is a compact area but not so around large enclaves.
- Creation of site-specific quality barriers using a participatory approach from designing monitoring and maintenance by systematic engagement of communities is essential.
- Barrier should only be used at the interface between human use areas and forests.
- Barriers with sharp spikes that have potential to injure Elephants, wildlife, livestock and humans should be avoided.
- When barriers are to be developed, a map should be prepared showing location of Elephant groups, seasonal migration patterns of Elephants and locations of Elephant corridors including location of proposed Elephant barriers.
- Barriers may be created only if the boundary is “hard” (clear and sharp demarcation between forest and human landscape), fairly straight without much convolution and not broken by roads, river or large stream for making them more effective.

4.8 JUDICIOUS USE OF OTHER EXCLUSIONARY MEASURES, TAKING A HARMONIOUS-COEXISTENCE APPROACH

Beating of drums or tin can, kerosene torch (mashal), swinging fireball and shouting are the most common repellent measures, but their effectiveness is low in most situations. The following measures may be envisaged:

- Innovative local repellent techniques like honey-bee boxes, chilly ropes etc may be piloted, and customised to enhance their effectiveness, while ensuring their wildlife-friendliness.
- New repellent methods may also include sound of bees and carnivores, use of drones etc besides deterrents like trip / sensor-based alarm system.
- Community-based institutions may be engaged by the SFDs together with wildlife experts / organisations, in motivating, training and hand-holding the community in use of exclusionary measures.

4.9 SUPPORT LOCAL POPULATION IN CROP-GUARDING METHODS

Guarding crops at night from any safe structure is one of the most effective early warning and deterrent method. Crop-guarding involves deterring Elephants by chasing and driving them using noise (i.e., shouting, beating drums or tins or using firecrackers/torches). Guarding crops at night is suitable in low-conflict areas. The following measures may be envisaged:

- Developing Community-based-conflict-management (CBCM) measures, especially in North Eastern Region, as a means of empowering the community to share the responsibility of HEC mitigation with the Forest Department through JFMC / EDC / Gram Sabha considering their vital stake and for eliciting more rapid response.
- Community PRTs and farmer groups may be engaged to ensure that besides preventive measures, traditional crop-guarding methods are encouraged, with the involvement of the local community/farmers.
- Awareness-building and training should be carried out on the proper usage of firecrackers and fire torches such that do not harm the Elephants, nor become fire hazards and on various aspects of the crop-guarding techniques.

- Early warning bulk SMS Alerts along with pulsating warning lights on towers, that warns of Elephant presence in the area may be developed.
- Farmers can be supported in developing effective and sustainable crop-guarding practices by various incentive mechanisms and subsidised funding under district-level government schemes such as Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS).
- A compendium on good practices on crop guarding techniques may be developed for use by the local community.

4.10 ADDRESSING ZONOTIC AND OTHER EMERGING DISEASES, ADOPTING A ONE HEALTH ¹² APPROACH

The response teams and other stakeholders, at HWC hotspots, are vulnerable to a variety of Zoonotic disease that can be transmitted from different animals, apart from the risk that exists for disease transmission domestic animals and wildlife; and between human-domestic animals:

- Veterinary capacities and infrastructure may be upgraded, to facilitate disease monitoring in Elephant populations (e.g., for anthrax, rinderpest, foot-and-mouth disease), both from an Elephant conservation point of view, and from zoonotic diseases spreading to livestock and human populations.
- To reduce biotic pressure on forests and prevent the spread of zoonotic diseases, it is encouraged to keep high yielding cattle and stall-feed them
- A well formulated Wildlife Health Management and Disease Surveillance Plan may be developed at every division/Protected Area (PA).
- All personnel involved with capture operations may be trained, vaccinated and equipped.
- The basic approach should be to integrate the concept of 'One Health', which links human and animal health in a shared environment, into all the operations and HEC mitigation measures in the field.

¹² 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 HEC

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 loss of lives and assets. The response to such emergencies involves prompt handling of situations, ensuring reduced vulnerabilities of humans and Elephants.

An indicative list of the potential emergency situations on a priority basis is as follows:

- i. A human is killed/injured
- ii. Elephant/abandoned calves are injured and need rescue
- iii. Property is damaged
- iv. Elephant has entered human use areas (agriculture field or settlement areas)
- v. Livestock is injured/ dead
- vi. Elephant death due to retaliatory action by humans / train collision
- vii. Crop damage
- viii. Sighting of Elephant in the vicinity of agricultural land or settlement

Key response procedures should be established, and actions promptly implemented/ undertaken for addressing emergency situations. Detailed step-by-step guidance should be developed as “Operating Procedures for Addressing Emergency Response Situations”

The key emergency response procedures may be elaborated, and should include the following:

5.1 PREPAREDNESS MEASURES – BEFORE AN EMERGENCY SITUATION ARISES

5.1.1 ESTABLISHMENT OF EMERGENCY RESPONSE MECHANISM

A strong institutional mechanism is required, to respond to emergency situation arising due to HEC. This starts with detection of incident, communication to Control Room and information dissemination to the officials and staff in the command-and-control hierarchy, including forest and civil administration, for initiation of appropriate response actions. The divisional forest office coordinates action by rushing RRTs to the incident site. The field support

operations to be structured around the following key operational stages, for synchronisation of activities to meet the emergency:

- Monitoring and situational awareness.
- Mitigation Hubs/Control Room/helplines to receive and disseminate information.
- RRT/ PRT personnel, veterinary team, drug and equipment, mobility and communication to address the emergency situation, effectively and efficiently.

5.1.2 INTRA- AND INTER-AGENCY COORDINATION AND COOPERATION

- Procedures may be laid down in each forest division/district, in line with these guidelines, and in line with the institutional framework suggested under the HWC-NAP, to ensure timely coordination amongst the various response teams from forest department and other agencies, under the DLCC consisting of District Magistrate/District Collector; Police, Fire Services, Animal Husbandry Department, Health Department, SDRF, NDRF, Paramilitary Forces, etc and local community, especially local Panchayat leaders and village Community PRTs.

5.1.3 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 facilitated in their capacity development through trainings and other measures, including trainings 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 diseases and pandemic prevention, management and control.

5.2 MEASURES DURING AN EMERGENCY SITUATION

5.2.1 IDENTIFICATION OF THE ELEPHANT-IN-CONFLICT

Identification of individual or group of Elephants-in-conflict to be characterised into casual (opportunistic) or repeated

(obligatory) crop foraging individuals/groups, which may result from Elephants with their natural movement adjoining the periphery of the forest, or Elephants which exclusively move within the crop lands due to the attractions, resulting in their localisation. The following steps may be taken for identifying the Elephant that causes conflict:

- The movement area of the Elephant in conflict may be demarcated or mapped.
- Follow the track marks and other distinct signs to confirm and track the presence and absence of Elephants.
- Investigate all conflict-related incidents within the region.
- Deploy a number of cameras at strategic locations depending on their predictable movement.
- Investigate the existing camera trap database if available and identify the individual based on the distinct morphological identification features.

5.2.2 OTHER KEY RESPONSE ACTIONS DURING AN EMERGENCY

- Operating Procedures may be laid down to receive, channelise and disseminate information at the onset of any emergency, from site of the incident, to related forest officials, HWC Mitigation Hub and further information dissemination, to requisition related response action at the emergency site.
- Specifications may be detailed for mobilisation, activation and deployment of response teams on ground to respond to the emergency situation.
- Adequate arrangements may be made to provide first aid to the person facing a health emergency condition, and then his/her quick transfer to the nearest available

equipped hospital should be facilitated. It is also critical to ensure occupational safety and health of the forest department personnel before, during and after any response operation.

- During an HEC situation, it is very essential to maintain public order and tranquillity through effective crowd management. SOPs indicating the specific roles and responsibilities of the forest department officials, District Magistrate/administration, police department, fire department, emergency services (NDRF, SDRF, paramilitary forces), health department, animal husbandry department, relief/revenue Department; first responders, specialised responders and other volunteers in crowd management should be laid down clearly, and these should be agreed to by all the stakeholders.
- The role of the media, before, during and after HEC situations should be discussed to ensure they participate effectively in crowd management and other mitigation measures.

5.3 MEASURES AFTER AN EMERGENCY SITUATION

- Operating Procedures may be laid down for reporting and process documentation of the response operation, including detailed on step-wise response actions taken and challenges faced, further Insights into the conflict and its future management, key follow up actions that need to be taken, if any, to resolve the issue (incident), management of animal if a capture was required, and assessment of the need to monitor the location for a few days to discourage any retaliatory actions

6. REDUCING THE IMPACT OF HEC ON HEALTH AND OVERALL WELL-BEING OF THE AFFECTED HUMANS

Humans living in Elephant range areas are familiar with its habits and behaviour and are accustomed to Elephant presence in the area. Although they are aware of how to react to the situations, many a times, things go beyond control and marginal farmers face losses due to HEC. Moreover, due to dispersal and colonisation of Elephants in new areas, people are not familiar with Elephants and are less tolerant of the damage caused in conflict.

A major response to HEC has been compensation for losses, but little evidence exists to support the claims that these schemes have an impact on people's attitude or the impact on the conservation of wildlife. Moral hazard, optimisation and leveraging of compensation schemes are a challenge.

Measures, which may encourage people to work towards harmonious co-existence, include participatory planning, awareness and communication for change the threat perceptions, integrating HEC mitigation into poverty alleviation programs and community-based natural resource management, and other site-appropriate stakeholder engagement measures, such as.

- Compensation for economic loss from damage to crops by Elephant activities, or personal injury or risk from Elephant encounters, is meant to increase community tolerance towards Elephants
- Insurance schemes require participants to pay a premium, for insurance against economic loss. This premium is determined based on the risk associated with HWC/HEC. The challenges of high premiums charged (due to high risk) have been addressed in some areas, by supplementing premiums with government or non-governmental funding support, community financing (e.g., through ecotourism), or better risk evaluation. Dialogue with insurance sector may be initiated for providing insurance cover for damages due to HEC. Modalities may vary for such programme from place to place based on assessment of risk by the Insurance companies. Feasibility may be explored at the state level
- Performance payments for community support for conservation may also be explored as an instrument, where the EDCs / VFCs can be provided funds for conservation-linked performance payments, and experiences and learnings can be shared back, for further refinement of these guidelines
- Conservation Easement may be a good instrument

for mitigation of conflict, which could be explored by incentivising conservation for mitigation of conflict and as an innovative mechanism, where farmers can be compensated for keeping these areas fallow for part of the year for wild animals or no/reduced gain from the farming income. Experiences and learnings can be shared back, for further refinement of these guidelines.

6.1 ADDRESSING THE SITUATION OF LOSS OF HUMAN LIFE

The dimensions of human death are many folds. It's not simple to fathom the loss of human life to the family of the victim. The primary assumption behind *ex gratia* is that the loss of life of any individual cannot be compensated. Therefore, any amount paid to the family of the victim is mere consolation or a kind of solatium.

The following measures may be implemented to effectively address the situation:

- Part of the *ex gratia* payment may be made immediately to the victim's family/heirs and the balance payment may be made at the earliest.
- The payments to the victim's family should be made into their bank accounts.
- In the HEC hotspots, a revolving fund may also be established, at the division-level, to ensure availability of funds for providing immediate relief to the victim/family.
- Possibility of setting up of foundations in the territorial divisions, for extending sustainable support to the victim, can also be explored. The minimum *ex gratia* payment may be kept in conformity with the Gajah (Elephant Task Force)¹³ recommendation by various states.

6.2 ADDRESSING THE HEALTH AND OVERALL WELL-BEING OF THE AFFECTED HUMANS

- In the case of injury, as a result of encounter with Elephant, the victim needs to be immediately hospitalised and *ex gratia* should be paid, as per the state government norms.
- Professional counselling through qualified psychiatrists/ health workers will be useful to check the effects of such traumatic incidents.

13 Rangarajan, Mahesh, Ajay Desai, R Sukumar, PS Easa, Vivek Menon, S Vincent, Suparna Ganguly, BK Talukdar, Brijendra Singh, Divya Mudappa, Sushant Chowdhary and AN Prasad. Gajah. Securing the Future for Elephants in India. The Report of the Elephant Task Force,

- The SFDs and other government agencies/ institutions may organise some counselling sessions for such victims and support them in coming out of this psychological impact.

6.3 ADDRESSING THE SITUATION OF PROPERTY DAMAGE

Ex gratia for property damage does not generally consider the cost of repairing and the costs of temporary fixes that are needed prior to repairs. The poor are affected more as their houses are of low value and damages do not consider the fact that the main costs is actually labour that the family provides in reconstruction and not the cost of materials themselves.

- Property insurance should be the ultimate goal. Awareness and adoption of options regarding property insurance should be given priority. However, till the system is fully established, present system of payment of compensation should be continued and enhanced by factoring in the hidden costs and losses. Compensation for damage to property (including buildings) should be in accordance with the state government rules, and may be made at the earliest.
- Mobile application-based system may be developed, to evaluate the loss of property and *ex gratia* paid to the property owner.
- Elephant may enter urban areas and semi-urban area close to the forest, which may create panic amongst residents. The following measures may provide relief and assistance to the community. SFDs may coordinate with the respective resident welfare associations for *ex gratia* payment in the event of loss of property and human injury

6.4 ADDRESSING THE SITUATION OF CROP DAMAGE AND LIVESTOCK INJURY/LOSS

The long-term impacts of assessment of crop compensation amount are complex. While payment of inadequate compensation to farmers will lead to resentment among humans, leading to adverse impact on wildlife conversation due to retaliatory killings. Payment of compensation is equally challenging as it might also lead to laxity in crop protection by the farmers, and inhibit possible innovations for crop guarding.

- Ministry of Agriculture and Farmers Welfare have included the crop loss by activities of wild animals under its flagship scheme *Pradhan Mantri Fasal Bima Yojana* (PMFBY), which can be used as an important HWC mitigation instrument. However, till the system is formally established in remote forest areas, the existing system of direct payment of compensation to farmers should be continued.

The process of settling crop or property loss compensation should be transparent and simplified. Mobile apps may be used for collecting the information and processing of claims of farmers, after crop losses from Elephant activities, to ensure efficiency and transparency in the system. Experiences and success-story sharing across states can facilitate further improvements in the system.

- Farmers may be encouraged, facilitated through community-based institutions, to explore solutions such as change in cropping pattern, use of non-palatable crops etc.
- Collaborative efforts can be made to promote market-based arrangements for alternate crops, wherever feasible. Community Primary Response Teams (PRTs) may be engaged to facilitate this process in their respective villages/ areas of operations.
- Site-specific studies may be conducted to find out appropriate crops that are non-palatable to Elephants, in collaboration with agricultural institutions.
- Ensure sufficient delegation at field-level for deciding and disbursing *ex gratia* compensation for its effective use for addressing possible trauma due to HEC
- Livestock loss or injury, as a result of encounter with Elephant, are not common. However, cattle tethered near or in Elephant movement paths may be at risk. SFDs may coordinate with Animal Husbandry Department for providing livestock insurance coverage in HWC hotspots. To reduce conflict and risk of loss of livestock inside the forest areas, it is encouraged to stall feed the livestock in HWC hotspots.

6.5 ADDRESSING THE SITUATION OF LOST LIVELIHOOD OPPORTUNITIES

- HEC may deprive humans of their jobs, or reduce their ability to raise income, and thus diminish their capacity to make a living. *Ex gratia* and compensation in an important coping mechanism, but specific measures may be required to ensure long-term sustainability of livelihoods at the HWC hotspots. Following measures may be planned and implemented, with cross-sector cooperation:
 - Systematic assessments of the extent and scale of lost livelihood opportunities and other indirect impacts, due to HEC, may be conducted
 - Development of skills for alternative non-land/non-farming-based income generation opportunities
 - Creation of self-help groups (SHG) for facilitating small businesses that adopt alternative non-land / non-farming based livelihoods.

7. REDUCING THE IMPACT OF HEC ON THE HEALTH AND WELL-BEING OF ELEPHANTS

Indian laws take a very strong stand on animal welfare. There are enough provisions in national and state laws to avoid and prevent cruelty and harm to animals.

- All the 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 made under the Indian Penal Code (Sections 428 and 429), Prevention of Cruelty to Animals Act of 1960 (Section 11(1)(h) and Section 11(1)(d)), Motor Vehicles Act 1978 (Transport of Animal) Rules, 2001) and guidelines issued by the MoEF&CC.

7.1 ADDRESSING THE HEALTH OF ELEPHANTS DURING CAPTURE AND POST-CAPTURE OPERATIONS

Capturing of Elephants can be for different purposes, for example capture can be for radio-collaring to be used for research purposes, or for early warning and rapid response treatment of injured Elephants or rescuing abandoned calves, or removal of Elephant from conflict space for the purpose of translocation or bringing it into captivity.

Operating procedure (OP), providing step-by-step procedure and approach for tracking and capturing Elephant/s as a mitigation measure, may be developed. Separate Operating Procedures for radio-collaring, treatment and transport to be developed to ensure animal health and safety during such operations.

Post-capture management of Elephants includes knowing the position of the captured animal (captured through immobilisation), monitoring physiological parameters and transportation of the animal. Currently, most of the capture of Elephants is done through immobilisation.

- The first & foremost thing after immobilisation of the Elephant is to restrain it securely in a comfortable position to maintain airway.
- Following drug induction, the Elephant should be approached (from the rear) keeping safety in mind.
- Post capture health examination and monitoring of the immobilised Elephant is mandatory.
- The physiological parameters (temperature, respiration, pulse and colour of mucous membrane) need constant monitoring, as these are likely to be compromised during chemical capture.
- Any significant deviation in normal physiological parameters should be dealt with appropriately.

Health Examination post capture & Critical monitoring of the immobilised Elephant:

- Once the Elephant is properly positioned, the Veterinarian should examine its health status and monitor its vital signs (pulse, respiration rate, temperature, blood oxygen level etc). Accordingly, it may be decided whether the radio collaring or capture operation will continue or the animal needs to be revived due to some complication/health emergency and released.
- A checklist of parameters may be elaborated.

Transportation post capture:

- The animals should be transported in specially designed vehicles or large containers (for long distance) or on foot (for short distance).
- The vehicle should be designed considering the animal's weight, adequate ventilation options (containers), sound non-slippery floor, provision of drainage to facilitate disposal of waste etc.
- The animal needs to be appropriately secured in the vehicle and necessary transport considerations should be in place during transit.
- Alternatively, the animal can be hoisted on the vehicle using slings/ropes/belts taking due anatomical and physiological considerations strictly under veterinary supervision and using a skilled crane operator.
- Stops en-route should be pre-planned and identified well in advance aimed at achieving the shortest journey time possible and ensuring safety and wellbeing of the animal.
- The animal needs to be regularly monitored for signs of discomfort or stress during the entire journey period by veterinary professional, and the Elephant maintained in a sedated state.
- Koonkies, if available, should be used in moving / pushing the animal into the vehicle/ container.

Food and water during transportation

- It is better to avoid provisioning of feed and water during overnight transport and efforts should be made to reach the destination (release site/ Elephant camp/ designated facility) as early as possible taking due care of vehicle speed and halting destinations.
- Water should be made available to the animal during transportation especially on hot journeys exceeding 6

hr. Water should also be at hand to control possible hyperthermia of recumbent animals.

7.2 RELEASE ESSENTIALS

- Relocated Elephants should be fitted with GPS-based collars to monitor their movement with the option of recapturing them in case they again come into conflict.
- The site of release should be at sufficient distance (typically of 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.
- “Soft release” options can also be experimented with; this would involve keeping the animal in a stockade for some limited time period at the proposed site of release before letting it free.
- The animals should be monitored for any transport injuries or any other health-related issues following release.
- The release sites should have proper off-loading facility and release should be done with the least possible stress on the Elephants.
- Following release in native habitats, it is necessary to monitor the behaviour of the animal/s and its interaction with the other herbivores
- The animal should be monitored post-release, for injuries, wounds, ill-health and disease such as nervous, locomotive or digestive disturbance by team of veterinary professionals, biologist and manager during the initial period.
- There is also a need for long-term monitoring of the health of the released individual/ population.
- In some instances, the best option or the only option may be to retain the captured Elephant or Elephants in captivity, especially if the animal has killed people or the risks of release into the wild are too high. If Elephants are retained in captivity, it is essential to consider their proper welfare and utilisation.
- In case destined for captivity, the animal should be held in fenced enclosure/ Kraal. This would provide chances for animal to recover from anaesthetics, in getting acclimatised to their surroundings at new destination and provide opportunities for intensive monitoring and veterinary management.

- In case the Elephant is required to be kept in captivity, the space provided to the Elephant should be as per the guidelines issued by the Project Elephant division, MoEFCC.

- Proper sanitation and hygiene should be maintained to avoid chances of infection
- Adequate balanced food and water should be made available along with mineral and vitamins supplements as per the health status of the Elephant.
- Health Screening: A general health screening once a week should be done and a thorough health examination should be done at least once in a month. Bi-monthly foot dip, foot care and nail trimming should be carried out to prevent foot problems. In case of suspicion of some serious health condition, samples should be collected and sent to institutes like Indian Veterinary Research Institute (IVRI) etc. for more advanced investigations.

7.3 REHABILITATION OF THE CAPTURED ELEPHANT

- In the case of Elephant brought into captivity temporarily for treatment, their release post treatment should take into consideration their past record in conflict.
- Elephants that have a record of high conflict cannot be released back as they are more habituated to humans when compared to the Elephants not causing serious conflict, which can be released back with adequate monitoring.
- States having wild Elephant population may envisage at least one Elephant rescue and rehabilitation centre and should follow CZA guidelines for their management.
- Chief Wildlife Wardens should ensure that Rescue and Rehabilitation Centres for Elephants as well as housing facilities for captive Elephants are maintained properly to avoid complaints about cruelty/ ill treatment of Elephants.

