



Government of India



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

Monitoring of potential Gaur-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 Gaur-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 Gaur in potential conflict areas, especially their migration/movement patterns.
- SFDs may develop an identification database of identified Gaur and known herds, their movement patterns within human-dominated landscapes and the conflict that is generated by the movements. This will help identify individual Gaur with high potential for conflict.

4.5 MANAGING POTENTIAL GAURS-IN- CONFLICT

When male Gaur 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. Gaur, once habituated to crop fields, keep returning, even when driven back to the forest. Often, Gaur 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 Gaur require specific attention.

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

- Given the fact that Gaur 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 Gaur are attracted, the cropping seasonality and the Gaur's 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 Gaur that are highly aggressive and resident in human-dominated areas may be attempted when their rehabilitation in suitable habitats is a viable option.
- Gaur 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 Gaur 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 Gaur.
- 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 Gaur. A poorly designed barrier is likely to have low effectiveness and can possibly negatively affect the health of Gaur. No barrier is fool-proof; there will be breaches and occasionally some Gaur 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 Gaur 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 Gaur 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 MoEF&CC in December 2022, consisting of officials from MoEF&CC, 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 (GoI) Dr S P Yadav, <i>IFS</i> , Former Additional Director General of Forest (WL), MoEF&CC, GoI (December 2021 to March 1, 2022) Shri Soumitra Dasgupta, <i>IFS</i> , Former Additional Director General of Forest (WL), MoEF&CC, GoI (June 2019 to November 2021)	Chairperson
Shri Rohit Tiwari, Inspector General of Forest (WL), MoEF&CC, GoI	Member
Shri Rakesh Kumar Jagenia, Deputy Inspector General of Forest (WL), MoEF&CC, GoI	Member
Dr Sunil Sharma, <i>IFS</i> , Joint Director (WL), MoEF&CC, GoI Dr R. Gopinath, <i>IFS</i> , Former Joint Director (WL), MoEF&CC, GoI (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