



Government of India



Guidelines for Human-Blackbuck Conflict Mitigation

Taking a Harmonious-Coexistence Approach



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Ministry of Environment, Forest and Climate Change

Abbreviations

BMZ	German Federal Ministry for Economic Cooperation and Development	IUCN	International Union for Conservation of Nature
BMZ	German Federal Ministry for Economic Cooperation and Development	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 organization
DFO	Divisional Forest Officer	NTCA	National Tiger Conservation Authority
DLCC	District-level Coordination Committee	NTG	National Technical Group
DNA	Deoxyribonucleic acid	NWAP	National Wildlife Action Plan
EIA	Environment 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	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i>	PPE	Personal protective equipment
Gol	Government of India	PRT	Primary Response Team
HBBC	Human–Blackbuck 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

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1. ABOUT THE GUIDELINES

1.1 THE OVERALL CONTEXT

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

1.2 PURPOSE AND SCOPE

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

1.5 INSTITUTIONAL MECHANISM FOR IMPLEMENTATION OF THESE GUIDELINES

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

1 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>

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

1.3 APPROACH

- The development and implementation of these guidelines is driven by a harmonious-coexistence approach² to ensure that both humans and Blackbucks are protected from negative impacts of HBBC.
- The guidelines address the issue of HBBC, and in doing this they take a holistic approach. The holistic approach of the guidelines entails addressing the drivers and pressures that lead to HBBC; providing guidance on establishing and managing prevention methods; and reducing the impact of conflict on both humans and Blackbucks.
- 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 HBBC mitigation measures with key sectors and stakeholders at the national, state and local levels.
- The guidelines reflect on the need for a landscape approach while formulating solutions for mitigating HBBC to ensure sustainable solutions as unless comprehensive and integrated HBBC 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 implementers by providing the Implementer’s Toolkit to provide operating procedures (OPs), formats, checklists and other field implementation aids.

1.4 LEGAL AND POLICY FRAMEWORK FOR IMPLEMENTING THE GUIDELINES

- These guidelines should be read in conjunction with the existing relevant legal and regulatory frameworks, especially the Wild Life (Protection) Act, 1972.
- The following laws are considered directly relevant for conservation when dealing with HBBC:
 - 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 HBBC.
- The Supplementary Framework to HWC-NAP on Legislative Framework for HWC Mitigation in India⁶ may be referred to for more details on the specific legal provisions related to HWC mitigation.
- Other important legislations that facilitate conservation when dealing with HBBC include the 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; and Disaster Management Act, 2005.

2. CONTEXT AND SITUATION

- The Blackbuck, or Indian Antelope (*Antilope cervicapra*), is native to the Indian subcontinent. It was distributed throughout the area south of the Himalaya earlier, but now it is extinct in Pakistan and Bangladesh. Two sub-species of Blackbuck are found in India: *Antilope cervicapra cervicapra*, in peninsular India, north-east into West Bengal, and *Antilope cervicapra rajputanae*, in north-west India.
- Grassland–scrubland loss and habitat destruction are the primary causes for the slow recovery of Blackbuck populations. Protected areas are a relatively small proportion of the remaining grassland–scrubland landscape. And the majority of Blackbuck populations today are found in fragmented, human-dominated landscapes that are interspersed with remaining patches of degraded grasslands or scrub habitats. Thus Blackbucks have to move between protected habitat patches, grazing lands and agricultural lands. Thus, the conservation of this species depends on managing and protecting such habitats in human-dominated landscape matrices. At present, the Blackbuck populations are larger in countryside farmlands and village commons than in any nearby protected areas.
- ‘Human–Blackbuck conflict (HBBC) refers to the negative interactions between people and Blackbucks that lead to negative impacts on people or their resources, such as human injury, crop damage and loss of property. It also refers to the negative effects of the interactions on the emotional well-being of humans and Blackbucks or their habitats.
- Crop damage due to HBBC is not extensive across the range of the species; it is very localised. However, the damage can be heavy. In some areas, there has been a drastic decline in the Blackbuck population and local extinction. The total population of the Blackbuck is recovering. It was 22,000 in the 1970s and had increased to over 50,000 by 2000. The total number of mature individuals in India is believed to be 35,000 (IUCN 2017), which is the reason for the change in the International Union for Conservation of Nature (IUCN) Red List status of the Blackbuck from Vulnerable (1994–96) to Near Threatened (NT) (2003–08) and Least Concern (LC) (2017). There is a need to now conduct systematic population estimation to gain information on the population size across the range of the species, and to assess population trends.
- HBBC is resulting in damage to crops in some states such as Rajasthan, Haryana, Maharashtra, Gujarat and Andhra Pradesh.
- The Blackbuck population in some states/regions within state is declining rapidly along with the HBBC incidences, while it is increasing in some other states/other regions.
- The two contrasting cases can be seen in Rajasthan, where the population has increased greatly; however, Blackbucks have become extinct in some places in the western part of Rajasthan. The Blackbuck has thus become a species that needs strong conservation measures and conflict mitigation strategies to be protected in its habitat.
- Illegal hunting, habitat loss due to conversion of the habitat to other land-use classes and fragmentation are the primary threats to the species. Linear infrastructure is a major factor responsible for fragmentation of natural habitats. Road networks in the landscape result in mortality due to collisions with vehicular traffic in the short term, while fragmentation and population isolation result in mortality in the long term. Road accidents are responsible for the deaths of many individuals.
- HBBC mitigation measures that are effective and wildlife-friendly, need to be developed and further improved towards crop protection, including fencing, as well as procedures for capture, handling, transportation and translocation, identification of suitable habitats for relocation, and required capacity development of the personnel.