7.4 MANAGING ORPHANED/STRAY ELEPHANT CALVES-IN-CONFLICT

An Elephant calf, in the wild, is orphaned due to several reasons and special care is required to handle it, as follows

- The rescued calf should be raised under guidance of a veterinarian by an experienced senior/dedicated mahout. It should be handled only by one mahout with full precautions about hand hygiene and hygiene of the room/enclosure in which the calf is housed.
- For young calves below the age of 1 year, the constant presence (24 x 7) of the mahout is critical as stress of separation can very adversely affect its survival. If there are adult female Elephants in the facility and one of them is tolerant to the calf, then the calf should be raised in its presence as the female will act as a foster mother.
- The calves should not be exposed to humans as they have a weak immunity and may contract the diseases quickly.

7.5 RADIO COLLARING OR TAGGING (RFID-MICROCHIP) AN ELEPHANT

Elephants may be radio collared before release. Radio collars are important for HEC mitigation with the objective of understanding ranging behaviour and other information.

- Ranging behaviour studies will help to better understand how and why certain Elephants come into conflict and help the development of customised conflict mitigation measures including RRT deployment, aversion conditioning, barriers, community awareness about preventive behaviours/actions, etc. These studies will also help to ascertain the effectiveness of mitigation methods and also in understanding how Elephants respond to these methods and how these methods impact Elephants.
- Radio collaring may also facilitate enhancing the effectiveness and efficiency of the response teams, as using real-time location information from satellite collars can help RRTs to intervene early and stop Elephants from coming into conflict.
- It is useful to radio collar an injured Elephant to monitor it systematically for medical intervention over an extended period of time.
- Radio Frequency Identification Device (RFID) may be used for tagging captured wild Elephants brought to captivity

7.6 HEALTH AND WELL-BEING OF PRIVATE AND TEMPLE ELEPHANTS

- There are several instances of private Elephants and temple Elephants not being managed properly and going out of control, often during processions, due to loud music, crackers and presence of large crowd etc. The captive Elephants need to be managed as under:
- As far as possible, Elephants may be kept away from the congested places and large crowds. Assembly of Elephants in temples or other public places should not be permitted unless the organisers have taken adequate measures to deal with any emergency. It should be ensured that the Elephants, particularly bulls, participating in public functions are manned only by trained and experienced mahouts.
- A dossier should be maintained of all Elephants including their behaviour in the crowd and public functions. Operating Procedures (OPs) should be drafted for tackling such situations. Rapid response teams should be formed by the Forest Department in big cities to tackle such situations.
- Captive Elephant welfare committees should be constituted at State and District levels to ensure welfare and humane treatment of captive Elephants, particularly in private custody.
- Chief Wildlife Wardens should periodically monitor ownership certificates/ microchips of Elephants.
- Guidelines for care and management of captive Elephants issued by the MoEF No. 9-5/2003 PE dated 8.1.2008 for transportation, housing, care, feeding, work etc should be strictly followed including maintenance of necessary records and registers.

8. USE OF LEARNINGS FROM THE GUIDELINES TO FURTHER STRENGTHEN INSTITUTIONAL AND POLICY FRAMEWORK ON HEC 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 coming from implementation of them.

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

fine-tuning these mitigation measures, and also 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, consisting of representatives from Government agencies, SFDs, research institutions, civil society institutions, International organisations and independent wildlife policy experts as members of the core team. 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.¹⁴ The experts implemented different roles in the drafting and editing process, viz. Coordinating Lead Authors, Lead Authors, Contributing Authors, and Review Editors. The Author Group worked on developing these Guidelines during July 2019- August 2021, while consulting 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 this new document. A National Technical Group (NTG), consisting of experts from MoEF&CC, Wildlife Institute of India (WII), *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ), and independent wildlife and

policy experts, was formed for overall steering and facilitation of the process. A 'Working Group on Pilot Implementation of Guidelines and HWC-NAP' was formed to facilitate planning and implementation of pilot testing, consultations and final editing of draft guidelines and HWC-NAP. Detailed terms of reference of each of this category was 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 test and receive feedback on the feasibility and acceptability of the recommendations expressed in the Guidelines, using structured process and tools. Based on 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, 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 in 2024 may be desirable. In the long term, the review cycle of these guidelines can be aligned with the review cycle of HWC-NAP.

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

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

ANNEXE 1

NATIONAL TECHNICAL GROUP (NTG)

Shri Bivash Ranjan, <i>IFS</i> , Additional Director General of Forest (Wildlife), Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India (Gol) Dr S P Yadav, <i>IFS</i> , Former Additional Director General General of Forest (WL), MoEF&CC, Gol (December 2021 to March 1, 2022) Shri Soumitra Dasgupta, <i>IFS</i> , Former Additional Director General of Forest (WL), MoEF&CC, Gol (June 2019 to November 2021)	Chairperson
Shri Rohit Tiwari, Inspector General of Forest (WL), MoEF&CC, Gol	Member
Shri Rakesh Kumar Jagenia, Deputy Inspector General of Forest (WL), MoEF&CC, Gol	Member
Dr Sunil Sharma, <i>IFS</i> , Joint Director (WL), MoEF&CC, Gol Dr R. Gopinath, <i>IFS</i> , Former Joint Director (WL), MoEF&CC, Gol (June 2019 to December 2020)	Member
Director, Wildlife Institute of India (WII)	Member
Shri P C Tyagi, <i>IFS</i> (Retd.), Former Principle Chief Conservator of Forests-Head of Forest Force, Tamil Nadu	Member
Late Shri Ajay Desai, Wildlife Expert (June 2019 to November 20, 2020)	Member
Dr Sanjay Gubbi, Wildlife Expert, Nature Conservation Foundation (June 2019 to November 20, 2020)	Member
Dr Neeraj Khara, Team Leader, Indo-German Project on HWC Mitigation, GIZ India	Member Convenor

WORKING GROUP ON PILOT IMPLEMENTATION OF GUIDELINES AND HWC-NAP

Dr. Neeraj Khara, Team Leader, Indo-German Project on HWC Mitigation, GIZ India (Member Facilitator) Dr. Bhaskar Acharya, Independent Wildlife and Documentation Expert Ms Naghma Firdaus, Disaster Management Specialist Shri Ramesh Menon, Media Expert Shri C. Sasi Kumar, Technical Officer, MoEF&CC Shri Aditya Bisht, Project Elephant-MoEF&CC Shri Siddhanta Das, <i>IFS</i> (Retd.), Former DGF&SS, MoEF&CC Shri Ajai Misra, <i>IFS</i> (Retd.), Former PCCF (WL), Karnataka Shri Sanjay Srivastava, <i>IFS</i> (Retd.), Former PCCF- HOFF, Tamil Nadu Shri P C Tyagi, <i>IFS</i> (Retd.), Former PCCF-HOFF, Tamil Nadu Dr. C. Ramesh, Scientist, Wildlife Institute of India Dr. K. Ramesh, Scientist, Wildlife Institute of India Shri Surendra Varma, Asian Nature Conservation Foundation Dr. Nayanika Singh, M&E and Policy Expert
--

AUTHOR GROUP FOR DRAFTING THE GUIDELINES

Late Sh. Ajay A Desai, Wildlife Expert Sh Surendra Varma, Asia Nature Conservation Foundation Sh Ramesh Pandey, <i>IFS</i> , IGF (Project Elephant), MoEFCC, Gol	Coordinating Lead Authors
Sh. Akash Verma, <i>IFS</i> , Uttarakhand Forest Department (UKFD) Dr. Bivash Pandav, Bombay Natural History Society Capt. Dr. Parag Nigam, Scientist, Wildlife Institute of India Sh. R K Singh, <i>IFS</i> (Retd.) Ms. Naghma Firdaus, Disaster Management Specialist Dr. Aditi Sharma, Department of Animal Husbandry, Government of Uttarakhand	Lead Authors
Sh Ravi Kant Sinha, <i>IFS</i> (Retd.), Former PCCF (HOFF), West Bengal Sh. Rajiv Kumar Srivastava, <i>IFS</i> (Retd.), Dr. R Gopinath, <i>IFS</i> , Deputy Secretary, AIIMS (All India Institute of Medical Sciences, New Delhi) Sh. G Rangarao, <i>IFS</i> , Karnataka Forest department (KFD) Sh. Ujjal Ghosh, <i>IFS</i> , West Bengal Forest department (Wbfd) Sh. Manoj Kumar, <i>IFS</i> , KFD Sh. Noyal Thomas, <i>IFS</i> , Former IGF-Project Elephant, MoEFCC, Gol Sh. Prasanta Pandit, <i>IFS</i> (Retd.), Wbfd Dr. M Selvan, Project Elephant, MoEFCC Ms. Prajna Panda, Wildlife Trust of India Sh. Maria Christu Raja, <i>IFS</i> , KFD Sh Shivram Babu, <i>IFS</i> , KFD Sh. Aditya Bisht, Project Elephant, MoEFCC	Contributing Authors
Shri P. C. Tyagi, <i>IFS</i> (Retd.), Former PCCF-HOFF, Tamil Nadu Shri Sanjay K. Srivastava, <i>IFS</i> (Retd.), Former PCCF-HOFF, Tamil Nadu	Review Editors



Ministry of Environment, Forest and Climate Change
Government of India
2023



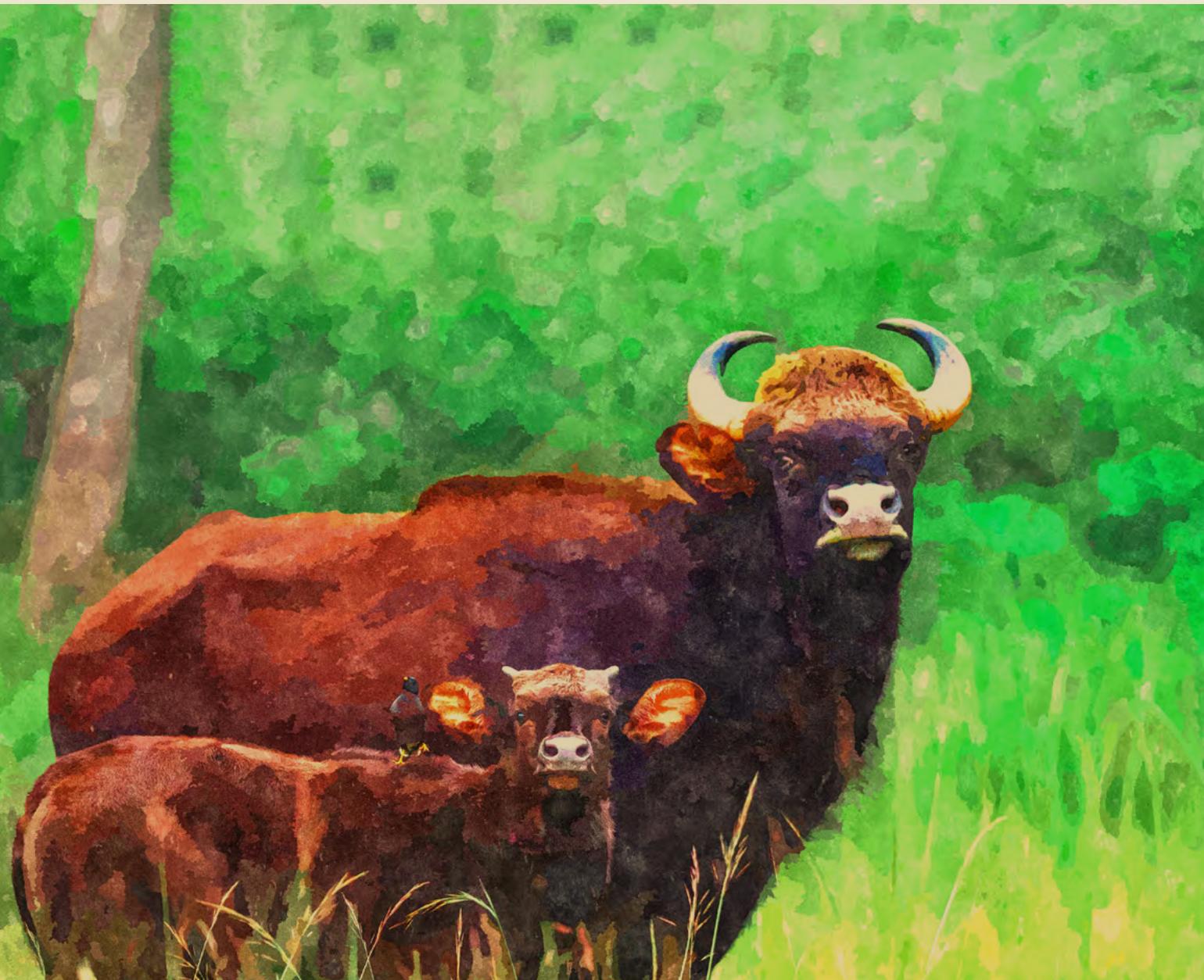
Government of India



Annexure-3

Guidelines for Human-Gaur Conflict Mitigation

Taking a Harmonious-Coexistence Approach



© Ministry of Environment, Forest and Climate Change, Government of India, 2023

Material from this publication may be used for educational purposes provided due credit is given.

Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhavan, Jor Bagh Road, New Delhi - 110 003, INDIA
Website: www.moef.gov.in

Acknowledgments

The Ministry of Environment, Forest and Climate Change, Government of India gratefully acknowledges the contributions of experts and field practitioners who developed the guidelines, with support from innumerable contributors using a participatory approach in workshops and consultations organised under the Indo-German Project on Human-Wildlife Conflict Mitigation in India.

The Ministry acknowledges the technical support extended by *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) in the preparation and pilot testing of these guidelines.

The Ministry acknowledges the support provided by the Wildlife Institute of India and the state forest departments of Karnataka, Uttarakhand and West Bengal for pilot implementation of the key elements of the guidelines during 2018-22 and for providing their valuable feedback for updating the drafts.

Ministry of Environment, Forest and Climate Change



Government of India



Guidelines for Human–Gaur Conflict Mitigation

Taking a Harmonious–Coexistence Approach

Abbreviations

BMZ	German Federal Ministry for Economic Cooperation and Development
CWLW	Chief Wildlife Warden
CZA	Central Zoo Authority
DLCC	District-Level Coordination Committee
EDC	Eco-development Committee
EIA	Environmental impact assessment
EWRR	Early Warning and Rapid Response
GIS	Geographical information system
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoI	Government of India
HGC	Human–Gaur conflict
HOFF	Head of Forest Force (in a state)
HWC	Human–wildlife conflict
HWC-MAP	Human–Wildlife Conflict Management Action Plan
HWC-NAP	National Human–Wildlife Conflict Mitigation Strategy and Action Plan
HWC-SAP	State-Level HWC Mitigation Strategy and Action Plan
IFS	Indian Forest Service
LAMP	Large Area Multipurpose Society
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MoEF&CC	Ministry of Environment, Forest and Climate Change
M&E	Monitoring and Evaluation
NDRF	National Disaster Response Force
NGO	Non-governmental organisation
NTG	National Technical Group
NTFP	Non-timber forest produce
NWAP	National Wildlife Action Plan of India
OPs	Operating procedures
OHS	Occupational health and safety
PA	Protected area
PCCF	Principal Chief Conservator of Forest
PPE	Personal protective equipment
PHVA	Population–habitat viability analysis
PMFBY	Pradhan Mantri Fasal Bima Yojana
PRT	Primary Response Team
RRT	Rapid Response Team
SDRF	State Disaster Response Force
SFD	State forest department
SLCC	State-Level Coordination Committee
VFC	Village Forest Committee
WII	Wildlife Institute of India
WLPA	Wild Life (Protection) Act, 1972

Contents

Abbreviations	iv
1. About the Guidelines	6
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 of these guidelines	6
2. Context and Situation	7
3. Addressing the drivers and pressures of HGC	8
3.1 Overall measures	8
3.2 Monitoring and managing habitat-related drivers and pressures	8
3.3 Removal of invasive plant species in and around HGC hotspots	9
3.4 Reduce livelihood dependence of humans on forests	9
3.5 Scientific management of population at interface areas or conflict hotspots	9
3.6 Strengthening the role of key stakeholders and cross-sector and inter-agency cooperation for HGC mitigation	10
3.7 Community awareness and communication measures to reduce the risk of accidental encounters and retaliation	10
3.8 Sustainable garbage management and safe sanitation around Gaur habitats	10
3.9 Systematic research and monitoring addressing HGC	11
3.10 Facilitating capacity development measures to develop the required competencies for addressing HGC in the most effective and efficient manner	12
3.11 Measures to strengthen the system of knowledge management related to HGC mitigation	12
4. Deploying Measures to Prevent Human-Gaur Conflicts	13
4.1 Differential mitigation approaches for different HGC location scenarios	13
4.2 Identifying hotspots of HGC	13
4.3 Effective use of the Early Warning and Rapid Response system at each hotspot	13
4.4 Monitor and document 'potential Gaurs-in-conflict' in the landscape	14
4.5 Managing potential Gaurs-in-conflict	14
4.6 Judicious use of barriers, taking a landscape approach	14
4.7 Support local population with crop-guarding methods	15
4.8 Addressing zoonotic and other emerging diseases, taking a One Health approach	15
5. Addressing the Emergency Situations Arising due to HGC	16
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 emergency or specific situations	17
6. Reducing the Impact of HGC on Health and Well-being of Humans	18
6.1 Addressing the situation of loss of human life	18
6.2 Addressing the health and overall well-being of affected humans	18
6.3 Addressing the situation of loss of livestock	18
6.4 Addressing the situation of loss of property	19
6.5 Addressing the situation of crop damage	19
7. Reducing the Impact of HGC on the Health and Well-being of Gaurs	20
7.1 Arrangements prior to capture operation, to ensure the Health and Safety of Gaurs	20
7.2 Addressing health of Gaurs during immobilisation, capture, transport and release	20
7.3 Managing orphaned/stray Gaur calves-in-conflict	21
8. Use of Learnings from the Guidelines to Further Strengthen Institutional and Policy Framework on HGC Mitigation in India	22
9. Process of Development and Pilot Testing of These Guidelines and Consultation Process	22
10. Monitoring and Evaluation of Guidelines	22
Annexe I	23
National Technical Group (NTG)	23
Working Group on Pilot Implementation of Guidelines and HWC-NAP	23
Author Group for drafting the guidelines	23

1. About the Guidelines

1.1 THE OVERALL CONTEXT

- These guidelines on Human-Gaur Conflict Mitigation get the overall context from the Wild Life (Protection) Act, 1972, National Wildlife Action Plan (2017-31)¹, the Advisory to Deal with Human-Wildlife Conflicts (MoEF&CC 2021) and National Human-Wildlife Conflict Mitigation Strategy and Action Plan of India (2021-26) (HWC-NAP)². HWC-NAP provides the overall conceptual and institutional framework for implementing the guidelines.
- These guidelines take into consideration the existing guidelines, advisories and good practices issued by various state forest departments (SFDs) and builds on them to bring about a more holistic approach to HGC mitigation.
- 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.
- In addition to the HGC mitigation-guidelines, the following guidelines are to provide guidance on other selected species: Guidelines for Mitigating Human -Elephant, -Leopard, -Snake, -Crocodile, -Rhesus Macaque, -Wild Pig, -Bear, -Blue Bull and -Blackbuck Conflict.

1.2 PURPOSE AND SCOPE

- The guidelines aim to facilitate a common understanding among key stakeholders, on what constitutes effective and efficient mitigation of HGC 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 Gaurs.
- The guidelines provide advice on mitigation measures to address HGC in the long term, as well as facilitate in development, assessment, customisation and evaluation of site-specific HGC mitigation measures that are effective and wildlife-friendly.
- The guidelines serve as a basis for overall long-term planning and coordination of HGC mitigation measures at national, state and forest division level.
- In general, the guidelines apply to all stakeholders relevant to HGC mitigation and are not limited to state forest departments.
- 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-coexistence³ approach to ensure that both humans and Gaur are protected from the negative impacts of HGC.
- The guidelines address the issue of HGC, taking a holistic approach. The holistic approach of the guidelines entails not only addressing the emergency situations arising due to immediate conflict situations but also addressing the drivers and pressures that lead to HGC; guidance on establishing and managing prevention methods; and reducing the impact of conflict both on humans and Gaurs.
- 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 HWC mitigation measures with key sectors and stakeholders at national, state and local levels.
- The guidelines facilitate a landscape approach while formulating solutions for mitigating HGC to ensure sustainable solutions, as unless comprehensive and integrated HGC 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 are to be read in conjunction with the existing relevant legal and regulatory frameworks, especially the Wildlife (Protection) Act 1972.
- The following legislations are considered directly relevant for conservation when dealing with HGC:
 - Wild Life (Protection) Act 1972
 - Prevention of Cruelty to Animals Act, 1960
- Sections 9, 11(1)(a) (2) (3), 12(bb), 29, 35(6), 39(1)(a) of the WLPA 1972 are especially relevant while dealing with the HGC.
- Supplementary framework to HWC-NAP on Legislative Framework for HWC Mitigation in India⁴ may be referred for more details on the specific legal provisions for HWC mitigation.
- Other important legislations that facilitate conservation when dealing with HGC, include Environment Protection Act 1986, Indian Penal Code 1860; 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; 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 impact of human-wildlife interaction 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 Gaur (*Bos gaurus gaurus*), family Bovidae, is one of the largest wild ungulates of Asian forests. The Gaur is the tallest living bovid and one of the four heaviest land mammals. Gaurs are important modifiers of the physical structure of habitats and of ecosystem structure and function because they can trigger trophic cascades, increase spatial heterogeneity, accelerate successional processes and influence nutrient cycling and primary productivity. As ecosystem landscapers, Gaurs play an important role in the moist and dry deciduous forests of India, in ensuring provisioning of ecosystem services and in maintaining biodiversity.

