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TRUMPET

PROJECT ELEPHANT

MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE 2023

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Project Elephant

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From the Director's Desk

Ramesh Kumar Pandey
Inspector General of Forests (PT&E) & Director, Project Elephant

I am pleased to state that in this edition of "Trumpet" newsletter, we are sharing the work done for the conservation and protection of elephants along with the recent developments and achievements made by Project Elephant and Elephant Cell, WII during the period April-August, 2023. We have articles related to elephant health care and other management issues, written by respective authors based on their invaluable field experience. We also have conservation news about the work done for the betterment of Elephants and their habitats

In order to commemorate the 30 successful years of the National Conservation Programme, 'Project Elephant', the Ministry of Environment, Forest and Climate Change, Government of India with support of State Forest Department of Assam, Government of Assam celebrated the "Gaj Utsav, 2023" during 07th-08th April, 2023 at Kaziranga National Park, Assam. The Gaj Utsav, 2023 celebrations, which aimed at rejoicing nature-culture relationship in India was inaugurated by Smt. Droupadi Murmu,Hon'ble President of India on 7th April, 2023.

The 18th meeting of the Steering Committee of the Project Elephant was held on 07th April, 2023 at Kaziranga National Park, Assam under the chairmanship of Shri. Bhupender Yadav, Hon'ble Minister, EF&CC and in presence of Shri. Ashwini Kumar Choubey, Hon'ble Minister of State, EF&CC & Vice Chairman of the Project Elephant Steering Committee. The meeting deliberated upon further strengthening elephant corridors and management of elephant reserves and emphasised on efforts to deal with human-elephant conflicts in a responsive manner.

Amongst the multitude of activities that Project Elephant and State Forest Departments are currently undertaking, I must mention that the process of field validation (ground-truthing) of the Elephant Corridors across India has been completed. New additional elephant corridors have been also reported during the field validation which elephants had started using in the last one decade. The identification and protection of the elephant corridors would also entail the protection and movement of other wildlife as well.

An inter-ministerial meeting was also held between the officials of the MoEF&CC and the Ministry of Railways in June, 2023 to deliberate upon the mitigation measures being adopted on the railway tracks to minimize the incidents of elephant-train hits.

To avoid the elephant deaths due to train hits, sensitive railway stretches have been identified. To prioritise planning and monitor the implementation of mitigation measures, a portal was launched by Hon'ble Minister, EF&CC and Hon'ble MoS, EF&CC on 19th May, 2023. It's a multi-stakeholders initiative which involves the active cooperation from the Government of India, State Governments and the Indian Railways. The General Guidelines for Suggesting Mitigation Measures on Railway Tracks passing through Elephant Habitats in India have been also prepared and circulated to all the States/UTs for implementation. Various modern technological interventions such as Intelligent Elephant Movement Detection and Alert System through multiple sensors such as seismic, acoustic and thermal cameras, Intrusion Detection System (IDS) with the help of specially designed AI-based software and through Optical Fibre Cable (OFC) system, are being pilot tested at various sensitive railway stretches in various States.

As part of the project on creation of a repository of database of captive elephants in India, the collection of data and the DNA profiling of more than 300 captive elephants from different parts of the country have been completed.

The Ministry is in process of signing a Memorandum of Understanding (MoU) between the Governments of Chhattisgarh, Jharkhand, Odisha and West Bengal for addressing various elephant related matters including Human Elephant Conflict management. The MoU would promote inclusive governance for planning and implementing the Regional Action Plan for Conservation of Elephants for East Central Region with special emphasis on Human Elephant Conflict management. The MoU would be a working document that would provide the overarching framework for the activities for conservation and protection of elephants and management of inter-state movement of elephants.