3. ADDRESSING THE DRIVERS AND PRESSURES OF HBBC

3.1 OVERALL MEASURES

HWC-NAP recommends a holistic approach to HWC mitigation in which the thematic triangle of drivers–prevention–damage mitigation is considered and addressed.

These guidelines have been prepared in line with the recommended holistic approach to bridge the current gap. Effective and sustainable mitigation of HBBC involves effective problem analysis to identify drivers and pressures of conflict. Such analysis will allow appropriate selection of mitigation measures.

- An assessment of the long-term outcomes and implications of all mitigation measures may facilitate in identifying effective and wildlife-friendly mitigation measures to address HBBC. For this, a systematic analysis of HBBC mitigation measures may be performed to assess their effectiveness and wildlife-friendliness in different types of conflict situation. This will facilitate the necessary customisation and adaptation of the mitigation measures to achieve the best possible impacts in the field.
- Cross-sectoral cooperation is critical for addressing drivers of conflict through improved land-use planning and other measures and for customising the mitigation measures.

3.2 ZONATION

- Blackbucks are often found in agricultural lands that are located at the periphery of protected areas. In the forest zone, they are shy animals and usually avoid interactions with humans. Most conflicts are reported at the interface between human areas and grassland–scrublands (grassland/scrubland fringes and agricultural settlements). In many places, the population is dependent only upon the agricultural areas.
- The zonation takes into consideration the available resources and allows the adoption of a science-based pragmatic approach to landscape-level planning for conservation and HBBC mitigation.
- **Zone 1 – Blackbuck conservation zone** – Open forest, scrubland areas and protected grasslands are part of this zone. However, as this zone is in protected areas, management interventions need to address challenges such as habitat fragmentation and degradation. All activities regarding the restoration of habitats may be undertaken in this zone. Removal of

alien species planted for the conversion of grasslands to woodlands, invasive species removal, management of grassland species, etc. may be done in this zone. Further identification of the area which is used by the species for resting or foraging and of activities to reduce disturbances, etc. will be done in this zone. As the Blackbuck population is declining rapidly in some areas, population restoration and conservation action plans for the recovery of the species will also be implemented in this zone.

- **Zone 2 – Human–grassland scrubland interface** – Most of the Blackbuck populations from this zone are responsible for agricultural loss and conflict with humans. There is an active need to manage the Blackbuck population in this zone in close collaboration with the Forest Department. Village panchayats are active stakeholders. As the original habitat of the Blackbuck is converted to human-use areas, multi-use area management needs to be developed for conserving the local Blackbuck population. The survival of the species in many states also depends on the management of this zone. Most of the barrier mechanisms (fencing), preventive mitigation measures, etc. need to be used in this zone. As a large part of the Blackbuck population is found in multi-use zones, where there are no unaltered habitats, there is a need to manage these areas for the survival of the species. It is also essential to define the conflict and areas of conservation of the species at this interface. For effective conservation planning, it is essential to prepare a predictive map of crop use by the Blackbucks and to identify high- to low-risk areas and suggest appropriate mitigatory measures accordingly.
- **Zone 3 – Blackbuck management zone** – Some populations of Blackbuck have adapted well to humans and live in refuges, agricultural fields or patches of wasteland away from protected areas. They may not have access to adequate natural habitats, and their connectivity with the potential habitat may be lost. Thus they may be dependent on these human-use areas primarily. The options of community-based conservation measures, other effective area based conservation measures (OECMs) may be explored along with the promotion of alternative crops, crop insurance, blackbuck population monitoring and effective use of barriers. In high conflict areas, measures for scientific population management of blackbuck may be explored.

3.3 MONITORING AND MANAGING HABITAT-RELATED DRIVERS AND PRESSURES

Habitat loss and fragmentation and degradation of habitats are among the primary reasons for many wildlife species moving toward human habitations. There has been a widespread loss of forests due to expansion of agriculture and plantations and increasing numbers of human habitations. With the loss of forests, the Blackbuck habitat has also become fragmented.

- As the species is primarily found in grasslands and villages wastelands and refuges, vegetation (habitat) monitoring protocols applicable to such habitats may be followed. Surveys may be conducted annually for habitat and threat assessments.
- In forest areas, critically important habitat components such as foraging areas, resting areas, and scrub forests may be monitored.
- Non-timber forest product (NTFP) collection may lead to degradation of grasslands or scrublands if not checked periodically. Thus the respective forest departments can collect data on the amounts/weights of different NTFPs collected from different forest beats. Spreading of weeds and anthropogenic pressures, including signs of ground fires, if any, may be monitored. The remaining natural habitats, whether inside PAs or outside, may be protected and maintained. Areas of importance to the species for priority management interventions aimed at reducing conflict may be identified.
- Monitoring and maintenance of water resources in such habitats may also be carried out as the species is mostly found in semi-arid regions and herds might move to human-use areas for water.
- Areas important for the survival of remnant populations, along with nearby threats (such as human habitations, agricultural fields) may be mapped and highlighted in the management/ working plans. Refuge areas inside the villages or near them also support Blackbuck populations of and may be monitored regularly. Maintaining a refuge has a negative impact on the human-Blackbuck conflict, and thus efforts may be made to reduce or remove the Blackbucks from such habitations.
- The conversion of grasslands to woodlands (through commercial plantations or proliferation of invasive species such as *Prosopis juliflora* that reduce the extent of viable Blackbuck habitats) is also a major concern. Therefore, *Prosopis* and other woodland species need to be managed in the grasslands and other habitats close to human-use areas.