Gaurs are social animals, diurnal in their activity; however, human disturbance forces them to become more nocturnal. They have typical local and seasonal movements that are influenced by the availability of resources. They are obligatory drinkers and require to drink water at least once every day. The frequency may increase during the peak of summer. Gaurs are both grazers and browsers - feeding on a large variety of plant species.

The Gaur population in India co-occurs with Elephants throughout its present distributional range, except in much of the Central Indian Highlands, where Elephants have become extinct. Presently the Gaur population is distributed in more or less isolated pockets, largely corresponding to the major mountain systems of the Western Ghats, the Central Indian Highlands and the North-eastern Himalaya, including the hills south of the Brahmaputra.

In recent years, increasing numbers of HGC cases have been reported from north-eastern India (especially in northern West Bengal) and central and southern India. Incidences of aggression towards humans and frequent Gaur encounters cause fear and panic in humans' minds. Widespread and frequent instances of Gaur damage to crop fields, kitchen/backyard gardens and property and injury to humans (death of humans in a few extreme cases) have been reported. Thus, the intensity of Human-Gaur conflict (HGC) is increasing in the Gaur distributional range.

HGC refers to the negative interaction between humans and Gaurs, leading to adverse impacts such as injury or loss of human lives, crops, livestock and other properties, or even the emotional well-being of humans, and equally negative impacts on Gaurs or their habitats.

The key drivers of HGC include the human population increase, greater local dependency on the biomass in forest-fringe areas, land use changes, linear infrastructure, mining, urban development and habitat loss, fragmentation and degradation.

Gaur population increase at the forest interfaces and human-dominated areas; forest fires leading to habitat degradation; inadequate alternative livelihood options for local communities in and around forest areas; and insufficient awareness of gaur behaviour and garbage management among humans exert further pressures resulting in HGC.

HGC is expressed in the form of crop foraging by gaurs, rare livestock encounters and human death/injury in the forest fringe villages, human habitations and tea estates. Gaurs are shy animals. Hence, large-scale damage from their foraging of crops in the fringe areas has not been reported. In recent years, owing to shrinkage and fragmentation of forests, the conflict has, however, increased. There are instances of death of a few Gaurs every year, especially near smaller and fragmented habitats.

HGC mitigation so far has been largely focused on the use of barriers, short-distance drives and *ex gratia* payments for damages. While these efforts have helped in mitigating HGC to some extent, a holistic approach to HGC mitigation is required to ensure effectiveness and sustainability in the mitigation efforts.

3. Addressing the Drivers and Pressures of HGC

3.1 OVERALL MEASURES

Effective and sustainable mitigation of HGC involves effective problem analysis, to identify drivers and pressures of conflict resulting in appropriate selection of mitigation measures.

- An assessment of long-term outcomes and implications of all mitigation measures is needed to identify effective and wildlife-friendly mitigation measures to address HGC. This will facilitate customisation and adaptation of the mitigation measures and combining mitigation measures to achieve the best possible impacts in the field. Cross-sectoral cooperation is critical for addressing drivers of HGC through improved land use planning and other measures and to customise the mitigation measures.

HWC-NAP recommends a holistic approach to HWC mitigation by considering and addressing the thematic triangle of drivers-prevention-damage mitigation. These guidelines are prepared in line with the recommended holistic approach to bridge the current gap.

3.2 MONITORING AND MANAGING HABITAT-RELATED DRIVERS AND PRESSURES

Monitoring the drivers and pressures will play a crucial role in understanding and mitigating HGC. The following habitat-related assessment and actions may help in planning appropriate mitigation measures:

- Map existing drivers and pressures of conflict such as linear infrastructure, mining, encroachments, humans settlements within forests and use by local communities.
- Identify connectivity/corridors, improve their long-term viability and maintain ecological contiguity.
- Linear infrastructure projects (roads, rail, canals etc.) have the potential to fragment the habitat and obstruct daily and seasonal movements of Gaurs. These can be technologically retrofitted with underpasses/overpasses to allow safe crossing points for Gaurs, and suitable speed limits on roads/railways may be determined. Linear development projects to follow measures recommended in Wildlife Institute of India (WII) linear infrastructure guidelines.

- Clearly demarcate all forest boundaries to enable the patrolling teams in efficient detection of any encroachments.
- Map land tenures, identify key stakeholders and initiate consultations with them to develop community reserves and to secure relevant corridors.
- Map the foraging, ranging and distribution of Gaurs in human-dominated landscapes.
- Irrigation canals with the potential to trap Gaurs entering them may be fitted with barriers.
- Infrastructure development projects (urban development, mining, hydro-electric projects, etc.) may follow environment impact assessment (EIA) guidelines and rules and specifically identify the extent and magnitude of HWC/HGC that may arise or get escalated as a result of the proposed activities and may build in measures to prevent and/or mitigate the HWC impacts, if any.
- Prepare, implement and periodically update long-term perspective plans, such as State-Level HWC Mitigation Strategy and Action Plans (HWC-SAP) and Division-Level HWC Management Action Plans (HWC-MAP). A common framework for developing these plans is provided in the supplementary frameworks to the HWC-NAP⁵.
- Develop synergies and facilitate integrated land-use planning for effective implementation of planned measures, through the State-Level Coordination Committees (SLCC), Multi-stakeholder Fora at the state-level, Joint Working Groups with key departments and agencies at the landscape level, and the District-level Coordination Committees (DLCC).
- Develop innovative fire protection strategies and equipment, using remote sensing technology, etc. and engage the local community, especially the community-level Primary Response Teams (Community PRTs).
- Facilitate long-term studies to understand the effectiveness and wildlife-friendliness of these measures in addressing the drivers in the landscapes.

5 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>

3.3 REMOVAL OF INVASIVE PLANT SPECIES IN AND AROUND HGC HOTSPOTS

There may be suppression and reduction of indigenous plants (forage for Gaurs) due to the presence of invasive alien species in the area resulting in decreased habitat quality, leading to increased movements of Gaurs out of the forested landscapes in search of better forage, subsequently leading to increased HGC in human-dominated landscapes. The following measures may be implemented:

- Map invasive species cover and abundance within the landscape and herbivore use of the landscape and accordingly implement habitat management plans.
- Explore the use of remote sensing data for mapping and managing invasive species.
- Prioritise sites for intervention on the basis of invasive species abundance, areas critical for Gaurs (and other herbivores) and conflict hotspots to ensure efficient mitigation, given the severity and urgency of the problem and the challenges involved in containing and eliminating invasive species over large landscapes.

3.4 REDUCE LIVELIHOOD DEPENDENCE OF HUMANS ON FORESTS

Accidental encounters of humans with Gaurs inside the forest areas can be prevented to a large extent by reducing the dependence of humans on forests. The following indicative measures may be implemented.

- Facilitate management interventions for better livelihood opportunities for forest-dwelling communities through community participatory approaches, including various eco-development measures and livelihood improvement programmes.
- Facilitate reduction of dependency of fringe forest communities on forests (cattle grazing, fodder collection, fuelwood collection, NTFP collection, right-of-way, etc.) by participatory forest management.
- Facilitate in addressing livelihood needs of communities by skill development, poverty alleviation and alternate income generation schemes of the Government.
- Facilitate in improving animal husbandry practices (e.g., by promoting stall-feeding of cattle or incentivising the rearing of improved livestock breeds)

- Facilitate cooperation between SFDs and other line departments and agencies, to integrate HGC mitigation planning at District level. This can be supported through measures including, but not limited to, dovetailing HWC mitigation measures with schemes relevant to community development.

3.5 SCIENTIFIC MANAGEMENT OF GAUR POPULATION AT INTERFACE AREAS OR CONFLICT HOTSPOTS

A local overabundance⁶ of Gaurs could be due to various factors, including habitat loss, degradation and fragmentation of natural habitats, or an increase in the Gaur population. Some Gaur populations in forest-fringe areas have also become habituated to humans. Therefore, there needs to be a clear understanding of the spatio-temporal distribution, foraging and ranging patterns and the use of human-dominated landscapes, for scientific management of Gaur population in such areas.

The following measures are envisaged:

- 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 population assessment and its scientific management.
- SFDs may adopt a robust population monitoring protocol and implement it using trained field staff or/and in collaboration with research institutes or local universities/colleges.
- The impacts of dispersing Gaur populations that have colonised new areas on the safety of the local communities and the Gaurs themselves may be assessed.
- SFDs may work towards clearing ground vegetation and carry out tree thinning, in those forest patches where Gaur populations have become resident outside the forest, are taking shelter in small insular forest patches and are moving in a set pattern to forage on crops. This will prevent opportunistic and accidental sudden encounters between Gaurs and humans.
- Measures to understand the population dynamics of Gaurs in tea estates where they have become resident and record changes in their behavioural attributes.

⁶ 'Local overabundance' refers to the occurrence, in a habitat, of an excessive number of individuals of a species beyond the normal population density due to a variety of factors.

3.6 STRENGTHENING THE ROLE OF KEY STAKEHOLDERS AND CROSS-SECTOR AND INTER-AGENCY COOPERATION FOR HGC MITIGATION

Cross-sectoral cooperation for HGC mitigation entails engaging multiple stakeholders from different sectors and domains, at national, state, landscape and district/forest division levels. Key stakeholders for HGC mitigation may include the SFD and other line departments, viz., Agriculture, Revenue, Animal Husbandry, Police, Public Works, Health and Family Welfare and Education departments; Public Health Institutions; Electricity Boards; the private sector (tea or coffee plantations); agencies, viz., the Railways and the National Highway Authority of India; and wildlife conservation and development NGOs, farmers' cooperatives and agricultural research institutions.

Long-term engagement with key stakeholders and sectors may be institutionalised on a sustained basis by adopting the following measures:

- 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 HGC, and district-specific operational mechanisms may be used to address specific needs of HGC mitigation.
- Maintaining information and data of HGC cases and the developments in the area that may have a bearing on the conflict. This may include agricultural practices, NTFP collection and cultural, religious or other traditional practices inside forests.
- Facilitate support to the community-level (village/ward) Primary Response Teams (PRT) as the entry point for all community engagement work and form a dedicated cadre of community-level response teams, especially including youth and women at HGC hotspots.
- The EDCs/ VFCs formed by the SFDs in villages abutting the forest area at HGC hotspots are to be made functional and their sustainability ensured.
- Plan and implement training programmes and other capacity development measures with school and college students, with women's self-help groups (SHGs), Village Forest Committees (VFCs), Eco-development Committees (EDCs), Large Area Multipurpose Society (LAMPs), forest user groups, etc.
- Local communities may be supported in enhancing their understanding of Gaur behaviour, and how to conduct themselves in Gaur habitats, as well as addressing situations when Gaur are actively using their property/crop fields.

- Develop appropriate awareness material in local languages (posters, handouts, short films, street plays, etc) delete with support from local community outreach organisations and institutions.
- Ensure participation from stakeholders to integrate traditional and local knowledge and experiences into development of division-level HWC-MAPs

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

- To facilitate effective engagement of local communities and various stakeholders in mitigation of HGC, and to prevent accidental encounters of humans and Gaur, 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 HGC hotspots, and their impacts may be assessed periodically to ensure that the awareness and communication measures are locally customised.

3.8 SUSTAINABLE GARBAGE MANAGEMENT AND SAFE SANITATION AROUND GAUR HABITATS

The risk associated with generation of waste is greatest in the villages and towns abutting the forests, where, if sustainable waste management is not practiced, food waste attracts wild animals. The local communities, living in forest-fringe villages are vulnerable to accidental encounters with Gaur/other wild animals that range in the forest periphery, attracted not only to such food waste but also crops and water sources, especially during the lean season.

The following are indicative measures to address the situation:

- Ensure sustainable and ecologically sound waste and garbage disposal by town municipalities and village panchayats bordering Gaur habitats.
- Undertake periodic inspection of the forest perimeter near villages/towns to ensure that poor disposal of waste and garbage is detected early and brought to the notice of relevant local authorities. Volunteers can be engaged for this.
- 'Aversion conditioning' measures may be implemented in areas where Gaur have started foraging inside the villages and towns in search of forage and have become accustomed to feeding on garbage.

- SFDs may also coordinate with municipalities/ panchayats regarding garbage management and explore the possibility of getting toilets built under the *Swachh Bharat Mission* to prevent accidental encounters of Gaurs and humans at HGC hotspots.

3.9 SYSTEMATIC RESEARCH AND MONITORING ADDRESSING HGC

HGC mitigation is a challenging issue, especially when adequate data on the Gaur population density, demography, social and ranging behaviour and ecology are not available. Currently the data used for assessing the impact of HGC are limited to the number of *ex gratia* payments made, number of humans killed or injured and the number of Gaurs killed. There is a clear need to have a more holistic understanding of HGC and its implications for humans and Gaurs, through the following indicative measures:

- Facilitate development of a knowledge base of critical information such as habitat usage, habitat connectivity, corridors, preferred or suitable habitat, home range, behaviour, attractions along the habitat and the movement paths.
- Data on indirect costs of HGC (e.g., farmers abandoning agriculture due to HGC or deteriorating human well-being, including stress, fear and restrictions on normal human daily activities) and other socio-economic impacts of HGC on families and communities are to be collected.
- Record and analyse data on long-term adverse impacts of HGC on Gaurs (in terms of stress, reduction in reproductive fitness, loss of genetic diversity, etc.).
- SFDs may involve research institutions, non-governmental organisations (NGOs) and experts to carry out data- and result-oriented research on the HGC status and existing mitigation measures, besides undertaking in-house research.
- Standardised criteria for assessing the effectiveness and wildlife-friendliness of mitigation measures may be developed and used.
- The following areas may be given higher priority for research and monitoring at HGC hotspots. The results from such studies are to be consolidated at the national level to support further review of these guidelines and strengthen the HGC mitigation measures:
 - Gaur responses to land-use changes (mining, linear infrastructure) inside the forest
 - Gaur responses to changing cropping patterns and land-use changes outside the forest
 - Understanding what factors influence crop foraging behaviour in Gaurs
 - Status of Gaur populations, along with demographic parameters
 - Impact of local overabundance on habitat and population and impact on other species
 - Effectiveness and wildlife-friendliness of HGC mitigation measures
 - Impacts of different mitigation measures on Gaurs (changes in resource use, health and HGC)
 - Effect of habitat fragmentation and linear infrastructure on the HGC patterns
 - Mapping ecosystem services provided by Gaurs and the trade-off with economic loss caused due to injuries or deaths of humans or livestock from encounters with Gaurs
 - Assessment of the socio-economic status and perception of communities on forest fringes, and the social and knowledge capitals to sustain HGC pressures, and related factors enabling co-management and co-existence
 - Assessment of Gaurs in human-dominated areas (agriculture fields, plantations, semi-urban areas, etc.), and economics of HGC, by understanding and engaging different stakeholders, including corporates and other departments/agencies
 - Assessment of the status of Gaurs in semi-urban centres, the associated perception of local communities and effective instruments to address the perception and enable co-existence
 - Modelling the HGC dynamics and risk probability in the context of forest cover change, human population growth, development projects, disasters (including fire, flood, landslides etc.) and climate change impacts
 - Developing and using protocols for identifying and monitoring potential and actual Gaurs-in-conflict across the landscape
 - Development of knowledge-management and decision-support systems at state-, division- and local levels, as real-time information flows, and integrating them with the national database
 - Resource use pattern of Gaurs in the forest-village interface areas studied and correlates or factors that facilitate Gaur persistence in the forest-fringes identified
 - Movement ecology of Gaurs (through the use of radio collars and telemetry) and predicting the conflict probability within and between landscapes.

3.10 FACILITATING CAPACITY DEVELOPMENT MEASURES TO DEVELOP THE REQUIRED COMPETENCIES FOR ADDRESSING HGC IN THE MOST EFFECTIVE AND EFFICIENT MANNER

The following measures are envisaged for facilitating capacity development of key institutions and experts:

- SFDs are to ensure that all their response team personnel and, if possible, those of 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*⁷.
- The response teams, other field personnel and local community members may be provided regular training and made aware about zoonotic and other emerging diseases, and occupational health and safety, through a One Health approach⁸.
- Regular and systematic specialised training programmes on critical operations such as rescues, captures and translocations may be conducted jointly with other key relevant departments in the form of mock-drills and simulation training.
- Advanced training programmes on animal welfare issues may be conducted for all the personnel of the RRTs.
- The competencies of the members of the RRTs may be reviewed regularly, and their training curriculum is to be fine-tuned and updated regularly, by the state forest training institutions.

3.11 MEASURES TO STRENGTHEN THE SYSTEM OF KNOWLEDGE MANAGEMENT RELATED TO HGC MITIGATION

- To take effective and sustainable HGC mitigation measures, it is essential that field experiences, learnings, field-evidence and conceptual advances be shared across key stakeholders and landscapes, and that such knowledge be documented to be utilised for future strategies and plans related to HGC mitigation.
- 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 taken to systematically document field experiences, learnings, field-evidence and conceptual advances related to HGC mitigation to inform the future strategies and plans related to HGC mitigation.

⁷ *Supplementary Framework to HWC-NAP on Establishment and Capacity Development of HWC Mitigation Response Teams* is available from <https://moef.gov.in/wp-content/uploads/2022/01/National-Human-Wildlife-Conflict-Mitigation-Strategy-and-Action-Plan-of-India-2.pdf>

⁸ The One Health concept is based on the understanding that human, animal and environmental health are closely interconnected and interdependent. One Health is a collaborative, multisectoral and transdisciplinary approach- working at the local, regional, national and global levels with the goal of achieving optimal health outcomes, recognising the interconnection between humans, animals, plants and their shared environment.

4. Deploying Measures to Prevent Human-Gaur Conflicts

4.1 DIFFERENTIAL MITIGATION APPROACHES FOR DIFFERENT HGC LOCATION SCENARIOS

HGC can be effectively addressed by understanding the type of conflict, the site of occurrence and the overall impact on humans and Gaurs. HGC can be divided into three broad categories, each of which requires different mitigation methods, with some overlap:

- For HGC occurring inside the forest, measures such as habitat management, minimising forest use, and capacity development can be implemented.
- When HGC occurs at the interface, early warning and rapid response system including deployment of RRTs and PRTs, capacity development, and barriers and deterrents are to be implemented.
- When HGC occurs in human-dominated landscapes, then apart from early warning and rapid response, capacity development, barriers and deterrents, focus can be on capture and translocation of Gaurs-in-conflict, and their safe release and rehabilitation.

4.2 IDENTIFYING HOTSPOTS OF HGC

'HWC hotspots' are areas with actual or predicted repeated occurrence of HWC incidents resulting in crop-loss, livestock death, human death and injury and wildlife death and injury over temporal and spatial scales. It can be static (repeated in the same place or time) or dynamic (shift in space and time over years). In addition to count statistics, the magnitude of the incidents is subjected to interpolation or extrapolation techniques to define the hotspots in space and time.

Identifying HGC hotspots, which may provide a direction towards the drivers of the conflict, is critical to provide site-specific solutions to mitigate conflict. Conflict hotspots of HGC can be mapped through geo-spatial assessments using both primary data and secondary data, including time-series data. The hotspots may be identified and mapped as follows:

- **Incident hotspot:** Frequency of occurrence of incidences over past five or ten years, mapped over the target area. The data include the numbers of incidents of injury, death and loss of crop.

- **Vulnerability hotspot:** Cumulative index obtained by overlaying past incidents, the vulnerability of the local community and the potential risk of the area.

The following assessments are envisaged:

- Database may be created by involving frontline SFD personnel, researchers, research institutions, veterinary professionals and others for identifying and assessing the hotspot.
- Predictive modelling based on the field data and Geographic Information System (GIS) analysis may be carried out by trained personnel.

4.3 EFFECTIVE USE OF THE EARLY WARNING AND RAPID RESPONSE SYSTEM AT EACH HOTSPOT

An Early Warning and Rapid Response (EWRR) system may be established at HWC hotspots in India to enhance the preparedness and overall efficiency of mitigation efforts in the field. EWRR is a set of tools, processes and personnel competencies needed for the timely and meaningful generation and dissemination of conflict information to individuals, communities and establishments at risk for optimal preparedness and response at the appropriate time to reduce the likelihood of injury, death or crop damage.

The EWRR may include an HWC Mitigation Hub/ Control Room and a system of three-tiered response teams, viz, Forest Division-level Rapid Response teams (Division RRT), Forest Range-level Rapid Response Teams (Range RRT) and community (village/ ward)- level Primary Response Teams (PRTs). The EWRR system may be established in line with the *Supplementary Framework to HWC-NAP on Establishment and Capacity development of HWC Mitigation response Teams*⁹.

The EWRR system may be used for detecting early cases of HGC related emergencies and for ensuring appropriate emergency response.

9 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>

4.4 MONITOR AND DOCUMENT 'POTENTIAL GAURS-IN-CONFLICT' IN THE LANDSCAPE

Potential Gaurs-in-conflict are individuals/herds that are likely to enter a HGC situation owing to their movement pattern/other behaviour.