The Ministry has initiated the process of Management Effectiveness Evaluation (MEE) of the Elephant Reserves of India. As part of it, the following sites for carrying out the pilot testing of MEE of the Elephant Reserves have been finalized and the MEE would be conducted shortly:

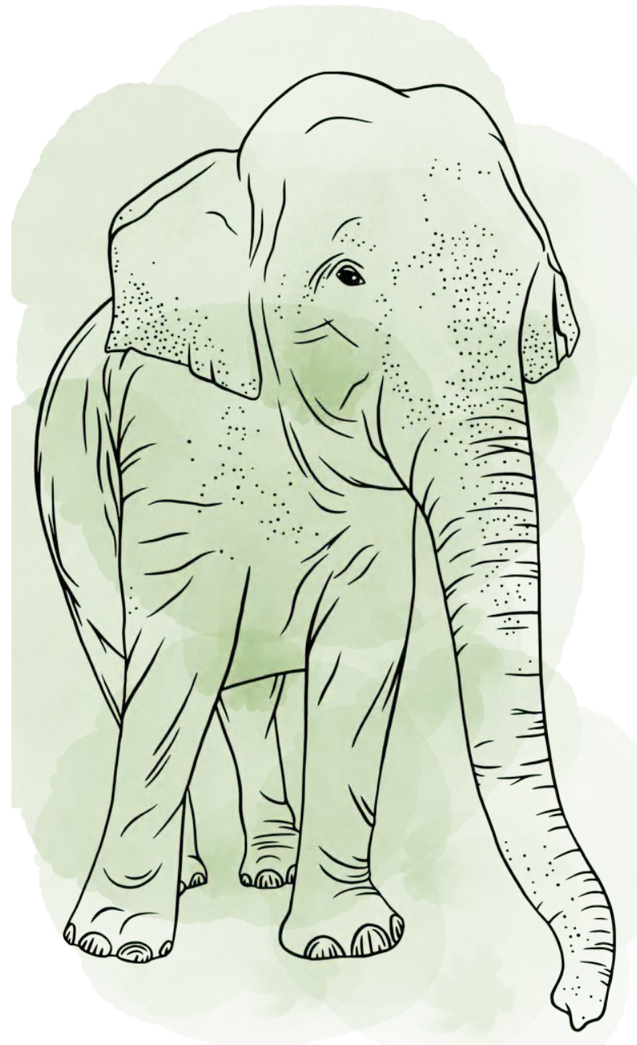
i. Shivalik ER (Northern Region)

ii. Nilgiri ER (Southern Region)

iii. Myurbhanj ER (East Central Region)

iv. Kaziranga Karbi Anglong ER (North-Eastern Region)

I am confident that with all these collective efforts of the Central Government, State Forest Departments, line departments, civil societies etc., the elephant landscapes, habitats and corridors would be secured and their generations would thrive happily.



Role of Kumki Elephant in Management and Mitigation of Human-Wildlife Conflict

Praveen Chandra Tyagi

IFS (Retd), Former PCCF & CWLW (HoFF), Tamil Nadu

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The word 'kumki' or 'koonkie' is a term used in India for trained captive Asian elephants. The word is derived from the Persian word 'kumak' which literally means to "aid" and is widely used in India for the trained elephants used in operations to capture wild conflict elephants or to rescue/ provide medical treatment to trapped injured wild animals.

Historical Perspective

The elephant has served man in times of war and assisted in economic activities relating to Forest logging operations, patrolling and eco-tourism. It has also helped in the elephant capture operations for the mitigation of human-elephant conflict. Our epics and folklore are full of stories about this magnificent giant. The elephant has been an integral part of Indian culture, history and religious beliefs since time immemorial and is revered. Ancient scriptures describe the methods for the capture and care of elephants recorded in the Sanskrit classic, the Gaja Shastra.

Role of Kumki in Elephant Capture Operations

The most popular method for capturing wild elephants is the 'Khedda' method which involves trapping them in pens or stockades. The word Khedda is derived from the Hindi word 'khedna' which means to drive. In this method, wild elephants were driven into a pen or stockade by skilled mahouts riding the kumki (koomkie) elephants. The Khedda method, associated with the eastern part of the country, was later introduced with various modifications to other parts of the country as well, the most famous of which was in the Mysore State.

The Mysore Kheddas were massive operations that required a large number of men force and kumkis (tame elephants trained for capturing wild elephants). Wild elephant herds had to be driven in from long distances and were moved in stages till they were driven into the stockade just like the bomma method used for the capture of herbivores causing depredation of crops.