- Removal of invasive plant species is important for maintaining the health and nutritional value of grasslands and preventing the movement of local Blackbuck populations to farmlands for forage. Due to the dominance of invasive species that out-compete the native vegetation for space, there may be a reduction in the cover under native woody shrubs and suppression of native tree species, which may result in increased HBBC.
- Invasive species hotspots may be mapped on the basis of community assemblages and abundance data. The use of remote sensing data for mapping weeds may also be explored. Sites can be prioritized for restoration on the basis of their importance as foraging areas for the species and the extent of habitat degradation.
- A database may be maintained of prevailing invasive species/weeds and possible eradication strategies. It may be regularly updated, with information on eradication efforts as well.

3.4 MEASURES TO REDUCE LIVELIHOOD DEPENDENCE OF PEOPLE ON GRASSLANDS AND SCRUBLANDS

Joint Forest (Grassland) Management can be promoted in areas with resource-use overlaps between local Blackbuck populations and local communities. Alternatives to resource collection such as stall-feeding of livestock and subsidizing cattle feed may be explored and implemented.

- Eco-development activities may be undertaken by the Forest Department in collaboration with the Revenue Department, local panchayats, and block development officers for income generation and reduction of the dependence on the natural resources.
- Facilitating funds under MGNREGA or other government schemes for providing livelihoods may also be explored.
- Alternative livelihood options and promotion of higher-value alternative crops may be explored so as to improve incomes and reduce dependency.

3.5 SCIENTIFIC MANAGEMENT OF POPULATION AT INTERFACE AREAS OR CONFLICT HOTSPOTS

- A local overabundance of wildlife, including Blackbucks, may be due to a reduction in carrying capacity brought about by habitat loss, degradation and fragmentation of natural habitats. It may also be due to population growth. Or it could be a combination of both. It is therefore important to determine which factor is driving the overabundance effect so that the appropriate interventions can be selected.
- Managing local overabundance requires good knowledge and data on population size, dynamics, ranging behaviour, habitat variables, HBBC etc. SFDs may work towards building both internal capacity and collaborations with research institutes and researchers to achieve the high standards of data collection and analysis needed for the scientific management of population.
- SFDs may adopt a robust population monitoring protocol and implement it using trained field staff members or through collaborations with research institutes or local universities/colleges.
- Naturally dispersing populations that have colonized new areas need to be reviewed to see if this is a viable solution for scientific management of population. Past dispersal may be reviewed in terms of crop and property damage, adverse impacts on the well-being of people in and around the newly colonized sites, loss of Blackbuck lives (including captures) and population trends, and in terms of management inputs and challenges faced.

3.6 MEASURES FOR CROSS-SECTOR COOPERATION AND FOR STRENGTHENING THE ROLE OF KEY STAKEHOLDERS

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

- State-level Coordination Committees (SLCC), landscape-level multi-stakeholder fora and District-level Coordination Committees (DLCC) may be used to strengthen the inter-agency coordination required for HBBC, and a district-specific operational mechanism may be developed to address specific needs of HBBC mitigation.

- Communities that are significantly affected by HBBC (farmers, villagers) may be encouraged to organise themselves into community support groups to back the joint mitigation initiatives with the local forest department.
- There are several religious views associated with the Blackbuck. The species is also restricted in its distribution. Both these factors make the Blackbuck an attractive species for community-based eco-tourism. The community eco-tourism model set up in many states may be used in areas with high levels of crop foraging to provide alternative employment to the local communities, in cooperation with the Tourism Department.
- Local NGOs working towards conservation and animal welfare can especially play an important role in spreading awareness, as well as implementing the HBBC mitigation strategies in partnership with the local administration and Forest Department.
- The Education Department, research institutions and the Forest Department may undertake awareness generation and outreach programmes, especially on the role played by the Blackbuck in the ecosystem.
- Researchers and scientists with experience in working with the species and with experience with its behaviour can help prepare pamphlets and education material for communities.
- Besides involving local communities and various stakeholders in mitigating HBBC, creation of awareness and community education are extremely important.
 - Mobilizing volunteers (like Vanya Praani Mitra) for interacting with the public, to create an interface with the Forest Department and to carry out preliminary steps for mobilizing local help in case of emergencies.
 - Creating awareness about effective fences and demonstrating such fences in villages may be carried out by such institutions for effective Blackbuck conflict mitigation.
 - Encouraging communities to change the cropping pattern to crops that are not preferred by Blackbuck, such as oilseeds, sunflower, cotton or mustard (or even combination of crops, with preferred ones grown in rows or guarded by non-preferred crops) in impacted areas.

- Information campaigns may be carried out on conservation-friendly practices, cultivation of suitable species that do not attract wildlife and the steps to be taken when one comes across any wildlife. Human activities that may deter wildlife from approaching close to human habitations are to be encouraged.
- Regular meetings of field functionaries may be organised on the status and difficulties related to HBBC.
- Signage may be placed in the conflict locations identified to create awareness about precautionary measures to be taken when there are encounters with Blackbucks.