Monitoring of potential Gaurs-in-conflict in the forest-agriculture interface area may be carried out, as a preparedness and prevention measure, to ensure that their movement in the human-dominated landscape does not lead to an emergency situation. The following are some examples of such monitoring methods:

- Monitoring the movements of potential Gaurs-herds-in-conflict in the landscape, by recording direct observations, indirect evidence such as hoof prints and dung (to generate presence-absence data) and foraging signs in crop fields. Interviewing local villagers can reveal Gaur presence and movement patterns.
- Spatial and temporal movements and the behaviour of straying individuals from known Gaur herds monitored using camera traps and radio collars.
- Gathering updated information on the status of Gaurs in potential conflict areas, especially their migration/movement patterns.
- SFDs may develop an identification database of identified Gaurs and known herds, their movement patterns within human-dominated landscapes and the conflict that is generated by the movements. This will help identify individual Gaurs with high potential for conflict.

4.5 MANAGING POTENTIAL GAURS-IN- CONFLICT

When male Gaurs enter an agricultural landscape or settlement, they may get disoriented, may show an aggressive behaviour and may thus be prone to entering into conflict situation with humans. Gaurs, once habituated to crop fields, keep returning, even when driven back to the forest. Often, Gaurs taking refuge in small patches of forest near villages, agricultural landscapes, tea gardens and private/SFD plantations become resident there, showing no inclination to move back to the forest. The foraging, ranging and seasonal movement patterns of such Gaurs require specific attention.

The following measures may be implemented to manage Gaurs-in-conflict, in the long term:

- Given the fact that Gaurs become habituated to humans and also have the ability to breach barriers, it is usually difficult to contain them. It would be useful to test different 'aversion techniques' to habituate herds to avoid human-dominated landscapes.

- Identifying agricultural crops to which Gaurs are attracted, the cropping seasonality and the Gaurs' intensity and frequency of foraging on these crops. Planting non-palatable crops as a buffer between forests and villages could be attempted, according to the site-specific conditions.
- Translocation of a few individual Gaurs that are highly aggressive and resident in human-dominated areas may be attempted when their rehabilitation in suitable habitats is a viable option.
- Gaurs that are translocated to suitable habitats in the forest may be monitored for their subsequent movements and their likelihood of returning to agriculture landscapes gauged.
- When Gaurs are sighted within an agricultural landscape for the first time, they need to be driven back to the forests and monitored, before they get habituated to the new landscape and to humans. Population-habitat viability analysis (PHVA), coupled with requirements of meta-population management, may provide information for dealing with such first-time crop-foraging Gaurs.
- Ensure regular monitoring and reviews of the situation by the CWLW in all potential HGC hotspots.

4.6 JUDICIOUS USE OF BARRIERS, TAKING A LANDSCAPE APPROACH

Barriers are primarily used to prevent entry or regulate the movements of Gaurs. A poorly designed barrier is likely to have low effectiveness and can possibly negatively affect the health of Gaurs. No barrier is fool-proof; there will be breaches and occasionally some Gaurs may be able to overcome them and enter human-use areas. Therefore, the following measures are envisaged:

- Adopting a landscape approach during planning and execution, so as not to disrupt the natural movements of Gaurs within their landscape.
- Creation of site-specific quality barriers using a participatory approach, from designing and monitoring to maintenance, by systematic engagement with communities.
- Barriers may only be used at the interfaces between human-use areas and forests.
- Well-maintained barriers serve to keep Gaurs away from agricultural lands. However, the same also divert the population to adjoining unprotected lands and villages, thus transferring the problem elsewhere, which again needs to be mitigated. Therefore, a landscape-level planning may be done before installing barriers.
- Fences can be erected on forest boundaries, or on cropland boundaries, or around individual farms or groups of farms.

The following is an indicative list of barriers that may be tested and further fine-tuned at HGC hotspots:

- The most common fences that farmers construct to keep wild animals away are random rubble-wall stone fencing, apart from live hedges. Gaurs are known to run over and breach live fences and dead brushwood fences. Hence, any fence to keep them out should be firm and well entrenched.
- Chain-link or woven-wire fences are known to be effective, if raised on a toe wall with a good foundation.
- A solar fence¹⁰ with an oscillating current also acts as a psychological barrier, and with time, this may act as an aversion conditioning for Gaurs and may result in reduced attempts from Gaurs to cross the fence. Farmers raising crops along forest boundaries can erect power fences to protect their crops.
- The design and deployment of barriers may be planned, as far as possible, taking Gaur behaviour and landscape-use, including access to critical water sources or natural foraging areas, into consideration.

4.7 SUPPORT LOCAL POPULATION WITH CROP-GUARDING METHODS

Guarding crops at night from any safe structure is one of the most effective early warning and deterrent methods. Crop-guarding involves deterring Gaurs by using noise (i.e., shouting, beating drums or tins). Guarding crops at night is suitable in low-conflict areas. The following measures may be envisaged:

- Community PRTs and farmer groups may be engaged to ensure that besides preventive measures, traditional crop-guarding methods are encouraged, with the involvement of the local community/farmers.
- Awareness-building measures should be facilitated for the local community on the negative impacts of the use of firecrackers, fire torches and other similar methods.
- Farmers may be supported in developing effective and sustainable crop protection methods, including crop guarding, through central and state development programmes and schemes. The possibility of including such work under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) can be explored.
- A compendium on good practices on crop protection methods may be developed.

4.8 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, apart from the risk that exists for disease transmission between domestic animals and wildlife; and between humans and domestic animals.

- Veterinary capacities and infrastructure may be upgraded to facilitate disease monitoring in Gaur populations, both from a Gaur conservation point of view and to prevent zoonotic diseases from spreading to livestock and human populations.
- To reduce the biotic pressure on forests and prevent the spread of zoonotic diseases, it is recommended that high-yielding cattle be stall-fed.
- A well-formulated Wildlife Health Management and Disease Surveillance Plan may be developed at every division or PA.
- All personnel involved in capture operations may be trained, vaccinated and equipped.
- The basic approach may be to integrate the concept of One Health¹¹, which links human and animal health in a shared environment into all the operations and HGC mitigation measures in the field.

¹⁰ A solar fence draws energy from an electric energiser or solar energiser and passes a low current at an oscillating high voltage through strands. On contact, the fence produces a non-lethal shock and acts as a psychological barrier for wild animals.

¹¹ 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 HGC

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 loss of lives and assets.

The response to such emergencies involves prompt handling of situations, ensuring reduced vulnerabilities of humans and Gaurs.

An indicative list of the potential emergency situations is enumerated below:

- A Gaur has killed/injured a person.
- A Gaur has been injured or has died due to retaliatory actions by humans, or a Gaur has fallen into a well or deep ditch or has been trapped and needs to be rescued.
- A Gaur has entered a crowded lane in a village or town and is moving dangerously or attacking humans.
- A Gaur has entered the kitchen garden or backyard of a house in a village and is damaging property.
- A Gaur on a road has created panic among the local community and has halted traffic.
- A Gaur is occupying an agricultural field and is foraging on crops.

Key response procedures may be established and actions promptly implemented for addressing emergency situations.

A detailed emergency procedure may include the following steps:

5.1 ESTABLISHMENT OF EMERGENCY RESPONSE MECHANISM

A strong institutional mechanism is required to respond to emergency situations arising due to HGC. This starts with detection and dissemination of information for initiation of appropriate response actions.

The field support operations are to be structured around the following key operational stages for synchronisation of activities to meet the emergency:

- Monitoring and situational awareness
- Mitigation Hubs/Control Room/helplines receive and disseminate information.
- RRT/ PRT personnel, veterinary team, drug and equipment, mobility and communication to address the emergency situation, effectively and efficiently.

5.2 INTRA- AND INTER-AGENCY COORDINATION AND COOPERATION

- Operating procedures may be laid down in each forest division/district, in line with these guidelines, and in line with the institutional framework suggested under the HWC-NAP, to ensure timely coordination amongst the various response teams from the Forest Department and other agencies, under the DLCC, consisting of the District Magistrate/District Collector, Police, Fire Services, Agriculture Department, Rural Development and Panchayati Raj Department Animal Husbandry Department, Health Department, SDRF, NDRF, paramilitary forces, etc. and the local community, especially local panchayat leaders and community PRTs.

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 adequately established and facilitated in their capacity development 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

5.4.1 Identification of the Gaur-in-conflict

The Gaur-in-conflict is an individual that is involved in a case of HGC. It could be female or male, an adult, calf or juvenile. Adult females normally have the most influence on their herds. The adult male neither dominates nor leads the herd during crop foraging. The adult bulls are seen wandering alone, separated from the herd. Formation of bull groups in Gaur is opportunistic, during which two or more bull Gaurs meet and remain together, only for a few hours or a few days, foraging on crops. The extensive ranging of adult bulls within and between agricultural landscapes makes their monitoring very difficult.

The Chief Wildlife Warden (CWLW) of each state can permit the capture of a Gaur if she/he is satisfied that such an individual Gaur has become dangerous to human life or is so disabled or diseased beyond recovery. However, she/he may record the reasons for issuing such a permit, in writing, after being satisfied with the report of the field officer at the site, that the Gaur has been correctly identified and that there has not been an accidental encounter (opportunistic) between a Gaur and the affected human but rather the result of habituated and repeated (obligatory) incidents.

The following steps may be taken for identifying the Gaur-in-conflict:

- The conflict location may be cordoned off first.
- Trace the movements by tracking the Gaur trail, following tracks and signs of damage to crops during Gaur's foraging. A Gaur either returns to the forest or takes refuge in a small patch of forest.
- Investigate an area within 100 m of the incident location focusing on the animal trails and paths.
- Deploy two to four camera traps, if available, with white flashes and infrared flashes, with one/two of them in still mode and the other one/two in video mode.

- In the case of a Gaur encounter with humans, analyse the injuries caused by horns and trampling by hooves.
- Investigate the existing camera-trap database, if one is available, and identify the individual, based on the size and other morphometric or unique details.
- Investigate details of earlier incidents with the SFD staff and local communities for corroboration with the circumstantial evidence.

5.4.2 Other key response actions during and after an emergency

- Operating procedures may be laid down for step-wise key actions for all emergency situations, media engagement, crowd management, addressing health emergencies and post-response operations for managing the animal. This includes ensuring the animal's health and safety during the capture, transport, selection of the translocation site and monitoring after releasing the animal safely back in the wild.

6. Reducing the Impact of HGC on the Health and Well-being of Humans

Key manifestations of HGC are damage to crops or property (damage to fences, houses, etc.) or assets (livestock injury/death) or as encounters leading to human injury or death.

- A wide range of approaches could be envisaged that encourage local communities to live and prosper in Gaur habitats according to the principles of co-existence, co-management, participatory planning, risk assessment, strategies to change perceptions, poverty alleviation programmes, community-based natural resource management, and other forms of stakeholder engagement and processes.
- *Ex gratia* payments for economic loss from damage to crops by Gaur activities, or personal injury or risk from Gaur encounters, is meant to increase community tolerance towards Gaurs.
- Insurance schemes require participants to pay a premium for insurance against economic loss. This premium is determined on the basis of the risk associated with HWC/HGC. The challenges of the high premium charged (due to the high risk) have been addressed in some areas by supplementing the premiums with government or non-governmental funding support, community financing (e.g., through ecotourism) or better risk evaluation.
- A dialogue may be initiated with the insurance sector for providing insurance cover for damage due to HGC. The modalities of the programme may vary from place to place according to the assessment of the risk by the insurance companies. The feasibility of such modalities may be explored at the state level.

6.1 ADDRESSING THE SITUATION OF LOSS OF HUMAN LIFE

The dimensions of human death are manifold. It is not simple to fathom what the loss of human life means to the family of the victim. The primary assumption behind *ex gratia* payments is that the loss of the life of any individual cannot be compensated. The following measures may be implemented:

- Part of the *ex gratia* payment may be made immediately to the victim's family/heirs, and the balance payment may be made at the earliest.
- The payments to the victim's family should be made in their bank accounts.
- In HGC hotspots, a revolving fund may also be established at the division-level to ensure that funds are available for providing immediate relief to the victim/family.

6.2 ADDRESSING THE HEALTH AND OVERALL WELL-BEING OF AFFECTED HUMANS

- In the case of injury resulting from an encounter with a Gaur, the victim needs to be hospitalised immediately and an *ex gratia* payment made, as per the state government norms.
- Professional counselling through qualified psychiatrists/health workers may be useful for the victims of such traumatic incidents.

6.3 ADDRESSING THE SITUATION OF LOSS OF LIVESTOCK

Livestock losses or injuries resulting from encounters with Gaurs are not common. However, cattle tethered near or in Gaur movement paths may be at risk.

- SFDs may coordinate with the Animal Husbandry Department for providing livestock insurance coverage in HWC hotspots.
- To reduce conflict and risk of loss of livestock inside forest areas, livestock may be stall-fed at HWC hotspots.

6.4 ADDRESSING THE SITUATION OF LOSS OF PROPERTY

- *Ex gratia* payment for damage to property (including buildings) from Gaur activities may be in accordance with the state government rules and may be paid at the earliest.
- A mobile application-based system may be used to evaluate the loss of property and *ex gratia* payment to the property owner.

Gaurs may enter urban areas and peri-urban areas close to forests, which may create panic amongst residents. The following measures may provide relief and assistance to the communities in urban and peri-urban areas.

- Raising awareness about the ecology and behaviour of the Gaur, to prevent accidental encounters.
- Installation of an early warning system using surveillance devices.
- Facilitating competency-development measures, on a regular basis, for community PRTs to ensure that there is an effective first response.
- Deployment of barriers and other deterrents.

- Maintaining sanitary conditions (including garbage management).
- SFDs may coordinate with the respective resident welfare associations for an *ex-gratia* payment in the event of loss of property and human injury.

6.5 ADDRESSING THE SITUATION OF CROP DAMAGE

Assessment of the amount of *ex gratia* payment to be made towards crop damage and its long-term effectiveness are complex issues. Payment of inadequate *ex gratia* may lead to resentment among humans, leading to adverse impacts on wildlife conservation due to retaliatory actions. Payment of *ex gratia* may also lead to laxity in crop protection and inhibit possible innovations in crop-guarding.

- The Ministry of Agriculture and Farmers Welfare has included crop loss caused by activities of wild animals under its flagship scheme *Pradhan Mantri Fasal Bima Yojana* (PMFBY), which may be used as an important HWC mitigation instrument.
- The process of providing *ex gratia* for crop or property loss should be transparent and simplified. Mobile apps may be used for collecting information and processing of claims farmers, after crop losses from

Gaur activities, to ensure that there is efficiency and transparency in the system. Experiences and success-story sharing across states can facilitate further improvements in the system.

- Farmers may be encouraged, facilitated through community-based institutions, to explore solutions such as changing cropping patterns and using non-palatable crops.
- Collaborative efforts can be made to promote market-based arrangements for alternate crops, wherever feasible. Community Primary Response Teams (PRTs) may be engaged to facilitate this process in their respective villages/areas of operations.
- Site-specific studies may be conducted to find out appropriate crops that are non-palatable to Gaurs, in collaboration with agricultural institutions.
- Appropriate protocols are to be developed for assessment of damage and providing relief.
- Ensure sufficient delegation at the field level for deciding and disbursing the *ex gratia* payment so that it is effectively used for addressing possible trauma due to HGC.

7. Reducing the Impact of HGC on the Health and Well-being of Gaurs

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 made under the Indian Penal Code (Sections 428 and 429), Prevention of Cruelty to Animals Act of 1960 (Section 11(1)(h) and Section 11(1)(d)), Motor Vehicles Act, 1978 (Transport of Animal) Rules, 2001) and guidelines issued by the MoEF&CC.

7.1 ARRANGEMENTS PRIOR TO CAPTURE OPERATIONS TO ENSURE THE HEALTH AND SAFETY OF GAURS

- The equipment required for a Gaur capture operation, including radio collars, transport vehicles and holding facilities/bomas¹² at the release site, may be checked from a checklist containing descriptions of the equipment, its field-worthiness, and maintenance, with cross-references to the maintenance manual.
- Protocols may be developed for the veterinary team for the pre- and post-capture, immobilisation, transportation and release procedures. A thorough check of the drugs (immobilisation and emergency) and accessories and functioning of the equipment may be carried out, according to the veterinary protocols.
- The training of the field staff for their role and responsibilities at the capture site and release site is the most important part of the operation. Training may be provided on locating and monitoring Gaur herds, capturing and darting, loading/unloading of immobilised Gaurs, emergency management, transport, logistics/support at the unloading site and post-release monitoring. The darting team may be trained to dart a Gaur at different distances before the actual operation.
- It may be useful to carry out a mock drill, if possible, prior to the capture for each activity, including a dry run of the transport truck from the capture site to the release site, to assess the road/travel conditions, the suitability of the vehicle and the availability of halting points during the journey, in order to optimise the vehicular speed.

7.2 ADDRESSING THE HEALTH OF GAURS DURING IMMOBILISATION, CAPTURE, TRANSPORT AND RELEASE

- The tracking team should be familiar with the habitat and should be competent in locating the Gaur-in-conflict.
- The Gaur-in-conflict may be approached by the darting team on the back of an Elephant/vehicle for darting. If the Gaur is not visible or is at a distance, then the approach may be made on foot carefully. After the immobilisation there are a few procedures that may be followed to ensure the safety of the Gaur, as well as the health and safety of the field teams.
 - The monitoring team should be very alert during the immobilisation of the Gaur. This is because, after darting, during the drug's induction phase, the Gaur may move considerable distances. Therefore, the tracking team may follow and locate it and ensure that the darted Gaur is in clear sight of the team before it goes down into sternal recumbency.
 - Proper positioning of the Gaur's body may be ensured for the normal eructation of ruminal gases. Otherwise, bloat may result and can lead to further complications. Moreover, care should be taken to ensure that the regurgitated rumen contents flow out of the Gaur's mouth and are not aspirated back.
 - After the rescue, the Gaur may be brought into the holding structure/boma prior to transportation to the release site. This is to ensure that the Gaur has recovered from the effects of the capture operations.

After they capture, the following health examinations are required:

- Animal-body screening for any symptoms of external or internal injuries
- Monitoring of critical animal welfare parameters
- Recording of morphometric measurements
- Collection of biological samples for investigation of any possible disease

A checklist of parameters may be developed.

¹² 'Boma' refers to a mass capturing technique for wild animals traditionally used in Africa by constructing a temporary enclosure into which wild animals are driven through a funnel toward a crush. Curtains in the funnel are closed once the animals have entered the funnel. Then they move through the crush onto a ramp and into a transport truck.

- The tranquilised Gaur may be loaded onto the transport truck with the aid of a ramp. A little coaxing of the Gaur and pulling it with ropes is sufficient to load it into the truck. However, for some reluctant/resisting Gaurs, *kumki* Elephants are to be used to facilitate loading.
- Sometimes in emergency rescue cases, when a Gaur is in a swampy area or inside water, cranes may be used for lifting the animal, after verifying that the ropes and harness that carry the Gaur are strong enough to take the weight of the 600 to 1000 kg animal.
- The truck journey to the release site or to the rescue facility/transit facility may commence in the late evening, so as to avoid any human and vehicular disturbance. It may be timed to reach the release site/rescue facility during the early morning hours.
- The Gaur being transported may be constantly monitored throughout the journey by the accompanying veterinary team members.
- For unloading the captured animal from the truck at the release site, an earthen ramp may be constructed adjacent to the boma/holding enclosure.
- After an initial stabilisation, a fitness test may be conducted on the Gaur by the veterinary team before it is released.
- The team should be well prepared for all the situations that may arise during the transport and/or release of the animal.
- Post-release monitoring of the released Gaur may be conducted through the use of direct (e.g., through radio-tagging, radio-telemetry) or indirect (e.g., spoor, indirect signs, camera traps) methods, depending on the availability of equipment and trained personnel, to observe the animal and its status.
- Demographic, ecological, and behavioural studies of the released Gaur may be conducted to ensure long-term adaptation to the new habitat.

OPs providing step-by-step procedures for tracking and capturing Gaurs as a mitigation measure and post-capture operations may be developed.

7.3 MANAGING ORPHANED/ STRAYED GAUR CALVES-IN-CONFLICT

A Gaur calf in the wild is orphaned due to several reasons, and special care is required to handle it:

- The rescued calf may be raised under the guidance of a veterinarian by an experienced animal keeper from a zoo. It should be handled only by the animal keeper with full precautions about hand hygiene and the hygiene of the room/enclosure in which the calf is housed.
- For young calves below the age of one year, it is necessary that bonding be developed between the animal keeper and calf so that there is a stress-free environment and the calf is free from the initial trauma of separation.
- A calf should not be exposed to humans as its immunity is weak and it may contract infections and diseases quickly.

8. Use of Learnings from the Guidelines to Further Strengthen the Institutional and Policy Framework Related to HGC 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 coming from implementing them.

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

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

- In the long term, the consolidated feedback may also be used in further review of 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 I) was formed, consisting of representatives from government agencies, SFDs, research institutions, civil society institutions and international organisations and independent wildlife policy experts as members of the core team. 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 methodology¹³. The experts played different roles in the drafting and editing process, viz., Coordinating Lead Authors, Lead Authors, Contributing Authors and Review Editors. The Author Group worked on developing these guidelines between July 2019 and August 2021, during which period 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 this new document. The 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 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, for testing and for receiving feedback on the feasibility and acceptability of the recommendations expressed in the guidelines using a structured process 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, 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 these guidelines is planned

to take place every five years from 2023 onwards. However, a mid-term review process may be desirable in 2024. In the long-term, review cycle of these guidelines can be aligned with the review cycle of HWC-NAP.