Training of Kumki Elephants

The kumkis are bold, fearless elephants who are capable of coming close to wild elephants and would drive them away from human settlements and agricultural fields into the forest. The wild dominant traits of such kumki elephants are preserved during training, so their training is distinct from the training of the domestic elephants used in temples and religious processions and as tourist elephants for elephant back safaris in the forests. The kumkis can control wild elephants by force if necessary and by their scent and other communication can drive other wild animals into the forest.

The traditional way of training an elephant involves two methods i) use of force for gaining dominance over the animal and ii) passive submission of the animal by calming and comforting the animal, developing a behavioural bond between Mahout and the elephant through reward.

The use of aggression and force against the animal creates fear, stress and affects the natural behaviour of the animal and may be construed as torture to the animal. This method involves the use of an 'ankush' a metal hook placed forcibly behind the ear to goad the animal. This method may have adverse consequences potentially endangering the life of trainer mahouts during training and later the animal becomes erratic and may display erratic behaviour killing mahout and any other person it comes into contact. Such an animal is not suitable to function as kumki and sometimes amid the crowd, it may not obey the command of the mahout.

The passive method for submission without the use of force is the closed training system, the elephant is confined in a kraal (stockade) with dimensions depending on the size of the animal without any liberty for the animal to move around. The size may vary from 12 ft x 12 ft to 18 ft by 12 ft. The floors of the kraals are soft earth replaced whenever becoming dirty due to defecation thereby maintaining cleanliness.

This method uses vocal and tactile commands and is practiced by the 'malasars', 'kurubas', and other tribals in Anamalai and Mudumalai areas. This method relies heavily on positive reinforcement and handing out rewards and sometimes giving mild punishment. The animal learns the desirable behaviour of obeying the command, discourages charging and show of aggression. Thus, by soft and harsh vocal commands, showing the stick and mild form of punishment like foregoing the rewards the animal is drawn to submission. The animal becomes familiar and gets habituated to the mahout's voice and body expression. The elephant's behaviour changes and it begins to positively respond to the mahout's command by sitting down, rising and raising its trunk to accept food.

The social bond between mahout and elephants develops in a month and the animal is taken out from the kraal and goes for regular field exercise in the wilderness close to the wild elephants and begins to interact with conspecifics. Once it is familiar with wild elephants, protected independent contact opportunities are given to mingle and bond with the wild herd comprising female elephants only. Any male in the herd may show deep aggression leading to fights and injuries.

The training is a slow and gradual process requiring much patience and animals gradually become habituated, develops a bond, and trust and recognizes the vocal and tactile commands of their mahout. It is necessary that after initial training another co-mahout should be groomed to take charge during illness or unavailability of the main mahout. Change of mahout is not encouraged unless required for urgent exigency.

The training of kumki elephants is different from the other elephants which are used for forestry operations and safari tourism. For kumki the natural wild traits have to be maintained and reinforced over and over again though sometimes they may be used for tourism. Kumki should preferably be used for regular patrolling which will provide them the opportunity to interact with the wild elephants, get natural food for foraging and stall feeding should be discouraged.

Human-Wildlife Conflict Mitigation using Kumkis

In the early 1980s when chemical tranquilization of animals was not so popular and was being gradually introduced, the kumki elephants were extremely helpful in capturing the elephants especially the 'problem elephants' which were causing crop depredation and loss of property including injury and sometimes death of persons in the rural/agricultural landscape.

The kumkis work in groups ranging from 2-4 animals depending on the number of wild elephants they have to confront for capturing. The mahouts have to train kumkis to operate in coordination with other kumkis and this requires special skills. They have to maintain, command and control the kumkis and ensure that they continue to display courage, fearlessly interact and approach wild elephants and during aggression and mock charges by wild elephants should be able to withdraw and position themselves quickly. The operations may take time till the aggressiveness of wild elephant's wanes and kumkis can approach the wild elephant's shoulder to shoulder, nudging them into submission and the mahout begins the roping operation by descending and reaching the wild elephant's hind legs to tie ropes.