3.7 SUSTAINABLE WASTE MANAGEMENT AROUND PROTECTED AREAS AND AT HWC CONFLICT HOTSPOTS

- Waste bins and garbage dumps can result in a flourishing population of feral dogs in the area. Such dogs are responsible for killing Blackbuck fawns in fringe areas, multi-use areas, etc. The Forest Department may work with the local communities, village panchayats and municipalities to reduce waste/garbage accumulation at the grassland–village edge and dispose of waste appropriately.
- Due to a variety of reasons, animals might move to village areas holding crop residues and other plant waste. Their movements close to/across roads can also result in vehicular collisions. Thus, ensuring a garbage-free environment may reduce threats to Blackbucks and to domestic animals that graze closer to such areas. The frontline staff and PRT teams may periodically inspect the forest periphery for signs of garbage disposal. In human-use areas, village panchayats may be involved in periodic inspections. SFDs may coordinate with the local administration for the overall organization of local markets, waste management and disposal such that wild animals are not attracted. SFDs may generate awareness among local communities on the need for waste disposal and its role in reducing conflict.
- Where some Blackbucks have become habituated to foraging inside villages and towns in search of garbage, ‘aversion conditioning’ may be tested if they do not stop this behaviour even after the garbage is no longer available.

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

To ensure that HBBC mitigation measures are planned and implemented with animal welfare and ethical considerations, as well as the safety and health of the response teams and other field personnel in mind, the SFDs may ensure that all response team personnel from the 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*³.

- Regular and systematic specialized training programmes may be conducted for critical operations such as rescue, capture and translocation jointly with other key departments in the form of mock-drills and simulation training sessions.
- Advanced training programmes related to animal welfare issues may be conducted for all the personnel of the Rapid Response Teams.
- The competencies of the members of RRTs may be reviewed on a regular basis and their training curriculum is to be fine-tuned and updated regularly.

³ *Supplementary Framework to HWC-NAP on Establishment and Capacity Development of HWC Mitigation Response Teams*, available from <https://moef.gov.in/wp-content/uploads/2022/01/National-Human-Wildlife-Conflict-Mitigation-Strategy-and-Action-Plan-of-India-2.pdf>

3.9 MEASURES TO STRENGTHEN THE SYSTEM OF KNOWLEDGE MANAGEMENT RELATED TO HBBC MITIGATION

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

- The National HWC Mitigation Forum, landscape-level multi-stakeholder fora 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 related to HBBC mitigation to inform future HBBC mitigation strategies and plans.

3.10 SYSTEMATIC RESEARCH AND MONITORING ADDRESSING HBBC

HBBC is extremely challenging considering that the original habitats of the species have shrunk drastically and large fragments of the population reside in multi-use areas. There is also a problem in controlling overabundance where there are high levels of crop foraging. The species is facing the threat of extinction in many regions, while becoming a species-in-conflict in some other areas.

Some of the priority areas for research are listed here:

- A comprehensive assessment of the Blackbuck distribution to assess the total population of the species and the population trends in different regions, including protected areas.
- Studies that examine drivers of HBBC, an understanding of how animals use multi-use landscapes, and which kinds of crop fields are preferred can help arrive at a predictive framework to understand the vulnerability to crop foraging by the species.
- The carrying capacities of the protected and classified grasslands and multi-use areas supporting the species, not including agricultural areas.

- Community-based traditional mitigation measures, including listing traditional/local varieties of crops that are not preferred by Blackbucks.
- Effectiveness and wildlife-friendliness of HBBC mitigation measures and Blackbucks' responses to these measures.
- How different mitigation measures impact the Blackbuck (changes in resource use, health and HBBC).
- Estimation of crop loss caused by Blackbucks and zonation based on the intensity of loss.
- A comprehensive population estimation in each region, forest and multi-use zone.
- Conservation plans for areas with a declining population of the species.
- Long-term implications for the families affected by crop loss in areas with high HBBC levels.
- Long-term impact of HBBC (crop loss and well-being) on households close to Blackbuck habitats (priority areas being conflict hotspots).
- Developing tools and strategies to implement Immuno-contraception.
- Developing predictive models to identify future conflict hotspots.
- Management of multi-use areas for the survival of the species and reduction of HBBC.
- Effect of livestock grazing in Blackbuck habitats.

4.

DEPLOYING MEASURES TO PREVENT HUMAN-BLACKBUCK CONFLICTS

4.1 IDENTIFICATION OF ANIMALS-IN-CONFLICT AND MAPPING CONFLICT HOTSPOTS

The type of conflict and the solutions depend on where the conflict is occurring and what its impacts on people and Blackbucks are.

4.1.1 Identification of animals-in-conflict

Individuals or groups of Blackbucks-in-conflict may be characterised as casual (opportunistic) or repeated (obligatory) crop forager. It is not feasible to individually identify an animal in a conflict situation, but it is possible to find proof of Blackbuck activity through signs of crop foraging such as digging, uprooting, trampling and harm inflicted through any human injury. Therefore, mitigation measures/solutions cannot be based on the individual animal approach in the case of the Blackbuck. Another way of addressing an individual-in-conflict or a group-in-conflict is to check if particular populations are habitual crop foragers of particular places. This could help decide if relocating a herd, if feasible, to another place could be resorted to. The following steps may be taken for identifying Blackbucks that cause conflict:

- The movement areas of the above-mentioned categories of Blackbuck within croplands may be demarcated or mapped, including tracking marks and other distinct signs, to confirm the presence and absence of Blackbucks.
- Investigate all conflict-related incidents within the region.
- Deploy a number of cameras at strategic locations, depending on their predicted movements. A few of the camera traps can be with a white flash and infrared flashes, a few of them being in still mode and a few of them being video mode.
- Investigate the existing camera trap and identify the individual based on distinct morphological identification features and short-list Blackbucks on the basis of the frequency of occurrence.