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

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

Annexe I

NATIONAL TECHNICAL GROUP (NTG)

Shri Bivash Ranjan, <i>IFS</i> , Additional Director General of Forest (Wildlife), Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India (Gol) Dr S P Yadav, <i>IFS</i> , Former Additional Director General of Forest (WL), MoEF&CC, Gol (December 2021 to March 1, 2022) Shri Soumitra Dasgupta, <i>IFS</i> , Former Additional Director General of Forest (WL), MoEF&CC, Gol (June 2019 to November 2021)	Chairperson
Shri Rohit Tiwari, Inspector General of Forest (WL), MoEF&CC, Gol	Member
Shri Rakesh Kumar Jagenia, Deputy Inspector General of Forest (WL), MoEF&CC, Gol	Member
Dr Sunil Sharma, <i>IFS</i> , Joint Director (WL), MoEF&CC, Gol Dr R. Gopinath, <i>IFS</i> , Former Joint Director (WL), MoEF&CC, Gol (June 2019 to December 2020)	Member
Director, Wildlife Institute of India (WII)	Member
Shri P C Tyagi, <i>IFS</i> (Retd.), Former Principle Chief Conservator of Forests-Head of Forest Force, Tamil Nadu	Member
Late Shri Ajay Desai, Wildlife Expert (June 2019 to November 20, 2020)	Member
Dr Sanjay Gubbi, Wildlife Expert, Nature Conservation Foundation (June 2019 to November 20, 2020)	Member
Dr Neeraj Khara, Team Leader, Indo-German Project on HWC Mitigation, GIZ India	Member Convenor

WORKING GROUP ON PILOT IMPLEMENTATION OF GUIDELINES AND HWC-NAP

Dr Neeraj Khara, Team Leader, Indo-German Project on HWC Mitigation, GIZ India (Member Facilitator) Dr Bhaskar Acharya, Independent Wildlife and Documentation Expert Ms Naghma Firdaus, Disaster Management Specialist Shri Ramesh Menon, Media Expert Shri Sasi Kumar, Technical Officer, MoEF&CC Shri Aditya Bisht, Project Elephant-MoEF&CC Shri Siddhanta Das, <i>IFS</i> (Retd.), Former DGF&SS, MoEF&CC Shri Ajai Misra, <i>IFS</i> (Retd.), Former PCCF (WL), Karnataka Shri Sanjay K Srivastava, <i>IFS</i> (Retd.), Former PCCF- HOFF, Tamil Nadu Shri P C Tyagi, <i>IFS</i> (Retd.), Former PCCF- HOFF, Tamil Nadu Dr C Ramesh, Scientist, Wildlife Institute of India Dr K Ramesh, Scientist, Wildlife Institute of India Shri Surendra Varma, Asian Nature Conservation Foundation Dr Nayanika Singh, M&E and Policy Expert

AUTHOR GROUP FOR DRAFTING THE GUIDELINES

Shri P C Tyagi <i>IFS</i> (Retd.), Former PCCF- HOFF, Tamil Nadu Dr K Sankar, Former Director, SACON	Coordinating Lead Authors
Dr T Ramesh, Senior Scientist, Salim Ali Centre for Ornithology and Natural History (SACON) Dr B Navaneethan, Wildlife Expert Dr Anwaruddin Choudhury, Deputy Commissioner, Government of Assam and The Rhino Foundation for Nature in North-east India	Lead Authors
Dr H S Pabla, <i>IFS</i> (Retd.), Former PCCF (WL), Madhya Pradesh Forest Department Dr A K Bhardwaj, Wildlife Institute of India Shri Subhankar Sengupta, Chief Conservator of Forests, West Bengal Forest Department Late Shri Ajay A Desai, Wildlife Expert Shri Surendra Varma, Asia Nature Conservation Foundation	Contributing Authors
Dr M D Madhusudan, Wildlife Expert Shri Sanjay K Srivastava, <i>IFS</i> (Retd.), Former PCCF- HOFF, Tamil Nadu	Review Editors



Ministry of Environment, Forest and Climate Change
Government of India
2023

**THE SOLID WASTE
MANAGEMENT RULES,
2016**

(as amended to date)

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 8th April, 2016

S.O. 1357(E).—Whereas the draft of the Solid Waste Management Rules, 2015 were published under the notification of the Government of India in the Ministry of Environment, Forest and Climate Change number G.S.R. 451 (E), dated the 3rd June, 2015 in the Gazette of India, part II, Section 3, sub-section (i) of the same date inviting objections or suggestions from the persons likely to be affected thereby, before the expiry of the period of sixty days from the publication of the said notification on the Solid Waste Management Rules, 2015 in supersession of the Municipal Solid Waste (Management and Handling) Rules, 2000;

And whereas, copies of the said Gazette were made available to the public on the 3rd June, 2015;

And whereas, the objections or comments received within the stipulated period were duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sections 3, 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) and in supersession of the Municipal Solid Waste (Management and Handling) Rules, 2000, except as respect things done or omitted to be done before such supersession, the Central Government hereby makes the following rules for management of Solid Waste, namely: -

1. Short title and commencement. –

- (1) These rules may be called the Solid Waste Management Rules, 2016.
- (2) They shall come into force on the date of their publication in the Official Gazette.

2. Application.- These rules shall apply to every urban local body, outgrowths in urban agglomerations, census towns as declared by the Registrar General and Census Commissioner of India, ¹[villages with population more than 3000,] notified areas, notified industrial townships, areas under the control of Indian Railways, airports, airbases, Ports and harbours, defence establishments, special economic zones, State and Central government organisations, places of pilgrims, religious and historical importance as may be notified by respective State government from time to time and to every domestic, institutional, commercial and any other non-residential solid waste generator situated in the areas except industrial waste, hazardous waste, hazardous chemicals, bio medical wastes, e-waste, lead acid batteries and radio-active waste, that are covered under separate rules framed under the Environment (Protection) Act, 1986.

3. Definitions – (1) In these rules, unless the context otherwise requires, -

1. **“aerobic composting”** means a controlled process involving microbial decomposition of organic matter in the presence of oxygen;
2. **“anaerobic digestion”** means a controlled process involving microbial decomposition of organic matter in absence of oxygen;
3. **“authorisation”** means the permission given by the State Pollution Control Board or Pollution Control Committee, as the case may be, to the operator of a facility or urban local authority, or any other agency responsible for processing and disposal of solid waste;
4. **“biodegradable waste ”** means any organic material that can be degraded by micro-

¹ Ins. the words and figure vide S.O. 1152(E) dated 19th March, 2020

organisms into simpler stable compounds;

5. **"bio-methanation"** means a process which entails enzymatic decomposition of the organic matter by microbial action to produce methane rich biogas;
6. **"brand owner"** means a person or company who sells any commodity under a registered brandlabel.
7. **"buffer zone"** means zone of no development to be maintained around solid waste processing and disposal facility, exceeding 5 TPD of installed capacity. This will be maintained within total land area allotted for the solid waste processing and disposal facility.
8. **"bulk waste generator"** means and includes buildings occupied by the Central government departments or undertakings, State government departments or undertakings, local bodies, public sector undertakings or private companies, hospitals, nursing homes, schools, colleges, universities, other educational institutions, hostels, hotels, commercial establishments, markets, places of worship, stadia and sports complexes having an average waste generation rate exceeding 100kg per day;
9. **"bye-laws"** means regulatory framework notified by local body, census town and notified area townships for facilitating the implementation of these rules effectively in their jurisdiction.
10. **"census town"** means an urban area as defined by the Registrar General and Census Commissioner of India;
11. **"combustible waste"** means non-biodegradable, non-recyclable, non-reusable, non-hazardous solid waste having minimum calorific value exceeding 1500 kcal/kg and excluding chlorinated materials like plastic, wood pulp, etc;
12. **"composting"** means a controlled process involving microbial decomposition of organic matter;
13. **"contractor"** means a person or firm that undertakes a contract to provide materials or labour to perform a service or do a job for service providing authority;
14. **"co-processing"** means use of non-biodegradable and non recyclable solid waste having calorific value exceeding 1500 kcal as raw material or as a source of energy or both to replace or supplement the natural mineral resources and fossil fuels in industrial processes;
15. **"decentralised processing"** means establishment of dispersed facilities for maximizing the processing of bio-degradable waste and recovery of recyclables closest to the source of generation so as to minimize transportation of waste for processing or disposal;
16. **"disposal"** means the final and safe disposal of post processed residual solid waste and inert street sweepings and silt from surface drains on land as specified in Schedule I to prevent contamination of ground water, surface water, ambient air and attraction of animals or birds;
17. **"domestic hazardous waste"** means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level;
18. **"door to door collection"** means collection of solid waste from the door step of households, shops, commercial establishments, offices, institutional or any other non residential premises and includes collection of such waste from entry gate or a designated location on the ground floor in a housing society, multi storied building or apartments, large residential, commercial or institutional complex or premises;
19. **"dry waste"** means waste other than bio-degradable waste and inert street sweepings and includes recyclable and non recyclable waste, combustible waste and sanitary napkin and diapers, etc;

20. **“dump sites”** means a land utilised by local body for disposal of solid waste without following the principles of sanitary land filling;
21. **“extended producer responsibility” (EPR)** means responsibility of any producer of packaging products such as plastic, tin, glass and corrugated boxes, etc., for environmentally sound management, till end-of-life of the packaging products;
22. **“facility”** means any establishment wherein the solid waste management processes namely segregation, recovery, storage, collection, recycling, processing, treatment or safe disposal are carried out;
23. **“fine”** means penalty imposed on waste generators or operators of waste processing and disposal facilities under the bye-laws for non-compliance of the directions contained in these rules and/or bye-laws
24. **“Form”** means a Form appended to these rules;
25. **“handling”** includes all activities relating to sorting, segregation, material recovery, collection, secondary storage, shredding, baling, crushing, loading, unloading, transportation, processing and disposal of solid wastes;
26. **“inerts”** means wastes which are not bio-degradable, recyclable or combustible street sweeping or dust and silt removed from the surface drains;
27. **“incineration”** means an engineered process involving burning or combustion of solid waste to thermally degrade waste materials at high temperatures;
28. **“informal waste collector”** includes individuals, associations or waste traders who are involved in sorting, sale and purchase of recyclable materials;
29. **“leachate”** means the liquid that seeps through solid waste or other medium and has extracts of dissolved or suspended material from it;
30. **“local body”** for the purpose of these rules means and includes the municipal corporation, nagar nigam, municipal council, nagarpalika, nagar Palika parishad, municipal board, nagar panchayat and town panchayat, census towns, notified areas and notified industrial townships with whatever name they are called in different States and union territories in India;
31. **“materials recovery facility” (MRF)** means a facility where non-compostable solid waste can be temporarily stored by the local body or any other entity mentioned in rule 2 or any person or agency authorised by any of them to facilitate segregation, sorting and recovery of recyclables from various components of waste by authorised informal sector of waste pickers, informal recyclers or any other work force engaged by the local body or entity mentioned in rule 2 for the purpose before the waste is delivered or taken up for its processing or disposal;
32. **“non-biodegradable waste”** means any waste that cannot be degraded by microorganisms into simpler stable compounds;
33. **“operator of a facility”** means a person or entity, who owns or operates a facility for handling solid waste which includes the local body and any other entity or agency appointed by the local body;
34. **“primary collection”** means collecting, lifting and removal of segregated solid waste from source of its generation including households, shops, offices and any other non-residential premises or from any collection points or any other location specified by the local body;
35. **“processing”** means any scientific process by which segregated solid waste is handled for the purpose of reuse, recycling or transformation into new products;
36. **“recycling”** means the process of transforming segregated non-biodegradable solid waste into new material or product or as raw material for producing new products which may or may not be similar to the original products;

37. **“redevelopment”** means rebuilding of old residential or commercial buildings at the same site, where the existing buildings and other infrastructures have become dilapidated;
38. **“refused derived fuel”(RDF)** means fuel derived from combustible waste fraction of solid waste like plastic, wood, pulp or organic waste, other than chlorinated materials, in the form of pellets or fluff produced by drying, shredding, dehydrating and compacting of solid waste;
39. **“residual solid waste”** means and includes the waste and rejects from the solid waste processing facilities which are not suitable for recycling or further processing;
40. **“sanitary land filling ”** means the final and safe disposal of residual solid waste and inert wastes on land in a facility designed with protective measures against pollution of ground water, surface water and fugitive air dust, wind-blown litter, bad odour, fire hazard, animal menace, bird menace, pests or rodents, greenhouse gas emissions, persistent organic pollutants slope instability and erosion;
41. **“sanitary waste”** means wastes comprising of used diapers, sanitary towels or napkins, tampons, condoms, incontinence sheets and any other similar waste;
42. **“Schedule”** means the Schedule appended to these rules;
43. **“secondary storage”** means the temporary containment of solid waste after collection at secondary waste storage depots or MRFs or bins for onward transportation of the waste to the processing or disposal facility;
44. **“segregation”** means sorting and separate storage of various components of solid waste namely biodegradable wastes including agriculture and dairy waste, non biodegradable wastes including recyclable waste, non- recyclable combustible waste, sanitary waste and non recyclable inert waste, domestic hazardous wastes, and construction and demolition wastes;
45. **“service provider”** means an authority providing public utility services like water, sewerage, electricity, telephone, roads, drainage, etc;
46. **“solid waste”** means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities mentioned in rule 2;
47. **“sorting”** means separating various components and categories of recyclables such as paper, plastic, card-boards, metal, glass, etc., from mixed waste as may be appropriate to facilitate recycling;
48. **“stabilising”** means the biological decomposition of biodegradable wastes to a stable state where it generates no leachate or offensive odours and is fit for application to farm land, soil erosion control and soil remediation;
49. **“street vendor”** means any person engaged in vending of articles, goods, wares, food items or merchandise of everyday use or offering services to the general public, in a street, lane, side walk, footpath, pavement, public park or any other public place or private area, from a temporary built up structure or by moving from place to place and includes hawker, peddler, squatter and all other synonymous terms which may be local or region specific; and the words “street vending” with their grammatical variations and cognate expressions, shall be construed accordingly;
50. **“tipping fee”** means a fee or support price determined by the local authorities or any state agency authorised by the State government to be paid to the concessionaire or operator of waste processing facility or for disposal of residual solid waste at the landfill;

51. **“transfer station”** means a facility created to receive solid waste from collection areas and transport in bulk in covered vehicles or containers to waste processing and, or, disposal facilities;
52. **“transportation”** means conveyance of solid waste, either treated, partly treated or untreated from a location to another location in an environmentally sound manner through specially designed and covered transport system so as to prevent the foul odour, littering and unsightly conditions;
53. **“treatment”** means the method, technique or process designed to modify physical, chemical or biological characteristics or composition of any waste so as to reduce its volume and potential to cause harm;
54. **“user fee”** means a fee imposed by the local body and any entity mentioned in rule 2 on the waste generator to cover full or part cost of providing solid waste collection, transportation, processing and disposal services.
55. **“vermi composting”** means the process of conversion of bio-degradable waste into compost using earth worms;
56. **“waste generator”** means and includes every person or group of persons, every residential premises and non residential establishments including Indian Railways, defense establishments, which generate solid waste;
57. **“waste hierarchy”** means the priority order in which the solid waste is to should be managed by giving emphasis to prevention, reduction, reuse, recycling, recovery and disposal, with prevention being the most preferred option and the disposal at the landfill being the least;
58. **“waste picker”** means a person or groups of persons informally engaged in collection and recovery of reusable and recyclable solid waste from the source of waste generation the streets, bins, material recovery facilities, processing and waste disposal facilities for sale to recyclers directly or through intermediaries to earn their livelihood.

(2) Words and expressions used herein but not defined, but defined in the Environment (Protection) Act, 1986, the Water (Prevention and Control of Pollution) Act, 1974, Water (Prevention and Control of Pollution) Cess Act, 1977 and the Air (prevention and Control of Pollution) Act, 1981 shall have the same meaning as assigned to them in the respective Acts.

4. Duties of waste generators. - (1) Every waste generator shall, -

(a) segregate and store the waste generated by them in three separate streams namely bio-degradable, non bio-degradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorised waste pickers or waste collectors as per the direction or notification by the local authorities from time to time;

(b) wrap securely the used sanitary waste like diapers, sanitary pads etc., in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material as instructed by the local authorities and shall place the same in the bin meant for dry waste or non- bio-degradable waste;

(c) store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016; and

(d) store horticulture waste and garden waste generated from his premises separately in his own premises and dispose of as per the directions of the local body from time to time.

(2) No waste generator shall throw, burn or bury the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.

(3) All waste generators shall pay such user fee for solid waste management, as specified

in the bye-laws of the local bodies.

(4) No person shall organise an event or gathering of more than one hundred persons at any unlicensed place without intimating the local body, at least three working days in advance and such person or the organiser of such event shall ensure segregation of waste at source and handing over of segregated waste to waste collector or agency as specified by the local body.

(5) Every street vendor shall keep suitable containers for storage of waste generated during the course of his activity such as food waste, disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits, etc., and shall deposit such waste at waste storage depot or container or vehicle as notified by the local body.

(6) All resident welfare and market associations shall, within one year from the date of notification of these rules and in partnership with the local body ensure segregation of waste at source by the generators as prescribed in these rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

(7) All gated communities and institutions with more than 5,000 sqm area shall, within one year from the date of notification of these rules and in partnership with the local body, ensure segregation of waste at source by the generators as prescribed in these rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

(8) All hotels and restaurants shall, within one year from the date of notification of these rules and in partnership with the local body ensure segregation of waste at source as prescribed in these rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

5. Duties of Ministry of Environment, Forest and Climate Change. - (1) The Ministry of Environment, Forest and Climate Change shall be responsible for over all monitoring the implementation of these rules in the country. It shall constitute a Central Monitoring Committee under the Chairmanship of Secretary, Ministry of Environment, Forest and Climate Change comprising officer not below the rank of Joint Secretary or Advisor from the following namely, -

- 1) Ministry of Housing and Urban Affairs
- 2) Ministry of Rural Development
- 3) Ministry of Chemicals and Fertilizers
- 4) Ministry of Agriculture
- 5) Central Pollution Control Board
- 6) Three State Pollution Control Boards or Pollution Control Committees by rotation
- 7) Urban Development Departments of three State Governments by rotation
- 8) Rural Development Departments from two State Governments by rotation
- 9) Three Urban Local bodies by rotation
- 10) Two census towns by rotation
- 11) FICCI, CII

12) Two subject experts

(2). This Central Monitoring Committee shall meet at least once in a year to monitor and review the implementation of these rules. The Ministry of Environment, Forest and Climate Change may co-opt other experts, if needed. The Committee shall be renewed every three years.

6. Duties of Ministry of Housing and Urban Affairs. - (1) The Ministry of Housing and Urban Affairs shall coordinate with State Governments and Union territory Administrations to, -

(a) take periodic review of the measures taken by the states and local bodies for improving solid waste management practices and execution of solid waste management projects funded by the Ministry and external agencies at least once in a year and give advice on taking corrective measures;

(b) formulate national policy and strategy on solid waste management including policy on waste to energy in consultation with stakeholders within six months from the date of notification of these rules;

(c) facilitate States and Union Territories in formulation of state policy and strategy on solid management based on national solid waste management policy and national urban sanitation policy;

(d) promote research and development in solid waste management sector and disseminate information to States and local bodies;

(e) undertake training and capacity building of local bodies and other stakeholders; ¹[***]

(f) provide technical guidelines and project finance to states, Union territories and local bodies on solid waste management to facilitate meeting timelines and standards, ²[and]

³[(g) ensure the implementation of these rules by the States and the Union territories as per rule 11].

7. Duties of Department of Fertilisers, Ministry of Chemicals and Fertilisers. - (1) The Department of Fertilisers through appropriate mechanisms shall, -

(a) provide market development assistance on city compost; and

(b) ensure promotion of co-marketing of compost with chemical fertilisers in the ratio of 3 to 4 bags: 6 to 7 bags by the fertiliser companies to the extent compost is made available for marketing to the companies.

8. Duties of Ministry of Agriculture, Government of India. - The Ministry of Agriculture through appropriate mechanisms shall, -

(a) provide flexibility in Fertiliser Control Order for manufacturing and sale of compost;

(b) propagate utilisation of compost on farm land;

(c) set up laboratories to test quality of compost produced by local authorities or their authorised agencies; and

(d) issue suitable guidelines for maintaining the quality of compost and ratio of use of compost visa-a-vis chemical fertilizers while applying compost to farmland.

9. Duties of the Ministry of Power. -The Ministry of Power through appropriate mechanisms shall, -

(a) decide tariff or charges for the power generated from the waste to energy plants based

¹ Omitted the word "and" vide S.O. 1152(E) dated 19th March, 2020

² Ins. the word "and" vide S.O. 1152(E) dated 19th March, 2020

³ Ins. sub-rule 4(iii) vide S.O. 1152(E) dated 19th March, 2020

on solid waste.

(b) compulsory purchase power generated from such waste to energy plants by distribution company.

10. Duties of Ministry of New and Renewable Energy Sources- The Ministry of New and Renewable Energy Sources through appropriate mechanisms shall, -

- (a) facilitate infrastructure creation for waste to energy plants; and
- (b) provide appropriate subsidy or incentives for such waste to energy plants.