4.1.2 Identifying hotspots of HBBC

- HBBC hotspots⁴ can be identified and mapped as follows:
 - Incident hotspot – Frequency of occurrence of incidences over the past specific 5 or 10 years, mapped over the target area. The data include the number of incidents of crop loss, injury and death of domestic animals.
 - Vulnerability hotspot – Cumulative index obtained by overlaying past incidents, vulnerability of local community and potential risk of the area.
- An analysis of incident hotspots will help identify factors affecting conflict incidents and, therefore, will help identify key factors to be used for predicting HBBC hotspots. In forest fringe–agriculture interface areas–refuges, the FD may also document the pattern/incidences of foraging (entry and exit routes, crops/ areas foraged, the number of individuals, size, etc.) through PRT teams or other FD staff members or by installing monitoring systems/camera traps at hotspots.

4.2 EFFECTIVE USE OF EARLY WARNING AND RAPID RESPONSE SYSTEM

An “Early Warning and Rapid Response (EWRR)⁵” system may be established and used to enhance the overall efficiency of the mitigation efforts in the field. For preventing HBBC, a modern early warning system (with passive infra-red sensors and barriers) based on landscape consideration may be planned.

- As the Blackbuck is a Schedule I species under WPA 1972, only the CWLW can give necessary orders for driving in areas where Blackbucks feed on crops. Therefore modalities may be devised for the issue of immediate orders. RRT members can help village communities and farmers with driving operations. These RRTs and PRTs may hold regular meetings with local governing bodies and institutions to review of the situation, and to ensure that there is joint preparedness to handle any large-scale HBBC mitigation exercise.

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

5 EWRR is a set of tools, processes and personnel competencies needed for timely and meaningful generation and dissemination of alert information to individuals, communities and establishments at risk for optimal preparedness and responses at the appropriate time to reduce the likelihood of injury, death or crop damage.

4.3 POPULATION MONITORING

- Few efforts have been made to estimate the Blackbuck population across India. There is a need to assess Blackbuck populations particularly in areas close to the hotspots.
- A suitable scientific protocol for monitoring Blackbuck populations in affected areas may be prepared in consultation with competent wildlife biologists, and the monitoring staff may be adequately trained in implementing the protocol. As far as possible, local universities, NGOs, and research institutions may be involved in population monitoring.
- Population monitoring of Blackbucks may be conducted with a focus on the human-use landscapes as the species continues to occupy common lands/crop lands. The Agricultural and Revenue departments, being key stakeholders in HBBC mitigation, may be involved in the population estimation.
- Blackbuck populations in grassland/scrubland habitats, human multi-use areas and refuges may be monitored regularly to keep track of changes in the population.
- Blackbuck population monitoring may not be limited to protected areas or state-owned land but may also be done in human-use areas, including but not limited to farmlands, fallow lands, scrublands, wastelands, etc. Volunteers/representatives of village youth or members of community PRTs, if any, may be involved in annual population monitoring drives.
- The males of the species usually forage alone, while the females forage in groups. Crop foraging behaviours in relation to crop availability, responses to deterrents/barriers, crop preference, etc. can be additional information for devising mitigation methods or crop alternatives for the fringe areas.
- Efforts may be made, in cooperation with the agriculture sector, to understand the crop foraging behaviour of herds and individuals on the basis of both species-specific and landscape-specific factors (availability of food in natural habitats, response to deterrents and barriers, crop preferences, etc.) in high-density areas and in the fringes of protected areas.
- The natural habitat of the Blackbuck has mostly been converted to plantations of commercially important tree species and agricultural and horticultural land classes. Natural forests that still provide refuge to populations frequently visiting crop fields may be

identified and restored. Monitoring and maintenance of water resources in such habitats may also be carried out as the species mostly inhabits arid regions and herds might move to human landscapes for water.

4.4 SUPPORT LOCAL COMMUNITIES AND FARMERS IN CROP PROTECTION AND OTHER EXCLUSIONARY MEASURES, TAKING A HARMONIOUS-COEXISTENCE APPROACH

The traditional methods used by farmers to stop crop foraging by Blackbucks include physical guarding, using scarecrows and guard dogs, spraying foul-smelling materials, faecal matter, etc. and erecting brushwood fences, rubble walls and thorn fences. Live bio-fences of *Euphorbia neriifolia* (Thor), *Acacia senegal* (Kumhat) and *Prosopis juliflora* (Vilayati Babul) are also popular. However, as these species are also invasive, such bio-fences may be monitored and trimmed from time to time. Running audio with fox lights creates a buzzing sound in high winds, which is also considered effective. Traditional acoustic deterrents used by farmers in some areas involve creating noise by shouting, and other means. Visual deterrents consist of lengths of coloured cloth strung on fences on the periphery of fields.

- The Forest Department and Agricultural Department may work with the communities to spread awareness about deterrents and provide technical skill. As the animals may quickly be habituated to these deterrents, there is a need to keep improvising and changing deterrents and to carry out community guarding.
- Farmers may be supported in crop guarding by encouraging the practice and by subsidising measures such as trip wire alarms/passive infra-red sensors. Synergies, with funding such measures under MGNREGS, may be explored.
- Apart from traditional crop protection techniques used by farmers, site-specific solutions may be required to deal with the problem, depending on whether the Blackbucks-in-conflict come from the adjoining grassland or scrubland or is resident entirely on the farmland; and whether the population consists of small isolated herds or is a large contiguous population occupying a large area.
- Blackbuck foraging on crops is common in the summer as these animals face a reduction of food and water in their natural habitats. To stop the foraging, fencing the area, planting wild food plants and creating water bodies in their natural habitats or wild refuges/ common lands outside croplands are needed.

- In areas where repeated crop foraging by Blackbucks occurs, farmers can be encouraged to grow less vulnerable crops, according to the climatic factors of the region. In some dry regions, crops such as sunflower (*Helianthus sp.*), Kasumbi (*Carthamus tinctorius*) and castor (*Ricinus sp.*) may be encouraged in place of highly susceptible crops such as peanut, wheat, cotton and sorghum.
- Traditionally farmers have used various methods such as fencing with tree and shrub branches and stringing smooth wire with polythene bags hanging from them between poles and using effigies, guard dogs, watchmen, night lights, various sounds, often in combination, to prevent crop foraging by Blackbucks. Farmers can be facilitated to use and further strengthen these methods.
- Although Blackbucks are known to be able to jump over fences and can also go through strand-based fences (electric and barbed wire), fences may by far be the most effective, though rather expensive, solution. Only a few animals will probably be able to cross fences at any time, and managing such animals will be much easier than keeping the farmlands unfenced. Farmers may be discouraged, through awareness campaigns, on the use of fences made of materials that may harm Blackbuck or other animals. .
- The following approach to fencing for HBBC mitigation is recommended:
 - Fences may be erected on forest boundaries abutting croplands facing severe conflicts. Where the terrain does not permit continuous fencing, special design interventions (such as hanging fences over rivers or streams) may be considered. Manual guarding may be adopted during the sensitive season at vulnerable points where either fencing is not possible or a fence is unlikely to be effective.
 - A Blackbuck fence may be a sufficiently tall chain-link (woven wire), or solar fence. Barbed wire fences should not be used because of the risk of serious injury to animals.
 - Chain-link or woven wire fences may be made of flexible steel to minimise injury to animals hitting the fence at speed.
 - Suitable view breakers such as thatch patches or metal plates may be used to warn the animals about the existence of the fences and avoid injuries by hitting them or running into them.
- A solar fence may be used only when its maintenance and a 24x7 pulsating power supply are assured.
- If the fence is also meant to provide protection against Wild Pigs or any other burrowing animals, it may be grouted at least one metre below the ground, preferably with one or two strands close to the ground.
- If fencing is not possible or is impractical on the forest boundary, farmers may be encouraged to go for collective fencing in order to reduce costs.
- In high-conflict areas where breaching may occur or fencing is not possible, manual guarding may be adopted during the sensitive season.
- Even the strongest fences can be damaged for various reasons. Effective arrangements for repair and maintenance may be put in place at the time that a fence is being planned. Community-based management of fences may be encouraged.
- State governments may consider subsidising suitable fences to encourage the adoption of such fences, or the possibility of bringing the fence construction under MGNREGS can be explored.
- There are other exclusionary devices or methods. These methods list some deterrents that do not injure Blackbucks and are not fatal to them.
 - Scare devices (beating of drums or tins; guard animals like dogs)
 - Spraying of local repellent solutions
 - Planting of thorny bushes around the crop area (*Euphorbia*, *Opuntia*, *Ziziphus*, *Agave* species)
 - Coconut ropes soaked in a mixture of sulphur and repellent oil
- In addition to the listed repellents, a large number of olfactory, acoustic and gustatory repellents have been developed to decrease Blackbuck damage; however, most testing results have shown that Blackbuck become habituated to these repellents. The effectiveness of most of the methods listed here depends upon the scientific use of the method in the field.

4.5 ADDRESSING ZONOTIC AND OTHER EMERGING DISEASES, TAKING A ONE HEALTH APPROACH

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

- Veterinary capacities and infrastructure may be upgraded, to facilitate disease monitoring in Blackbucks, for Blackbuck conservation and to prevent zoonotic diseases from spreading to livestock and human populations.

- A well-formulated Wildlife Health Management and Disease Surveillance Plan may be in place at every division/protected area.
- All personnel involved with capture operations may be trained, vaccinated and equipped.
- The basic approach may be to integrate the concept of ‘One Health’⁶, which links human and animal health in a shared environment, into all the operations and HBBC mitigation measures in the field.

⁶ 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 HBBC

An indicative list of the potential emergency situations ⁷ in decreasing order of priority follows:

- i. A human has been killed/injured..
- ii. A Blackbuck has damaged property/crops.
- iii. A Blackbuck has entered human-use areas (agriculture fields or settlement areas).
- iv. A Blackbuck death has occurred due to retaliatory action.
- v. An injured Blackbuck is being rescued.

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

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

5.1 ESTABLISHMENT OF EMERGENCY RESPONSE MECHANISM

- HBBC may not require regular emergency response, unlike conflicts involving other animals. However, sometimes the situation develops into an emergency when a Blackbuck turns aggressive. In such rare cases, a quick response from community-level PRTs/ RRTs is necessary.
- A mechanism is required at each division for communicating with key officials and for communicating information for initiation of appropriate response actions at the site of the incident.
- Helplines may be set up for the public to report information in case of any conflict situation requiring the support of the SFD. Hubs may be in place for receiving the information and transmitting it onwards for quick responses. The hubs may be set up in easily accessible locations.

5.2 INTRA- AND INTER-AGENCY COORDINATION AND COOPERATION

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

5.3 PREPAREDNESS OF RESPONSE TEAMS

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

5.4 ACTION AT THE ONSET OF EMERGENCY OR SPECIFIC SITUATIONS

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

5.5 KEY RESPONSE ACTIONS DURING AND AFTER AN EMERGENCY

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

⁷ Emergency or Crisis situations can be defined as situations which 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 minimize loss of lives and assets

6. REDUCING THE IMPACT OF HBBC ON HEALTH AND OVERALL WELL-BEING OF AFFECTED PEOPLE

6.1 ADDRESSING 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 an *ex gratia* payment is that the loss of the life of any individual cannot be compensated. Therefore, any amount paid to the family of the victim is mere consolation. 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 may be made in their bank accounts through Direct Benefit Transfer.
- In HBBC hotspots, a revolving fund may also be established, at the division-level, to ensure the availability of funds for providing immediate relief to victims/families.