11. Duties of the Secretary-in-charge, Urban Development in the States and Union territories. - (1) The Secretary, Urban Development Department in the State or Union territory through the Commissioner or Director of Municipal Administration or Director of local bodies shall, -

(a) prepare a state policy and solid waste management strategy for the state or the union territory in consultation with stakeholders including representative of waste pickers, self help group and similar groups working in the field of waste management consistent with these rules, national policy on solid waste management and national urban sanitation policy of the Ministry of Housing and Urban Affairs, in a period not later than one year from the date of notification of these rules;

(b) while preparing State policy and strategy on solid waste management, lay emphasis on waste reduction, reuse, recycling, recovery and optimum utilisation of various components of solid waste to ensure minimisation of waste going to the landfill and minimise impact of solid waste on human health and environment;

(c) state policies and strategies should acknowledge the primary role played by the informal sector of waste pickers, waste collectors and recycling industry in reducing waste and provide broad guidelines regarding integration of waste picker or informal waste collectors in the waste management system.

(d) ensure implementation of provisions of these rules by all local authorities;

(e) direct the town planning department of the State to ensure that master plan of every city in the State or Union territory provisions for setting up of solid waste processing and disposal facilities except for the cities who are members of common waste processing facility or regional sanitary landfill for a group of cities; and

(f) ensure identification and allocation of suitable land to the local bodies within one year for setting up of processing and disposal facilities for solid wastes and incorporate them in the master plans (land use plan) of the State or as the case may be, cities through metropolitan and district planning committees or town and country planning department;

(g) direct the town planning department of the State and local bodies to ensure that a separate space for segregation, storage, decentralised processing of solid waste is demarcated in the development plan for group housing or commercial, institutional or any other non-residential complex exceeding 200 dwelling or having a plot area exceeding 5,000 square meters;

(h) direct the developers of Special Economic Zone, Industrial Estate, Industrial Park to earmark at least five percent of the total area of the plot or minimum five plots or sheds for recovery and recycling facility.

(i) facilitate establishment of common regional sanitary land fill for a group of cities and towns falling within a distance of 50 km (or more) from the regional facility on a cost sharing basis and ensure professional management of such sanitary landfills;

(j) arrange for capacity building of local bodies in managing solid waste, segregation and transportation or processing of such waste at source;

(k) notify buffer zone for the solid waste processing and disposal facilities of more than

five tons per day in consultation with the State Pollution Control Board; and

- (l) start a scheme on registration of waste pickers and waste dealers.

12. Duties of District Magistrate or District Collector or Deputy Commissioner. - The District Magistrate or District Collector or as the case may be, the Deputy Commissioner shall, -

- (a) facilitate identification and allocation of suitable land as per clause (f) of rules 11 for setting up solid waste processing and disposal facilities to local authorities in his district in close coordination with the Secretary-in-charge of State Urban Development Department within one year from the date of notification of these rules;

- (b) review the performance of local bodies, at least once in a quarter on waste segregation, processing, treatment and disposal and take corrective measures in consultation with the Commissioner or Director of Municipal Administration or Director of local bodies and secretary-in-charge of the State Urban Development.

13. Duties of the Secretary-in-charge of Village Panchayats or Rural Development Department in the State and Union territory. - (1) The Secretary-in-charge of Village Panchayats or Rural Development Department in the State and Union territory shall have the same duties as the Secretary-in-charge, Urban Development in the States and Union territories, for the areas which are covered under these rules and are under their jurisdictions.

14. Duties of Central Pollution Control Board. -The Central Pollution Control Board shall, -

- (a) co-ordinate with the State Pollution Control Boards and the Pollution Control Committees for implementation of these rules and adherence to the prescribed standards by local authorities;

- (b) formulate the standards for ground water, ambient air, noise pollution, leachate in respect of all solid waste processing and disposal facilities;

- (c) review environmental standards and norms prescribed for solid waste processing facilities or treatment technologies and update them as and when required;

- (d) review through State Pollution Control Boards or Pollution Control Committees, at least once in a year, the implementation of prescribed environmental standards for solid waste processing facilities or treatment technologies and compile the data monitored by them;

- (e) review the proposals of State Pollution Control Boards or Pollution Control Committees on use of any new technologies for processing, recycling and treatment of solid waste and prescribe performance standards, emission norms for the same within 6 months;

- (f) monitor through State Pollution Control Boards or Pollution Control Committees the implementation of these rules by local bodies;

- (g) prepare an annual report on implementation of these rules on the basis of reports received from State Pollution Control Boards and Committees and submit to the Ministry of Environment, Forest and Climate Change and the report shall also be put in public domain;

- (h) publish guidelines for maintaining buffer zone restricting any residential, commercial or any other construction activity from the outer boundary of the waste processing and disposal facilities for different sizes of facilities handling more than five tons per day of solid waste;

- (i) publish guidelines, from time to time, on environmental aspects of processing and disposal of solid waste to enable local bodies to comply with the provisions of these rules; and

- (j) provide guidance to States or Union territories on inter-state movement of waste.

15. Duties and responsibilities of local authorities and village Panchayats of census towns and urban agglomerations. - The local authorities and Panchayats shall, -

- (a) prepare a solid waste management plan as per state policy and strategy on solid waste management within six months from the date of notification of state policy and strategy and submit a copy to respective departments of State Government or Union territory Administration or agency authorised by the State Government or Union territory Administration;
- (b) arrange for door to door collection of segregated solid waste from all households including slums and informal settlements, commercial, institutional and other non residential premises. From multi-storage buildings, large commercial complexes, malls, housing complexes, etc., this may be collected from the entry gate or any other designated location;
- (c) establish a system to recognise organisations of waste pickers or informal waste collectors and promote and establish a system for integration of these authorised waste-pickers and waste collectors to facilitate their participation in solid waste management including door to door collection of waste;
- (d) facilitate formation of Self Help Groups, provide identity cards and thereafter encourage integration in solid waste management including door to door collection of waste;
- (e) frame bye-laws incorporating the provisions of these rules within one year from the date of notification of these rules and ensure timely implementation;
- (f) prescribe from time to time user fee as deemed appropriate and collect the fee from the waste generators on its own or through authorised agency;
- (g) direct waste generators not to litter i.e throw or dispose of any waste such as paper, water bottles, liquor bottles, soft drink cans, tetra packs, fruit peel, wrappers, etc., or burn or bury waste on streets, open public spaces, drains, waste bodies and to segregate the waste at source as prescribed under these rules and hand over the segregated waste to authorised the waste pickers or waste collectors authorised by the local body;
- (h) setup material recovery facilities or secondary storage facilities with sufficient space for sorting of recyclable materials to enable informal or authorised waste pickers and waste collectors to separate recyclables from the waste and provide easy access to waste pickers and recyclers for collection of segregated recyclable waste such as paper, plastic, metal, glass, textile from the source of generation or from material recovery facilities; Bins for storage of bio-degradable wastes shall be painted green, those for storage of recyclable wastes shall be printed ¹[blue] and those for storage of other wastes shall be printed black;
- (i) establish waste deposition centres for domestic hazardous waste and give direction for waste generators to deposit domestic hazardous wastes at this centre for its safe disposal. Such facility shall be established in a city or town in a manner that one centre is set up for the area of twenty square kilometers or part thereof and notify the timings of receiving domestic hazardous waste at such centres;
- (j) ensure safe storage and transportation of the domestic hazardous waste to the hazardous waste disposal facility or as may be directed by the State Pollution Control Board or the Pollution Control Committee;
- (k) direct street sweepers not to burn tree leaves collected from street sweeping and store them separately and handover to the waste collectors or agency authorised by local body;
- (l) provide training on solid waste management to waste-pickers and waste collectors;
- (m) collect waste from vegetable, fruit, flower, meat, poultry and fish market on day to day basis and promote setting up of decentralised compost plant or bio-methanation plant at suitable locations in the markets or in the vicinity of markets ensuring hygienic conditions;

¹ Substituted for the word "white" the word "blue" by G.S.R. 298(E) dated 10.4.2019

- (n) collect separately waste from sweeping of streets, lanes and by-lanes daily, or on alternate days or twice a week depending on the density of population, commercial activity and local situation;
- (o) set up covered secondary storage facility for temporary storage of street sweepings and silt removed from surface drains in cases where direct collection of such waste into transport vehicles is not convenient. Waste so collected shall be collected and disposed of at regular intervals as decided by the local body;
- (p) collect horticulture, parks and garden waste separately and process in the parks and gardens, as far as possible;
- (q) transport segregated bio-degradable waste to the processing facilities like compost plant, bio-methanation plant or any such facility. Preference shall be given for on-site processing of such waste;
- (r) transport non-bio-degradable waste to the respective processing facility or material recovery facilities or secondary storage facility;
- (s) transport construction and demolition waste as per the provisions of the Construction and Demolition Waste Management Rules, 2016;
- (t) involve communities in waste management and promotion of home composting, bio-gas generation, decentralised processing of waste at community level subject to control of odour and maintenance of hygienic conditions around the facility;
- (u) phase out the use of chemical fertilizer in two years and use compost in all parks, gardens maintained by the local body and wherever possible in other places under its jurisdiction. Incentives may be provided to recycling initiatives by informal waste recycling sector.
- (v) facilitate construction, operation and maintenance of solid waste processing facilities and associated infrastructure on their own or with private sector participation or through any agency for optimum utilisation of various components of solid waste adopting suitable technology including the following technologies and adhering to the guidelines issued by the Ministry of Housing and Urban Affairs from time to time and standards prescribed by the Central Pollution Control Board. Preference shall be given to decentralised processing to minimize transportation cost and environmental impacts such as-
- a) bio-methanation, microbial composting, vermi-composting, anaerobic digestion or any other appropriate processing for bio-stabilisation of biodegradable wastes;
- b) waste to energy processes including refused derived fuel for combustible fraction of waste or supply as feedstock to solid waste based power plants or cement kilns;
- (w) undertake on their own or through any other agency construction, operation and maintenance of sanitary landfill and associated infrastructure as per Schedule 1 for disposal of residual wastes in a manner prescribed under these rules;
- (x) make adequate provision of funds for capital investments as well as operation and maintenance of solid waste management services in the annual budget ensuring that funds for discretionary functions of the local body have been allocated only after meeting the requirement of necessary funds for solid waste management and other obligatory functions of the local body as per these rules;
- (y) make an application in Form-I for grant of authorisation for setting up waste processing, treatment or disposal facility, if the volume of waste is exceeding five metric tonnes per day including sanitary landfills from the State Pollution Control Board or the Pollution Control Committee, as the case may be;
- (z) submit application for renewal of authorisation at least sixty days before the expiry of the validity of authorisation;
- (za) prepare and submit annual report in Form IV on or before the 30th April of the succeeding year to the Commissioner or Director, Municipal Administration or designated Officer;

(zb) the annual report shall then be sent to the Secretary-in-Charge of the State Urban Development Department or village panchayat or rural development department and to the respective State Pollution Control Board or Pollution Control Committee by the 31st May of every year;

(zc) educate workers including contract workers and supervisors for door to door collection of segregated waste and transporting the unmixed waste during primary and secondary transportation to processing or disposal facility;

(zd) ensure that the operator of a facility provides personal protection equipment including uniform, fluorescent jacket, hand gloves, raincoats, appropriate foot wear and masks to all workers handling solid waste and the same are used by the workforce;

(ze) ensure that provisions for setting up of centers for collection, segregation and storage of segregated wastes, are incorporated in building plan while granting approval of building plan of a group housing society or market complex; and

(zf) frame bye-laws and prescribe criteria for levying of spot fine for persons who litters or fails to comply with the provisions of these rules and delegate powers to officers or local bodies to levy spot fines as per the bye laws framed; and

(zg) create public awareness through information, education and communication campaign and educate the waste generators on the following; namely: -

- (i) not to litter;
- (ii) minimise generation of waste;
- (iii) reuse the waste to the extent possible;
- (iv) practice segregation of waste into bio-degradable, non-biodegradable (recyclable and combustible), sanitary waste and domestic hazardous wastes at source;
- (v) practice home composting, vermi-composting, bio-gas generation or community level composting;
- (vi) wrap securely used sanitary waste as and when generated in the pouches provided by the brand owners or a suitable wrapping as prescribed by the local body and place the same in the bin meant for non- biodegradable waste;
- (vii) storage of segregated waste at source in different bins;
- (viii) handover segregated waste to waste pickers, waste collectors, recyclers or waste collection agencies; and
- (ix) pay monthly user fee or charges to waste collectors or local bodies or any other person authorised by the local body for sustainability of solid waste management.

(zh) stop land filling or dumping of mixed waste soon after the timeline as specified in rule 23 for setting up and operationalisation of sanitary landfill is over;

(zi) allow only the non-usable, non-recyclable, non-biodegradable, non-combustible and non-reactive inert waste and pre-processing rejects and residues from waste processing facilities to go to sanitary landfill and the sanitary landfill sites shall meet the specifications as given in Schedule-I, however, every effort shall be made to recycle or reuse the rejects to achieve the desired objective of zero waste going to landfill;

(zj) investigate and analyse all old open dumpsites and existing operational dumpsites for their potential of bio-mining and bio-remediation and wheresoever feasible, take necessary actions to bio-mine or bio-remediate the sites;

(zk) in absence of the potential of bio-mining and bio-remediation of dumpsite, it shall be scientifically capped as per landfill capping norms to prevent further damage to the environment.

¹[(zl) collect and transport bio-degradable, non-bio-degradable and domestic hazardous waste from households including slums and informal settlements, commercial, institutional and other nonresidential premises, multi-storey buildings, large commercial complexes, malls, housing complexes and the like in compartmentalised and covered vehicle to the respective processing facility].

16. Duties of State Pollution Control Board or Pollution Control Committee. - (1) The State Pollution Control Board or Pollution Control Committee shall, -

(a) enforce these rules in their State through local bodies in their respective jurisdiction and review implementation of these rules at least twice a year in close coordination with concerned Directorate of Municipal Administration or Secretary-in-charge of State Urban Development Department;

(b) monitor environmental standards and adherence to conditions as specified under the Schedule I and Schedule II for waste processing and disposal sites;

(c) examine the proposal for authorisation and make such inquiries as deemed fit, after the receipt of the application for the same in Form I from the local body or any other agency authorised by the local body;

(d) while examining the proposal for authorisation, the requirement of consents under respective enactments and views of other agencies like the State Urban Development Department, the Town and Country Planning Department, District Planning Committee or Metropolitan Area Planning Committee, as may be applicable, Airport or Airbase Authority, the Ground Water Board, Railways, power distribution companies, highway department and other relevant agencies shall be taken into consideration and they shall be given four weeks time to give their views, if any;

(e) issue authorisation within a period of sixty days in Form II to the local body or an operator of a facility or any other agency authorised by local body stipulating compliance criteria and environmental standards as specified in Schedules I and II including other conditions, as may be necessary;

(f) synchronise the validity of said authorisation with the validity of the consents;

(g) suspend or cancel the authorization issued under clause (a) any time, if the local body or operator of the facility fails to operate the facility as per the conditions stipulated:

provided that no such authorization shall be suspended or cancelled without giving notice to the local body or operator, as the case may be; and

(h) on receipt of application for renewal, renew the authorisation for next five years, after examining every application on merit and subject to the condition that the operator of the facility has fulfilled all the provisions of the rules, standards or conditions specified in the authorisation, consents or environment clearance.

(2) The State Pollution Control Board or Pollution Control Committee shall, after giving reasonable opportunity of being heard to the applicant and for reasons thereof to be recorded in writing, refuse to grant or renew an authorisation.

(3) In case of new technologies, where no standards have been prescribed by the Central Pollution Control Board, State Pollution Control Board or Pollution Control Committee, as the case may be, shall approach Central Pollution Control Board for getting standards specified.

(4) The State Pollution Control Board or the Pollution Control Committee, as the case may be, shall monitor the compliance of the standards as prescribed or laid down and treatment technology as approved and the conditions stipulated in the authorisation and the standards specified in Schedules I and II under these rules as and when deemed appropriate but not less than once in a year.

(5) The State Pollution Control Board or the Pollution Control Committee may give

¹ Ins. sub-rule (zk) vide S.O. 1152(E) dated 19th March, 2020

directions to local bodies for safe handling and disposal of domestic hazardous waste deposited by the waste generators at hazardous waste deposition facilities.

(6) The State Pollution Control Board or the Pollution Control Committee shall regulate Inter-State movement of waste.

17. Duty of manufacturers or brand owners of disposable products and sanitary napkins and diapers. - (1) All manufacturers of disposable products such as tin, glass, plastics packaging, etc., or brand owners who introduce such products in the market shall provide necessary financial assistance to local authorities for establishment of waste management system.

(2) All such brand owners who sell or market their products in such packaging material which are non-biodegradable shall put in place a system to collect back the packaging waste generated due to their production.

(3) Manufacturers or brand owners or marketing companies of sanitary napkins and diapers shall explore the possibility of using all recyclable materials in their products or they shall provide a pouch or wrapper for disposal of each napkin or diapers along with the packet of their sanitary products.

(4) All such manufacturers, brand owners or marketing companies shall educate the masses for wrapping and disposal of their products.

18. Duties of the industrial units located within one hundred km from the refused derived fuel and waste to energy plants based on solid waste- All industrial units using fuel and located within one hundred km from a solid waste based refused derived fuel plant shall make arrangements within six months from the date of notification of these rules to replace at least five percent of their fuel requirement by refused derived fuel so produced.

19. Criteria for Duties regarding setting-up solid waste processing and treatment facility. -

(1) The department in-charge of the allocation of land assignment shall be responsible for providing suitable land for setting up of the solid waste processing and treatment facilities and notify such sites by the State Government or Union territory Administration.

(2) The operator of the facility shall design and set up the facility as per the technical guidelines issued by the Central Pollution Control Board in this regard from time to time and the manual on solid waste management prepared by the Ministry of Housing and Urban Affairs.

(3) The operator of the facility shall obtain necessary approvals from the State Pollution Control Board or Pollution Control Committee.

(4) The State Pollution Control Board or Pollution Control Committee shall monitor the environment standards of the operation of the solid waste processing and treatment facilities.

(5) The operator of the facility shall be responsible for the safe and environmentally sound operations of the solid waste processing and or treatment facilities as per the guidelines issued by the Central Pollution Control Board from time to time and the Manual on Municipal Solid Waste Management published by the Ministry of Housing and Urban Affairs and updated from time to time.

(6) The operator of the solid waste processing and treatment facility shall submit annual report in Form III each year by 30th April to the State Pollution Control Board or Pollution Committee and concerned local body.

20. Criteria and actions to be taken for solid waste management in hilly areas. - In the hilly areas, the duties and responsibilities of the local authorities shall be the same as mentioned in rule 15 with additional clauses as under:

(a) Construction of landfill on the hill shall be avoided. A transfer station at a suitable enclosed location shall be setup to collect residual waste from the processing facility and inert waste. A suitable land shall be identified in the plain areas down the hill within 25 kilometers for setting up sanitary landfill. The residual waste from the transfer station shall be disposed of at this sanitary

landfill.

(b) In case of non-availability of such land, efforts shall be made to set up regional sanitary landfill for the inert and residual waste.

(c) Local body shall frame Bye-laws and prohibit citizen from littering wastes on the streets and give strict direction to the tourists not to dispose any waste such as paper, water bottles, liquor bottles, soft drink cans, tetra packs, any other plastic or paper waste on the streets or down the hills and instead direct to deposit such waste in the litter bins that shall be placed by the local body at all tourist destinations.

(d) Local body shall arrange to convey the provisions of solid waste management under the bye-laws to all tourists visiting the hilly areas at the entry point in the town as well as through the hotels, guest houses or like where they stay and by putting suitable hoardings at tourist destinations.

(e) Local body may levy solid waste management charge from the tourist at the entry point to make the solid waste management services sustainable.

(f) The department in-charge of the allocation of land assignment shall identify and allot suitable space on the hills for setting up decentralised waste processing facilities. Local body shall set up such facilities. Step garden system may be adopted for optimum utilisation of hill space.

21. Criteria for waste to energy process. - (1) Non recyclable waste having calorific value of 1500 Kcal/kg or more shall not be disposed of on landfills and shall only be utilised for generating energy either or through refuse derived fuel or by giving away as feed stock for preparing refuse derived fuel.

(2) High calorific wastes shall be used for co-processing in cement or thermal power plants.

(3) The local body or an operator of facility or an agency designated by them proposing to set up waste to energy plant of more than five tones per day processing capacity shall submit an application in Form-I to the State Pollution Control Board or Pollution Control Committee, as the case may be, for authorisation.

(4) The State Pollution Control Board or Pollution Control Committee, on receiving such application for setting up waste to energy facility, shall examine the same and grant permission within sixty days.