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

- In the case of injury resulting from an encounter with a Blackbuck, the victim needs to be immediately hospitalised and an *ex gratia* payment paid, as per the state government's norms.
- Professional counselling by qualified psychiatrists/health workers may be useful in checking the effects of such traumatic incidents.
- The SFDs and other government agencies/institutions may organise some counselling sessions for such victims and support them as they come out of the psychological impact.

6.3 ADDRESSING CROP DAMAGE

The assessment of a crop compensation amount is complex. Payment of inadequate compensation to farmers will lead to resentment among humans, leading to adverse impacts on wildlife conservation and retaliatory killings. Payment of compensation might also lead to laxity in crop protection and inhibit innovations in crop guarding.

- The Ministry of Agriculture and Farmers Welfare has included crop loss resulting from 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 settling crop or property loss compensation should be transparent and simplified. Mobile apps may be used for collecting the information and processing claims of farmers after crop losses are sustained due to Blackbuck activities to ensure efficiency and transparency in the system. Experiences and success-story sharing across states may facilitate further improvements in the system.
- Farmers may be encouraged, facilitated through community-based institutions, to explore solutions such as changes in cropping patterns, using non-palatable crops, etc.
- Collaborative efforts may 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 Blackbucks, in collaboration with agricultural institutions.
- Appropriate protocols may be developed for assessment of damage and providing relief.

7.

REDUCING THE IMPACT OF HBBC ON THE HEALTH AND WELL-BEING OF BLACKBUCKS

- 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), the Prevention of Cruelty to Animals Act of 1960 (Section 11(1)(h) and Section 11(1)(d)), the Motor Vehicles Act 1978 (Transport of Animal) Rules, 2001) and guidelines issued by the MoEF&CC.

7.1 ADDRESSING THE HEALTH AND WELL-BEING OF BLACKBUCKS DURING CAPTURE AND TRANSLOCATION

- Translocation of the captured individuals may also translocate the HBBC to new locations, and therefore the decision may be based on scientific data (areas where the species is not present should thus be avoided totally; areas where other Blackbuck populations are present should be reviewed; Blackbuck should rarely be maintained in captive care facilities; and so forth).
- The decision about translocation, lifetime care or use of reproductive control methods in Blackbucks may be taken before the capture operation.

7.1.1 Potential Capture Techniques

- As it is a shy animal, darting a free-ranging Blackbuck is quite difficult. Presently, the most prevalent capture option available is called the boma technique. It has been tried by many states for ungulates.
- Nets (drop nets, drive nets, net guns, etc.) are widely used in capturing mammals in other countries but have not been tested adequately in India. Drop nets may be tried that have been widely used in capturing herbivores in other parts of the world with due caution as there is a likelihood of 'capture myopathy'.
- Chemical capture techniques may also be used for Blackbucks. This method is more useful in capturing individual animals rather than entire herds. It may also be used as a supplementary technique during mass capture/boma capture protocols, either in the case of Blackbuck health emergencies or during biological/disease sampling processes.
- All captures should be done with care and under expert supervision as these procedures may inflict injuries to the animals as well as the handlers/staff members involved.

7.1.2 Translocation including handling, transportation, monitoring and management

- Solitary Blackbucks can be darted and translocated with ease; however, since most Blackbucks usually move in a group, darting is not always a feasible option.
- Care is needed in this method as it involves physical restraint and may cause minor to fatal injuries. Disentangling the animals from the nets is generally a challenge, as there is a possibility that they may end up with broken limbs or succumb to capture myopathy.
- If the animals are to be captured and translocated, a lot of training under expert supervision will be required. Roles may be assigned to the members of the team. Driving (herding) and loading methods may be standardised through repeated testing.
- The equipment may be manufactured or procured exactly as per specifications. Its use may be rehearsed and practised. The inventory of equipment may be checked against a checklist before departing for the field.
- The capture equipment (depending on the capture techniques to be used) – stretchers, ropes, drive nets, drop nets, canon nets, dart guns, drugs, etc. – may be checked regularly and before capture operations.
- Customised vehicles may be designed for immediate movement of Blackbucks from capturing hotspots to rescue centres/lifetime care or translocation sites.
- The transportation truck may have interconnected compartments so that different ages and sexes can be separated. Mixing young ones with adult males should be avoided to prevent smaller animals being crushed. Similarly, more than one male in a single compartment should not be transported together. The truck may be driven straight to the translocation site and unloaded using a ramp that fits the back of the truck.
- The equipment required would depend on the mitigation strategy to be implemented, i.e., whether the animals are to be translocated or not. While customising the equipment, the items may be procured bearing in mind the size, behaviour and physiology of the species. Mass-capture techniques may be integrated into the capture and translocation protocols.

- The captured animals may be released into the wild after proper identification marking or using RFID.
- Unless the release area is large enough to provide sufficient scope for exploration by the new arrivals, they may be released in an enclosed area for some time so that they develop some attachment to the location. This may keep them from wandering out of the release site. It is advisable to retain the animals inside a fenced area of sufficiently large size to prevent them from entering crop fields and foraging on the crops again.

7.2 EFFECTIVE MASS CAPTURE

- Mass capturing Blackbuck from the wild is not only challenging, but it can also be a potentially dangerous procedure for both the animals and the personnel involved if not executed appropriately. In the absence of a remote-activated wireless commercial trapping system, the indigenous trapping system using a gate and fence can be considered. Trail camera surveillance may be carried out at the conflict site, and bait may be used to bring the animals into a trap.
- When capturing such species for fertility control and translocation initiatives, the capture team should maximise the efforts to trap the entire group, to minimise the impact of removing individuals on the welfare and social interactions of both the individual and the group.
- Drop nets/corral traps may be used for mass capturing Blackbucks, after standardising the techniques, without breaking groups.

7.3 POST-CAPTURE HEALTH EXAMINATION

- One of the major complications during Blackbuck capture is mortality or morbidity due to capture myopathy, which may appear within hours, days or months after the operation. This is a result of the stress and struggle experienced by the animals during capture. Capture myopathy can be reduced by avoiding predisposing factors and minimising unnecessary physical handling during mass capture operations.
- If the animals are released in an enclosure after capture, a regular watch may be kept on their numbers and health condition.
- The fence of the enclosure should be made clearly visible to animals by providing a shade net, thatch matting, etc. so that the animals do not hit it while running.

- If the Blackbucks are released in the wild, they may be marked for identification, and all encounters may be recorded and reported to a central database.
- If the number of translocated animals is large, 100 or more, a monthly assessment of the released population size may be made to ascertain its status.
- A trained wildlife veterinarian should always be part of capture operations to deal with any unforeseen emergency that may arise.

7.4 SCIENTIFIC MANAGEMENT OF POPULATION AND REHABILITATION

- In many conflict areas, deterrence has worked during the initial implementation but has lost its effectiveness quickly. Long-term scientific management of population is the major intervention needed in areas of high conflict.
- Natural predators of the Blackbuck can slow down the rate of increase of Blackbuck populations. Hence, maintaining the prey–predator balance is a significant management strategy. Translocations can be an effective means of reducing conflict but only to those areas where the species is present in small numbers and there is a low probability of conflict due to the translocations.
- Regular mass captures can provide relief to the conflict areas, but non-lethal methods of scientific management of population need to be examined as an option for actively managing the species.

7.4.1 Post-rehabilitation Monitoring

- The animals may be regularly monitored before and after capture and release for any abnormality.
- Tranquilisers may be administered to calm the animals during translocation. The animals should be handled gently but firmly at all times. It may be easier to monitor the health and behaviour of the captured animals if they are released in an enclosure. It also allows them to adapt to the new environment. The enclosures may be fenced with non-deleterious materials, and the fences may be visible and recognisable to the animals (by using fluorescent cloth, thatched matting, etc.) to make sure that the animals do not collide with them and cause injury to themselves.
- Before the animals are released to the wild, they may be properly marked and their population status may be monitored and recorded. Blackbucks may be monitored with markers such as radio collars and coloured body markings or coloured ear tags in order

to ensure that they stay in the target area and do not stray into croplands again.

- As far as possible, translocated animals may be released only in a fenced location unless the release area is very extensive.
- If the animals are released in the wild, they may be marked for identification (RFID) and all encounters may be recorded and reported to a central database.
- If the number of translocated animals is large, 100 or more, a monthly assessment of the released population size may be made to ascertain its status.
- Even if the animals are translocated for reducing crop losses, care may be taken that they get a fair chance to adapt to the new location.

7.5 SAFETY AND HEALTH DURING CAPTURE AND TRANSLOCATION OPERATIONS

- In most cases, Blackbucks will rather flee than confront a human being. The majority of incidences happen when the Blackbucks feel threatened or cornered, is also anticipated during capture or translocation procedures. Most injuries are on the legs and feet and vary from minor to fatal. Fatal injuries from Blackbuck attacks are generally due to blood loss. Although injuries are not always fatal, they can be extensive and are primarily lacerations. Severe toxemia can result from injuries. Therefore, proper medical care is necessary. Before carrying out a capture and translocation programme, all the staff members involved should be trained and briefed about the hazards of the procedure and the accidents that can happen.
- All the team members involved in capture, translocation or any other procedure to mitigate conflict that requires direct or close contact with the animals may get exposed to a variety of diseases and hazards. The team may be thoroughly briefed about these diseases, and provided with preventive measures such as wearing gloves, masks or PPEs.

8. USE OF LEARNINGS FROM THE GUIDELINES TO FURTHER STRENGTHEN THE INSTITUTIONAL AND POLICY FRAMEWORK RELATED TO HBBC MITIGATION IN INDIA

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

- The feedback arising from the use of these guidelines may, therefore, be consolidated to form the basis for fine-tuning these mitigation measures and

for understanding capacity needs for effectively implementing the mitigation measures.

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

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

- A dedicated framework of experts (Annexe 1) was formed that consisted of independent wildlife policy experts and representatives of government agencies, SFDs, research institutions, civil society institutions and international organizations. 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.⁸ The experts played different roles in the drafting and editing process (Coordinating Lead Authors, Lead Authors, Contributing Authors, Review Editors). The Author Group worked on developing these guidelines between July 2019 and August 2021, during which time they consulted a larger group of experts and stakeholders via workshops, meetings and consultations. The authors reviewed the existing documents and guidelines available from the MoEF&CC and different states, and relevant information and recommendations were brought into the new document. A National Technical Group (NTG), consisting of experts from MoEF&CC, Wildlife Institute of India (WII) and *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ)

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

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

10. MONITORING AND EVALUATION OF GUIDELINES

- This set of guidelines is not a static document; rather, it is a living document. It will keep abreast of the various developments in field implementation methods and wildlife research. For this, 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.

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

ANNEXE 1

NATIONAL TECHNICAL GROUP (NTG)

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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

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