22. Time frame for implementation. - Necessary infrastructure for implementation of these rules shall be created by the local bodies and other concerned authorities, as the case may be, on their own, by directly or engaging agencies within the time frame specified below:

Sl. No.	Activity	Time limit from the date of notification of rules
(1)	(2)	(3)
1.	Identification of suitable sites for setting up solid waste processing facilities	1 year
2.	Identification of suitable sites for setting up common regional sanitary landfill facilities for suitable clusters of local authorities under 0.5 million population and for setting up common regional sanitary landfill facilities or stand alone sanitary landfill facilities by all local authorities having a population of 0.5 million or more .	1 year
3.	Procurement of suitable sites for setting up solid waste processing facility and sanitary landfill facilities	2 years
4.	Enforcing waste generators to practice segregation of bio degradable, recyclable, combustible, sanitary waste domestic	2 years

	hazardous and inert solid wastes at source ,	
5.	Ensure door to door collection of segregated waste and its transportation in covered vehicles to processing or disposal facilities.	2 years
6.	Ensure separate storage, collection and transportation of construction and demolition wastes	2 years
7.	Setting up solid waste processing facilities by all local bodies having 100000 or more population	2 years
8.	Setting up solid waste processing facilities by local bodies and census towns below 100000 population.	3 years
9	Setting up common or stand alone sanitary landfills by or for all local bodies having 0.5 million or more population for the disposal of only such residual wastes from the processing facilities as well as untreatable inert wastes as permitted under the Rules	3 years
10.	Setting up common or regional sanitary landfills by all local bodies and census towns under 0.5 million population for the disposal of permitted waste under the rules	3years
11.	Bio-remediation or capping of old and abandoned dump sites	5years

23. State Level Advisory Body. – (1) Every Department in-charge of local bodies of the concerned State Government or Union territory administration shall constitute a State Level Advisory Body within six months from the date of notification of these rules comprising the following members, namely: -

Sl. No	Designation	Member
(1)	(2)	(3)
1.	Secretary, Department of Urban Development or Local self-government department of the State	Chairperson, ex-officio
2.	One representative of Panchayats or Rural development Department not below the rank of Joint Secretary to State Government	Member, ex-officio
3.	One representative of Revenue Department of State Government	Member, ex-officio
4.	One representative from Ministry of Environment, Forest and Climate Change Government of India	Member, ex-officio
5.	One representative Government of India from Ministry of Housing and Urban Affairs,	Member, ex-officio
6.	One representative Government of India from Ministry of Rural Development,	Member, ex-officio
7.	One representative from the Central Pollution Control Board	Member, ex-officio
8.	One representative from the State Pollution Control Board or Pollution Control Committee	Member, ex-officio
9.	One representative from Indian Institute of Technology or National Institute of Technology	Member, ex-officio
10.	Chief town planner of the state	Member
11.	Three representatives from the local bodies by rotation	Member
12.	Two representatives from census towns or urban agglomerations by rotation.	Member
13.	One representative from reputed Non-Governmental Organisation or Civil Society working for the waste pickers or informal recycler or solid waste management	Member

14.	One representative from a body representing Industries at the State or Central level	Member
15.	One representative from waste recycling industry	Member
16.	Two subject experts	Member
17.	Co-opt one representative each from agriculture department, and labour department of State Government.	Member

(2) The State Level Advisory Body shall meet at least one in every six months to review the matters related to implementation of these rules, state policy and strategy on solid waste management and give advice to state government for taking measures that are necessary for expeditious and appropriate implementation of these rules.

(3) The copies of the review report shall be forwarded to the State Pollution Control Board or Pollution Control Committee for necessary action.

24. Annual report. - (1) The operator of facility shall submit the annual report to the local body in Form-III on or before the 30th day of April every year.

(2) The local body shall submit its annual report in Form-IV to State Pollution Control Board or Pollution Control Committee and the Secretary-in-Charge of the Department of Urban Development of the concerned State or Union Territory in case of metropolitan city and to the Director of Municipal Administration or Commissioner of Municipal Administration or Officer in -Charge of Urban local bodies in the state in case of all other local bodies of state on or before the 30th day of June every year

(3) Each State Pollution Control Board or Pollution Control Committee as the case may be, shall prepare and submit the consolidated annual report to the Central Pollution Control Board and Ministry of Housing and Urban Affairs on the implementation of these rules and action taken against non complying local body by the 31st day of July of each year in Form-V.

(4) The Central Pollution Control Board shall prepare a consolidated annual review report on the status of implementation of these rules by local bodies in the country and forward the same to the Ministry of Housing and Urban Affairs and Ministry of Environment, Forest and Climate Change, along with its recommendations before the 31st day of August each year.

(5) The annual report shall be reviewed by the Ministry of Environment, Forest and Climate Change during the meeting of Central Monitoring Committee.

25. Accident reporting. - In case of an accident at any solid waste processing or treatment or disposal facility or landfill site, the Officer- in- charge of the facility shall report to the local body in Form-VI and the local body shall review and issue instructions if any, to the in- charge of the facility.

SCHEDULE I

[see rule 15 (w), (zi), 16 (1) (b) (e), 16 (4)]

Specifications for Sanitary Landfills

(A) Criteria for site selection. –

- (i) The department in the business allocation of land assignment shall provide suitable site for setting up of the solid waste processing and treatment facilities and notify such sites.
- (ii) The sanitary landfill site shall be planned, designed and developed with proper documentation of construction plan as well as a closure plan in a phased manner. In case a new landfill facility is being established adjoining an existing landfill site, the closure plan of existing landfill should form a part of the proposal of such new landfill.

- (iii) The landfill sites shall be selected to make use of nearby wastes processing facilities. Otherwise, wastes processing facility shall be planned as an integral part of the landfill site.
- (iv) Landfill sites shall be set up as per the guidelines of the Ministry of Housing and Urban Affairs, Government of India and Central Pollution Control Board.
- (v) The existing landfill sites which are in use for more than five years shall be improved in accordance with the specifications given in this Schedule.
- (vi) The landfill site shall be large enough to last for at least 20-25 years and shall develop 'landfill cells' in a phased manner to avoid water logging and misuse.
- (vii) The landfill site shall be 100 meter away from river, 200 meter from a pond, 200 meter from Highways, Habitations, Public Parks and water supply wells and 20 km away from Airports or Airbase. However, in a special case, landfill site may be set up within a distance of 10 and 20 km away from the Airport/Airbase after obtaining no objection certificate from the civil aviation authority/ Air force as the case may be. The Landfill site shall not be permitted within the flood plains as recorded for the last 100 years, zone of coastal regulation, wetland, Critical habitat areas, sensitive eco-fragile areas.
- (viii) The sites for landfill and processing and disposal of solid waste shall be incorporated in the Town Planning Department's land-use plans.
- (ix) A buffer zone of no development shall be maintained around solid waste processing and disposal facility, exceeding five Tonnes per day of installed capacity. This will be maintained within the total area of the solid waste processing and disposal facility. The buffer zone shall be prescribed on case to case basis by the local body in consultation with concerned State Pollution Control Board.
- (x) The biomedical waste shall be disposed of in accordance with the Bio-medical Waste Management Rules, 2016, as amended from time to time. The hazardous waste shall be managed in accordance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, as amended from time to time. The E- waste shall be managed in accordance with the e-Waste (Management) Rules, 2016 as amended from time to time.
- (xi) Temporary storage facility for solid waste shall be established in each landfill site to accommodate the waste in case of non-operation of waste processing and during emergency or natural calamities.

(B) Criteria for development of facilities at the sanitary landfills. –

- (i) Landfill site shall be fenced or hedged and provided with proper gate to monitor incoming vehicles, to prevent entry of unauthorised persons and stray animals
- (ii) The approach and / internal roads shall be concreted or paved so as to avoid generation of dust particles due to vehicular movement and shall be so designed to ensure free movement of vehicles and other machinery.
- (iii) The landfill site shall have waste inspection facility to monitor waste brought in for landfilling, office facility for record keeping and shelter for keeping equipment and machinery including pollution monitoring equipment. The operator of the facility shall maintain record of waste received, processed and disposed.
- (iv) Provisions like weigh bridge to measure quantity of waste brought at landfill site, fire protection equipment and other facilities as may be required shall be provided.
- (v) Utilities such as drinking water and sanitary facilities (preferably washing/bathing facilities for workers) and lighting arrangements for easy landfill operations during night hours shall be provided.
- (vi) Safety provisions including health inspections of workers at landfill sites shall be carried out made.
- (vii) Provisions for parking, cleaning, washing of transport vehicles carrying solid waste shall

be provided. The wastewater so generated shall be treated to meet the prescribed standards.

(C) Criteria for specifications for land filling operations and closure on completion of land filling. –

- (i) Waste for land filling shall be compacted in thin layers using heavy compactors to achieve high density of the waste. In high rainfall areas where heavy compactors cannot be used, alternative measures shall be adopted.
- (ii) Till the time waste processing facilities for composting or recycling or energy recovery are set up, the waste shall be sent to the sanitary landfill. The landfill cell shall be covered at the end of each working day with minimum 10 cm of soil, inert debris or construction material.
- (iii) Prior to the commencement of monsoon season, an intermediate cover of 40-65 cm thickness of soil shall be placed on the landfill with proper compaction and grading to prevent infiltration during monsoon. Proper drainage shall be constructed to divert run-off away from the active cell of the landfill.
- (iv) After completion of landfill, a final cover shall be designed to minimise infiltration and erosion. The final cover shall meet the following specifications, namely: --
 - a) The final cover shall have a barrier soil layer comprising of 60 cm of clay or amended soil with permeability coefficient less than 1×10^{-7} cm/sec.
 - b) On top of the barrier soil layer, there shall be a drainage layer of 15 cm.
 - c) On top of the drainage layer, there shall be a vegetative layer of 45 cm to support natural plant growth and to minimise erosion.

(D) Criteria for pollution prevention. - In order to prevent pollution from landfill operations, the following provisions shall be made, namely: -

- (i) The storm water drain shall be designed and constructed in such a way that the surface runoff water is diverted from the landfilling site and leachates from solid waste locations do not get mixed with the surface runoff water. Provisions for diversion of storm water discharge drains shall be made to minimise leachate generation and prevent pollution of surface water and also for avoiding flooding and creation of marshy conditions.
- (ii) Non-permeable lining system at the base and walls of waste disposal area. For landfill receiving residues of waste processing facilities or mixed waste or waste having contamination of hazardous materials (such as aerosols, bleaches, polishes, batteries, waste oils, paint products and pesticides) shall have liner of composite barrier of 1.5 mm thick high density polyethylene (HDPE) geo-membrane or geo-synthetic liners, or equivalent, overlying 90 cm of soil (clay or amended soil) having permeability coefficient not greater than 1×10^{-7} cm/sec. The highest level of water table shall be at least two meter below the base of clay or amended soil barrier layer provided at the bottom of landfills.
- (iii) Provisions for management of leachates including its collection and treatment shall be made. The treated leachate shall be recycled or utilized as permitted, otherwise shall be released into the sewerage line, after meeting the standards specified in Schedule- II. In no case, leachate shall be released into open environment.
- (iv) Arrangement shall be made to prevent leachate runoff from landfill area entering any drain, stream, river, lake or pond. In case of mixing of runoff water with leachate or solid waste, the entire mixed water shall be treated by the concern authority.

(E) Criteria for water quality monitoring. –

- (i) Before establishing any landfill site, baseline data of ground water quality in the area shall be collected and kept in record for future reference. The ground water quality

within 50 meter of the periphery of landfill site shall be periodically monitored covering different seasons in a year that is, summer, monsoon and post-monsoon period to ensure that the ground water is not contaminated.

- (ii) Usage of groundwater in and around landfill sites for any purpose (including drinking and irrigation) shall be considered only after ensuring its quality. The following specifications for drinking water quality shall apply for monitoring purpose, namely: -

S. No.	Parameters	IS 10500:2012, Edition 2.2(2003-09) Desirable limit (mg/l except for pH)
(1)	(2)	(3)
	Arsenic	0.01
	Cadmium	0.01
	Chromium(as Cr ⁶⁺)	0.05
	Copper	0.05
	Cyanide	0.05
	Lead	0.05
	Mercury	0.001
	Nickel	-
	Nitrate as NO ₃	45.0
	pH	6.5-8.5
	Iron	0.3
	Total hardness (as CaCO ₃)	300.0
	Chlorides	250
	Dissolved solids	500
	Phenolic compounds (as C ₆ H ₅ OH)	0.001
	Zinc	5.0
	Sulphate (as SO ₄)	200

(F) Criteria for ambient air quality monitoring. –

- (i) Landfill gas control system including gas collection system shall be installed at landfill site to minimize odour, prevent off-site migration of gases, to protect vegetation planted on the rehabilitated landfill surface. For enhancing landfill gas recovery, use of geomembranes in cover systems along with gas collection wells should be considered.
- (ii) The concentration of methane gas generated at landfill site shall not exceed 25 per cent of the lower explosive limit (LEL).
- (iii) The landfill gas from the collection facility at a landfill site shall be utilized for either direct thermal applications or power generation, as per viability. Otherwise, landfill gas shall be burnt (flared) and shall not be allowed to escape directly to the atmosphere or for illegal tapping. Passive venting shall be allowed in case if its utilisation or flaring is not possible.
- (iv) Ambient air quality at the landfill site and at the vicinity shall be regularly monitored. Ambient air quality shall meet the standards prescribed by the Central Pollution Control Board for Industrial area.

(G) Criteria for plantation at landfill Site. - A vegetative cover shall be provided over the completed site in accordance with the following specifications, namely: -

- (a) Locally adopted non-edible perennial plants that are resistant to drought and extreme temperatures shall be planted;
 - (b) The selection of plants should be of such variety that their roots do not penetrate more than 30 cms. This condition shall apply till the landfill is stabilized;
 - (c) Selected plants shall have ability to thrive on low-nutrient soil with minimum nutrient addition;
 - (d) Plantation to be made in sufficient density to minimise soil erosion.
 - (e) Green belts shall be developed all around the boundary of the landfill in consultation with State Pollution Control Boards or Pollution Control Committees.
- (H) Criteria for post-care of landfill site.** - (1) The post-closure care of landfill site shall be conducted for at least fifteen years and long term monitoring or care plan shall consist of the following, namely: -
- (a) Maintaining the integrity and effectiveness of final cover, making repairs and preventing run-on and run-off from eroding or otherwise damaging the final cover;
 - (b) Monitoring leachate collection system in accordance with the requirement;
 - (c) Monitoring of ground water in and around landfill;
 - (d) Maintaining and operating the landfill gas collection system to meet the standards.
- (2) Use of closed landfill sites after fifteen years of post-closure monitoring can be considered for human settlement or otherwise only after ensuring that gaseous emission and leachate quality analysis complies with the specified standards and the soil stability is ensured.
- (I) Criteria for special provisions for hilly areas.** - Cities and towns located on hills shall have location-specific methods evolved for final disposal of solid waste by the local body with the approval of the concerned State Pollution Control Board or the Pollution Control Committee. The local body shall set up processing facilities for utilisation of biodegradable organic waste. The non-biodegradable recyclable materials shall be stored and sent for recycling periodically. The inert and non-biodegradable waste shall be used for building roads or filling-up of appropriate areas on hills. In case of constraints in finding adequate land in hilly areas, waste not suitable for road-laying or filling up shall be disposed of in regional landfills in plain areas.
- (J) Closure and Rehabilitation of Old Dumps-** Solid waste dumps which have reached their full capacity or those which will not receive additional waste after setting up of new and properly designed landfills should be closed and rehabilitated by examining the following options:
- (i) Reduction of waste by bio mining and waste processing followed by placement of residues in new landfills or capping as in (ii) below.
 - (ii) Capping with solid waste cover or solid waste cover enhanced with geomembrane to enable collection and flaring / utilisation of greenhouse gases.
 - (iii) Capping as in (ii) above with additional measures (in alluvial and other coarse grained soils) such as cut-off walls and extraction wells for pumping and treating contaminated ground water.
 - (iv) Any other method suitable for reducing environmental impact to acceptable level.

SCHEDULE II

[see rule 16 (1), (b), (e), 16 (4)]

Standards of processing and treatment of solid waste

- A. Standards for composting.** - The waste processing facilities shall include composting as one of the technologies for processing of bio degradable waste. In order to prevent pollution from compost plant, the following shall be complied with namely: -
- (a) The incoming organic waste at site shall be stored properly prior to further processing. To the extent possible, the waste storage area should be covered. If, such storage is done in an open area, it shall be provided with impermeable base with facility for collection of leachate and surface water run-off into lined drains leading to a leachate treatment and disposal facility;
 - (b) Necessary precaution shall be taken to minimise nuisance of odour, flies, rodents, bird menace and fire hazard;
 - (c) In case of breakdown or maintenance of plant, waste intake shall be stopped and arrangements be worked out for diversion of waste to the temporary processing site or temporary landfill sites which will be again reprocessed when plant is in order;
 - (d) Pre-process and post-process rejects shall be removed from the processing facility on regular basis and shall not be allowed to pile at the site. Recyclables shall be routed through appropriate vendors. The non-recyclable high calorific fractions to be segregated and sent to waste to energy or for RDF production, co-processing in cement plants or to thermal power plants. Only rejects from all processes shall be sent for sanitary landfill site(s).
 - (e) The windrow area shall be provided with impermeable base. Such a base shall be made of concrete or compacted clay of 50 cm thick having permeability coefficient less than 10^{-7} cm/sec. The base shall be provided with 1 to 2 per cent slope and circled by lined drains for collection of leachate or surface run-off;
 - (f) Ambient air quality monitoring shall be regularly carried out. Odour nuisance at down-wind direction on the boundary of processing plant shall also be checked regularly.
 - (g) Leachate shall be re-circulated in compost plant for moisture maintenance.
 - (h) The end product compost shall meet the standards prescribed under Fertilizer Control Order notified from time to time.
 - (i) In order to ensure safe application of compost, the following specifications for compost quality shall be met, namely: -

Parameters	Organic Compost (FCO 2009)	Phosphate Rich Organic Manure (FCO 2013)
(1)	(2)	(3)
Arsenic (mg/kg)	10.00	10.00
Cadmium (mg/kg)	5.00	5.00
Chromium (mg/kg)	50.00	50.00
Copper (mg/kg)	300.00	300.00
Lead (mg/kg)	100.00	100.00
Mercury (mg/kg)	0.15	0.15
Nickel (mg/kg)	50.00	50.00
Zinc (mg/kg)	1000.00	1000.00
C/N ratio	<20	Less than 20:1
pH	6.5-7.5	(1:5 solution) maximum 6.7

Moisture, percent by weight, maximum	15.0-25.0	25.0
Bulk density (g/cm ³)	<1.0	Less than 1.6
Total Organic Carbon, percent by weight, minimum	12.0	7.9
Total Nitrogen (as N), percent by weight, minimum	0.8	0.4
Total Phosphate (as P ₂ O ₅) percent by weight, minimum	0.4	10.4
Total Potassium (as K ₂ O), percent by weight, minimum	0.4	-
Colour	Dark brown to black	-
Odour	Absence of foul Odor	-
Particle size	Minimum 90% material should pass through 4.0 mm IS sieve	Minimum 90% material should pass through 4.0 mm IS sieve
Conductivity (as dsm-1), not more than	4.0	8.2

* Compost (final product) exceeding the above stated concentration limits shall not be used for food crops. However, it may be utilized for purposes other than growing food crops.

B. Standards for treated leachates. -The disposal of treated leachates shall meet the following standards, namely: -

S. No	Parameter	(Mode of Disposal)		
		Inland surface water	Public sewers	Land disposal
(1)	(2)	(3)	(4)	(5)
1.	Suspended solids, mg/l, max	100	600	200
2.	Dissolved solids (inorganic) mg/l, max.	2100	2100	2100
3	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
4	Ammonical nitrogen (as N), mg/l, max.	50	50	-
5	Total Kjeldahl nitrogen (as N), mg/l, max.	100	-	-
6	Biochemical oxygen demand (3 days at 27 °C) max.(mg/l)	30	350	100
7	Chemical oxygen demand, mg/l, max.	250	-	-
8	Arsenic (as As), mg/l, max	0.2	0.2	0.2
9	Mercury (as Hg), mg/l, max	0.01	0.01	-
10	Lead (as Pb), mg/l, max	0.1	1.0	-
11	Cadmium (as Cd), mg/l, max	2.0	1.0	-
12	Total Chromium (as Cr), mg/l, max.	2.0	2.0	-
13	Copper (as Cu), mg/l, max.	3.0	3.0	-
14	Zinc (as Zn), mg/l, max.	5.0	15	-
15	Nickel (as Ni), mg/l, max	3.0	3.0	-
16	Cyanide (as CN), mg/l, max.	0.2	2.0	0.2
17	Chloride (as Cl), mg/l, max.	1000	1000	600
18	Fluoride (as F), mg/l, max	2.0	1.5	-
19	Phenolic compounds (as C ₆ H ₅ OH) mg/l, max.	1.0	5.0	-

Note: While discharging treated leachates into inland surface waters, quantity of leachates being discharged and the quantity of dilution water available in the receiving water body shall be given due consideration.

C. Standards for incineration: The Emission from incinerators /thermal technologies in Solid Waste treatment/disposal facility shall meet the following standards, namely: -

Parameter (1)	Emission standard	
	(2)	(1)
Particulates	50 mg/Nm ³	Standard refers to half hourly average value
HCl	50 mg/Nm ³	Standard refers to half hourly average value
SO₂	200 mg/Nm ³	Standard refers to half hourly average value
CO	100 mg/Nm ³	Standard refers to half hourly average value
	50 mg/Nm ³	Standard refers to daily average value
Total Organic Carbon	20 mg/Nm ³	Standard refers to half hourly average value
HF	4 mg/Nm ³	Standard refers to half hourly average value
NO_x (NO and NO₂ expressed as NO₂)	400 mg/Nm ³	Standard refers to half hourly average value
Total dioxins and furans	0.1 ng TEQ/Nm ³	Standard refers to 6-8 hours sampling. Please refer guidelines for 17 concerned congeners for toxic equivalence values to arrive at total toxic equivalence.
Cd + Th + their compounds	0.05 mg/Nm ³	Standard refers to sampling time anywhere between 30 minutes and 8 hours.
Hg and its compounds	0.05 mg/Nm ³	Standard refers to sampling time anywhere between 30 minutes and 8 hours.
Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V + their compounds	0.5 mg/Nm ³	Standard refers to sampling time anywhere between 30 minutes and 8 hours.
<i>Note.- All values corrected to 11% oxygen on a dry basis.</i>		

Note:

- Suitably designed pollution control devices shall be installed or retrofitted with the incinerator to achieve the above emission limits.
- Waste to be incinerated shall not be chemically treated with any chlorinated disinfectants.
- Incineration of chlorinated plastics shall be phased out within two years.
- If the concentration of toxic metals in incineration ash exceeds the limits specified in the Hazardous Waste (Management, Handling and Trans boundary Movement) Rules, 2008, as amended from time to time, the ash shall be sent to the hazardous waste treatment, storage and disposal facility.
- Only low sulphur fuel like LDO, LSHS, Diesel, bio-mass, coal, LNG, CNG, RDF and bio-gas shall be used as fuel in the incinerator.
- The CO₂ concentration in tail gas shall not be more than 7%.

- (g) All the facilities in twin chamber incinerators shall be designed to achieve a minimum temperature of 950⁰C in secondary combustion chamber and with a gas residence time in secondary combustion chamber not less than 2 (two) seconds.
- (h) Incineration plants shall be operated (combustion chambers) with such temperature, retention time and turbulence, as to achieve total Organic Carbon (TOC) content in the slag and bottom ash less than 3%, or the loss on ignition is less than 5% of the dry weight.
- (i) Odour from sites shall be managed as per guidelines of CPCB issued from time to time

FORM – I

[see rule 15 (y) 16 (1) (c), 21(3)]

Application for obtaining authorisation under solid waste management rules for processing/recycling/treatment and disposal of solid waste

To,
The Member Secretary,
State Pollution Control Board or Pollution Control Committee, of.....

Sir,

I/We hereby apply for authorisation under the Solid Waste Management Rules, 2016 for processing, recycling, treatment and disposal of solid waste.

1.	Name of the local body/agency appointed by them/ operator of facility	
2.	Correspondence address Telephone No. Fax No. e-mail:	
3.	Nodal Officer & designation(Officer authorised by the local body or agency responsible for operation of processing/ treatment or disposal facility)	
4.	Authorisation required for setting up and operation of the facility (Please tick mark)	waste processing recycling treatment disposal at landfill
5.	Attach copies of the Documents Site clearance (local body) Proof of Environmental Clearance Consent for establishment Agreement between municipal authority and operating agency Investment on the project and expected return	
6.	Processing/recycling/treatment of solid waste (i) Total Quantity of waste to be processed per day Quantity of waste to be recycled Quantity of waste to be treated Quantity of waste to be disposed into landfill (ii) Utilisation programme for waste processed (Product utilisation) (iii) Methodology for disposal (attach details)	

	<p>Quantity of leachate</p> <p>Treatment technology for leachate</p> <p>(iv) Measures to be taken for prevention and control of environmental pollution</p> <p>(v) Measures to be taken for safety of workers working in the plant</p> <p>(vi) Details on solid waste processing/ recycling/treatment/disposal facility (to be attached)</p>	
7.	<p>Disposal of solid waste</p> <p>Number of sites identified</p> <p>Quantity of waste to be disposed per day</p> <p>Details of methodology or criteria followed for site selection (attach)</p> <p>Details of existing site under operation</p> <p>Methodology and operational details of landfilling</p> <p>Measures taken to check environmental pollution</p>	
8	Any other information.	

Date:
Place:

Signature:
Designation

Form- II

[see rule 16 (1) (e)]

Format for issue of authorization

File No.: _____

Dated: _____

Authorisation No. _____

To

Ref: Your application number _____ dt. _____

The _____ State Pollution Control Board/Pollution Control Committee after examining the _____ the _____ proposal hereby authorises _____ having administrative office at _____ to set up and operate waste processing/recycling/ treatment/disposal facility at _____

The authorisation is hereby granted to operate the facility for processing, recycling, treatment and disposal of solid waste.

The authorisation is subject to the terms and conditions stated below and such conditions as may be otherwise specified in these rules and the standards laid down in Schedules I and II under these rules.

The _____ State Pollution Control Board/Pollution Control Committees of the UT _____ may, at any time, revoke any of the conditions applicable under the authorisation and shall communicate the same in writing.

Any violation of the provision of the Solid Waste Management Rules, 2016 will attract the penal provision of the Environment (Protection) Act, 1986 (29 of 1986).

(Member Secretary)
State Pollution Control Board/Pollution Control Committee of the UT
(Signature and designation)

Date:

Place:

Form – III

[see rule 19 (6), 24 (1)]

Format of annual report to be submitted by the operator of facility to the local body

1	Name of the City/Town and State	
2	Population	
3	Area in sq. kilometers	
4	Name & Address of the local body Telephone No. Fax No. E-mail:	
5	Name and address of operator of the facility	
6	Name of officer in-charge of the facility Phone No: Fax No:	

	E-mail:	
7	Number of households in the city/town, Number of non-residential premises in the city Number of election/ administrative wards in the city/town	
8	Quantity of Solid waste	
	Estimated Quantity of solid waste generated in the local body area per day in metric tones	/tpd
	Quantity of solid waste collected per day	/tpd
	Per capita waste collected per day	/gm/day
9	Quantity of solid waste processed	/tpd
	Quantity of solid waste disposed at landfill	/tpd
	Status of Solid Waste Management (SWM) service	
	Segregation and storage of waste at source	
	Whether solid waste is stored at source in domestic/commercial/ institutional bins If yes,	Yes/No
	Percentage of households practice storage of waste at source in domestic bins	%
	Percentage of non-residential premises practice storage of waste at source in commercial /institutional bins	%
	Percentage of households dispose of throw solid waste on the streets	%
	Percentage of non-residential premises dispose of throw solid waste on the streets	%
	Whether solid waste is stored at source in a segregated form	Yes/No
	If yes, Percentage of premises segregating the waste at source	%
	Door to Door Collection of solid waste	
	Whether door to door collection (D2D) of solid waste is being done in the city/town	Yes/No
	if yes	
	Number of wards covered in D2D collection of waste	
	No. of households covered	
	No. of non-residential premises including commercial establishments, hotels, restaurants educational institutions/ offices etc covered	
	Percentage of residential and non-residential premises covered in door to door collection through:	
	Motorized vehicle	%
	Containerized tricycle/handcart	%
	Other device	%
If not, method of primary collection adopted		
Sweeping of streets		
	Length of roads, streets, lanes, bye-lanes in the	km

	city that need to be cleaned					
	Frequency of street sweepings and percentage of population covered	frequency	Daily	Alter nate days	Twice a week	Occa sional ly
		% of population covered				
	Tools used					
	Manual sweeping	%				
	Mechanical sweeping	%				
	Whether long handle broom used by sanitation workers	Yes/No				
	Whether each sanitation worker is given handcart/tricycle for collection of waste	Yes/No				
	Whether handcart / tricycle is containerized	Yes/No				
	Whether the collection tool synchronizes with collection/ waste storage containers utilized	Yes/No				
	Secondary Waste Storage facilities					
	No. and type of waste storage depots in the city/town Open waste storage sites Masonry bins Cement concrete cylinder bins Dhalao/covered rooms/space Covered metal/plastic containers Upto 1.1 m ³ bins 2 to 5 m ³ bins Above 5m ³ containers Bin-less city	No.	Capacity in m ³			
	Bin/ population ratio					
	Ward wise details of waste storage depots (attach): Ward No: Area: Population: No. of bins placed Total volume of bins placed					
	Total storage capacity of waste storage facilities in cubic meters					
	Total waste actually stored at the waste storage depots daily					
	Give frequency of collection of waste from the depots	Frequency			No. of bins	
		Daily				
		Alternate day				
		Twice a week				
		Once a week				
		Occasionally				
	Whether storage depots have facility for storage of segregated waste in green, blue and black bins	Yes/ No (if yes, add details) No. of green bins:				

		No. of blue bins: No. of black bins:	
Whether lifting of solid waste from storage depots is manual or mechanical. Give percentage	(%) of Manual Lifting of SOLID WASTE		%
	(%) of Mechanical lifting		%
If mechanical – specify the method used	front-end loaders/ Top loaders		
Whether solid waste is lifted from door to door and transported to treatment plant directly in a segregated form	Yes/ No		
Waste Transportation per day Type and Number of vehicles used (pl tick or add)	No. Trips made waste transported		
Animal cart			
Tractors			
Non tipping Truck			
Tipping Truck			
Dumper Placers			
Refuse collectors			
Compactors Others JCB/loader			
Frequency of transportation of waste	Frequency Daily Alternate day a week Occasionally	Twice Once a week	(%) of waste transported
Quantity of waste transported each day	/tpd		
Percentage of total waste transported daily	%		
Waste Treatment Technologies used			
Whether solid waste is processed	Yes/No		
If yes, Quantity of waste processed daily	/tpd		
Land(s) available with the local body for waste processing (in Hectares)			
Land currently utilized for waste processing			
Solid waste processing facilities in operation			
Solid waste processing facilities under construction			
Distance of processing facilities from city/town boundary			
Details of technologies adopted			
Composting,	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled		
Vermi composting	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled		
Bio-methanation	Qty. raw material processed		

		Qty. final product produced Qty. sold Qty. of residual waste landfilled
	Refuse Derived Fuel	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled
	Waste to Energy technology such as incineration, gasification, pyrolysis or any other technology (give detail)	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled
	Co-processing	Qty. raw material processed
	Combustible waste supplied to cement plant	
	Combustible waste supplied to solid waste based power plants	
	Others	Qty.
	Solid waste disposal facilities	
	No. of dumpsites sites available with the local body	
	No. of sanitary landfill sites available with the local body	
	Area of each such sites available for waste disposal	
	Area of land currently used for waste disposal	
	Distance of dumpsite/landfill facility from city/town	kms
	Distance from the nearest habitation	kms
	Distance from water body	kms
	Distance from state/national highway	kms
	Distance from Airport	kms
	Distance from important religious places or historical monument	kms
	Whether it falls in flood prone area	Yes/No
	Whether it falls in earthquake fault line area	Yes/No
	Quantity of waste landfilled each day	tpd
	Whether landfill site is fenced	Yes/No
	Whether lighting facility is available on site	Yes/No
	Whether Weigh bridge facility available	Yes/No
	Vehicles and equipments used at landfill (specify)	Bulldozer, Compactors etc. available
	Manpower deployed at landfill site	Yes/No (if yes, attach details)
	Whether covering is done on daily basis	Yes/No
	If not, frequency of covering the waste deposited at the landfill	
	Cover material used	
	Whether adequate covering material is available	Yes/No
	Provisions for gas venting provided	Yes/No, (if yes, attach technical data sheet)

	Provision for leachate collection	Yes/No, (if yes, attach technical data sheet)
10	Whether an Action Plan has been prepared for improving solid waste management practices in the city	Yes/No (if Yes attach Action Plan details)
11	What separate provisions are made for: Dairy related activities: Slaughter houses waste: C&D waste (construction debris) :	Attach details on Proposals, Steps taken, Yes/No Yes/No Yes/No
12	Details of Post Closure Plan	Attach Plan
13	How many slums are identified and whether these are provided with Solid Waste Management facilities :	Yes/ No (if Yes, attach details)
14	Give details of manpower deployed for collection including street sweeping, secondary storage, transportation, processing and disposal of waste	
15	Mention briefly, the difficulties being experienced by the local body in complying with provisions of these rules	
16	Mention briefly, if any innovative idea is implemented to tackle a problem related to solid waste, which could be replicated by other local bodies.	

Signature of Operator

Dated:

Place:

Form – IV

[see rules 15(za), 24(2)]

Format for annual report on solid waste management to be submitted by the local body

CALENDAR YEAR:	DATE OF SUBMISSION OF REPORT:

1	Name of the City/Town and State	
2	Population	
3	Area in sq. kilometers	
4	Name & Address of the local body Telephone No. Fax No. E-mail:	
5	Name of officer in-charge dealing with solid waste management (SOLID WASTEM) Phone No: Fax No: E-mail:	
6	Number of households in the city/town, Number of non-residential premises in the city Number of election/ administrative wards in the city/town	
7	Quantity of Solid waste (solid waste)	
	Estimated Quantity of solid waste generated in the local body area per day in metric tones	/tpd
	Quantity of solid waste collected per day	/tpd
	Per capita waste collected per day	/gm/day
	Quantity of solid waste processed	/tpd
	Quantity of solid waste disposed at dumpsite/landfill	/tpd
8	Status of Solid Waste Management service	
	Segregation and storage of waste at source	
	Whether SOLID WASTE is stored at source in domestic/commercial/ institutional bins, If yes,	Yes/No
	Percentage of households practice storage of waste at source in domestic bins	%
	Percentage of non-residential premises practice storage of waste at source in commercial /institutional bins	%
	Percentage of households dispose or throw solid waste on the streets	%
	Percentage of non-residential premises dispose of throw solid waste on the streets	%
	Whether solid waste is stored at source in a segregated form, If yes,	Yes/No

	Percentage of premises segregating the waste at source						%
	Door to Door Collection of solid waste						
	Whether door to door collection (D2D) of solid waste is being done in the city/town if yes						Yes/No
	Number of wards covered in D2D collection of waste						
	No. of households covered						
	No. of non-residential premises including commercial establishments, hotels, restaurants educational institutions/ offices etc covered						
	Percentage of residential and non-residential premises covered in door to door collection through:						
	Motorized vehicle						%
	Containerized						%
	tricycle/handcart						%
	Other device						%
	If not, method of primary collection adopted						
	Sweeping of streets						
	Length of roads, streets, lanes, bye-lanes in the city that need to be cleaned						km
	Frequency of street sweepings and percentage of population covered	Frequency	Daily	Alternate days	Twice a week	Occasionally	
		% of population covered					
	Tools used						
	Manual sweeping						%
	Mechanical sweeping						%
	Whether long handle broom used by sanitation workers						Yes/No
	Whether each sanitation worker is given handcart/tricycle for collection of waste						Yes/No
	Whether handcart / tricycle is containerized						Yes/No
	Whether the collection tool synchronizes with collection/ waste storage containers utilized						Yes/No
	Secondary Waste Storage facilities						
	No. and type of waste storage depots in the city/town	No.	Capacity in m ³				
	Open waste storage sites						
	Masonry bins						
	Cement concrete cylinder bins						
	Dhalao/covered rooms/space						
	Covered metal/plastic containers						
	Upto 1.1 m ³ bins						
	2 to 5 m ³ bins						
	Above 5m ³ containers						
	Bin-less city						
	Bin/ population ratio						

	Ward wise details of waste storage depots (attach): Ward No: Area: Population: No. of bins placed Total volume of bins placed		
	Total storage capacity of waste storage facilities in cubic meters		
	Total waste actually stored at the waste storage depots daily		
	Give frequency of collection of waste from the depots	Frequency	No. of bins
		Daily	
		Alternate day	
		Twice a week	
		Once a week	
Occasionally			
Whether storage depots have facility for storage of segregated waste in green, blue and black bins	Yes/ No (if yes, add details) No. of green bins: No. of blue bins: No. of black bins:		
Whether lifting of solid waste from storage depots is manual or mechanical. Give percentage (%) of Manual Lifting of solid waste (%) of Mechanical lifting			
	If mechanical – specify the method used	front-end loaders/ Top loaders	
	Whether solid waste is lifted from door to door and transported to treatment plant directly in a segregated form	Yes/ No	
	Waste Transportation per day Type and Number of vehicles used (pl tick or add)	No. Trips made waste transported	
	Animal cart Tractors Non tipping Truck Tipping Truck Dumper Placers Refuse collectors Compactors Others JCB/loader		
Frequency of transportation of waste	Frequency Daily Alternate day Twice a week Once a week Occasionally	(%) of waste transported	
Quantity of waste transported each day	/tpd		
Percentage of total waste transported daily	%		

	Waste Treatment Technologies used	
	Whether solid waste is processed	Yes/No
	If yes, Quantity of waste processed daily	/tpd
	Whether treatment is done by local body or through an agency	
	Land(s) available with the local body for waste processing (in Hectares)	
	Land currently utilized for waste processing	
	Solid waste processing facilities in operation	
	Solid waste processing facilities under construction	
	Distance of processing facilities from city/town boundary	
	Details of technologies adopted	
	Composting,	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled
	Vermi composting	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled
	Bio-methanation	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled
	Refuse Derived Fuel	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled
	Waste to Energy technology such as incineration, gasification, pyrolysis or any other technology (give detail)	Qty. raw material processed Qty. final product produced Qty. sold Qty. of residual waste landfilled
	Co-processing	Qty. raw material processed
	Combustible waste supplied to cement plant	
	Combustible waste supplied to solid waste based power plants	
	Others	Qty.
	Solid waste disposal facilities	
	No. of dumpsites sites available with the local body	
	No. of sanitary landfill sites available with the local body	
	Area of each such sites available for waste disposal	
	Area of land currently used for waste disposal	

	Distance of dumpsite/landfill facility from city/town	kms
	Distance from the nearest habitation	kms
	Distance from water body	kms
	Distance from state/national highway	kms
	Distance from Airport	kms
	Distance from important religious places or historical monument	kms
	Whether it falls in flood prone area	Yes/No
	Whether it falls in earthquake fault line area	Yes/No
	Quantity of waste landfilled each day	tpd
	Whether landfill site is fenced	Yes/No
	Whether Lighting facility is available on site	Yes/No
	Whether Weigh bridge facility available	Yes/No
	Vehicles and equipments used at landfill (specify)	Bulldozer, Compacters etc. available
	Manpower deployed at landfill site	Yes/No (if yes, attach details)
	Whether covering is done on daily basis	Yes/No
	If not, Frequency of covering the waste deposited at the landfill	
	Cover material used	
	Whether adequate covering material is available	Yes/No
	Provisions for gas venting provided	Yes/No, (if yes, attach technical data sheet)
	Provision for leachate collection	Yes/No, (if yes, attach technical data sheet)
9	Whether an Action Plan has been prepared for improving solid waste management practices in the city	Yes/No (if Yes attach Action Plan details)
10	What separate provisions are made for: Dairy related activities: Slaughter houses waste: C&D waste (construction debris) :	Attach details on Proposals, Steps taken, Yes/No Yes/No Yes/No
11	Details of Post Closure Plan	Attach Plan
12	How many slums are identified and whether these are provided with Solid Waste Management facilities :	Yes/ No (if Yes, attach details)
13	Give details of Local body's own manpower deployed for collection including street sweeping, secondary storage, transportation, processing and disposal of waste	
14	Give details of: Contractor/ concessionaire's manpower deployed for collection including street sweeping, secondary storage, transportation, processing and disposal of waste	
15	Mention briefly, the difficulties being experienced by the local body in complying with provisions of these rules	

16	Mention briefly, if any innovative idea is implemented to tackle a problem related to solid waste, which could be replicated by other local bodies.	
----	---	--

Signature of CEO/Municipal Commissioner/
Executive Officer/Chief Officer

Dated:

Place:

Form – V
[see rule 24(3)]

Format of annual report to be submitted by the State Pollution Control Board Or Pollution Control Committee to the Central Pollution Control Board

PART-A

To,

The Chairman
Central Pollution Control Board
Parivesh Bhawan,
East Arjun Nagar, Delhi- 110 0032

1.	Name of the State/Union territory	:	
2.	Name & address of the State Pollution Control	:	
3.	Number of local bodies responsible for management of solid waste in the State/Union territory under these rules	:	
4.	No. of authorisation application Received	:	
5.	A Summary Statement on progress made by local body in respect of solid waste management	:	Please attach as Annexure-I
6.	A Summary Statement on progress made by local bodies in respect of waste collection, segregation, transportation and disposal	:	Please attach as Annexure-II
7.	A summary statement on progress made by local bodies in respect of implementation of Schedule II	:	Please attach as Annexure-III
Date: Place:			Chairman or the Member Secretary State Pollution Control Board/ Pollution Control Committee

PART B

Towns/cities

Total number of towns/cities

Total number of ULBs

Number of class I & class II cities/towns

Authorisation status (names/number)

Number of applications received

Number of authorisations granted

Authorisations under scrutiny

SOLID WASTE Generation status

Solid waste generation in the state (TPD)

collected

treated

landfilled

Compliance to Schedule I of SW Rules (Number/names of towns/capacity)

Good practices in cities/towns

House-to-house collection

Segregation

Storage

Covered transportation

Processing of SW (Number/names of towns/capacity)

Solid Waste processing facilities setup:

Sl. No.	Composting	Vermi-composting	Biogas	RDF/Pelletization

Processing facility operational:

Sl. No.	Composting	Vermi-composting	Biogas	RDF/Pelletization

Processing facility under installation/planned:

Sl. No.	Composting	Vermi-composting	Biogas	RDF/Pelletisation

Waste-to-Energy Plants: (Number/names of towns/capacity)

Sl. No.	Plant Location	Status of Operation	Power generation (MW)	Remarks

Disposal of solid waste (number/names of towns/capacity):

Landfill sites identified

Landfill constructed

Landfill under construction

Landfill in operation

Landfill exhausted

Landfilled capped

Solid Waste Dumpsites (number/names of towns/capacity):

Total number of existing dumpsites

Dumpsites reclaimed/capped

Dumpsites converted to sanitary landfill

Monitoring at Waste processing/Landfills sites

Sl. No.	Name of facilities	Ambient air	Groundwater	Leachate quality	Compost quality	VOCs
1.						
2.						
3.						

Status of Action Plan prepared by Municipalities

Total number of municipalities:

Number of Action Plan submitted:

Form – VI

[see rule 25]

Accident Reporting

1.	Date and time of accident	:	
2.	Sequence of events leading to accident	:	
3.	The waste involved in accident	:	
4.	Assessment of the effects of the accidents on human health and the environment	:	
5.	Emergency measures taken	:	
6.	Steps taken to alleviate the effects of accidents	:	
7.	Steps taken to prevent the recurrence of such an accident	:	
Date:		Signature:.....	
Place:		Designation:	

[F. No. 18-3/2004-HSMD]
BISHWANATH SINHA, Jt. Secy.