This type of capture operation was the usual practice before the introduction of chemical tranquilization which involves darting and induction of drugs for immobilizing the animals. However, the kumkis are indispensable as they are also required for tracking wild animals which may move a long distance after darting and before getting sedated / immobilized. The captured elephants are moved to the kraal (stockade) and treated for injuries.

The elephants are listed in Schedule I of the Wild Life (Protection) Act, 1972 and require permission from the Chief Wildlife Warden for their capture and translocation. The captured elephant after treatment is to be released in the wild, however, if the animal is injured and is an established 'problem elephant' and its release may again endanger the lives of humans, it can be captured and retained in captivity by written orders of the Chief Wildlife Warden. The process of capture should not cause undue stress and trauma to the animal. The use of kumkis in the elephant capture operation ensures that stress and trauma are not caused.

Tribal's traditional knowledge for training Kumkis

The tribal communities who have since many generations passed the knowledge and skills of training and working with elephants as their mahouts are mainly paniyas, kurubas, jainik-kurubas, and betta-kurubas of the Nilgiris district of Tamil Nādu while in Anamalai, the malasar community, with a few individuals from the Kadar community are skilled mahouts. These communities have their traditional knowledge and skill in nurturing and taming wild elephants. Similarly in Kerala and Karnataka certain tribals have mastered the technique and skill of handling elephants and handed over the knowledge and groomed the younger generation in these traditional methods to work with elephants.

Behaviour of Kumki Elephants

The elephants have inherent extremely complex emotions and spatial memories and kumkis must as far as possible, remain in the natural forest environment in the elephant camps and anti-poaching camps deep inside the forest and should not be exposed to extraneous stress and trauma otherwise they may develop psychological disorders and stereotype behaviour and become unfit as kumkis. The elephants, both in the wild and in captivity, exhibit happiness and grief, learn skills, play, practice, and use tools.

Role of Mahouts in Training and managing Kumki elephants

The mahouts have to perform very important role as the animal in his charge needs constant attention and follow-up learning to develop deep bonds to obey commands in the field operations. The mahout has to follow a daily routine of taking the animal to the river for scrubbing/bathing sessions, during which the mahout communicates with the animal. He also takes the animal for walk and fodder collection and keep its confinement to a minimum. The elephants need regular training and are taken into the wilderness, rivers - streams crossings and interacting with other wild animals, providing an opportunity for observational learning.

Welfare of Mahouts

The mahouts in the country are mostly kept as daily wage/contract labourers though they have unique knowledge and skills not available elsewhere and such human resource requires recognition, reward, and better pay and emoluments. The Forest Department should respect their expertise and unique skills and provide better welfare conditions for them and their families. The housing and health facilities need to be upgraded; pay scales to be enhanced for unique skilled personnel without limiting their pay because of low educational qualification.

Kumkis role in Human-Wildlife Conflict Mitigation

The kumkis of South India who have participated in several human-wildlife conflict mitigation and rescue operations and performed tasks with exceptional courage, obeying commands need a special mention. 'Kaleem' and other kumkis of Tamil Nadu have participated in more than 100 operations during their lifetime including the capture of famous 'Chinnathambi' and 'Vinayaga' and have driven straying elephants from agricultural fields and settlements; captured 'problem elephants' and rescued wild animals in distress. Tamil Nadu has also trained elephants and mahouts from other states. The Kerala kumkis (Bharath, Vikram, Surendran) and mahouts have been trained in Mudumalai Elephant camp and they have proved their training skills by assisting in capturing problem elephants.

Way Forward

Elephant training has been criticized as torture and cruelty to the animal on the ground of ethical and welfare issues; thus, it is important to formulate study training protocols and amalgamate best practices used in different regions with the least stress to the animals.

The database of mahouts and elephants kept in the states should be upgraded into a digital management information system and Project Elephant must establish a national database with an inventory of all kumki elephants and mahouts.

The traditional knowledge of tribals in elephant management should be documented and protocols and manuals should be drafted to preserve this knowledge for posterity.

Elephant and Mahout training schools be established region-wise with liberal funding and assistance from Project Elephant.

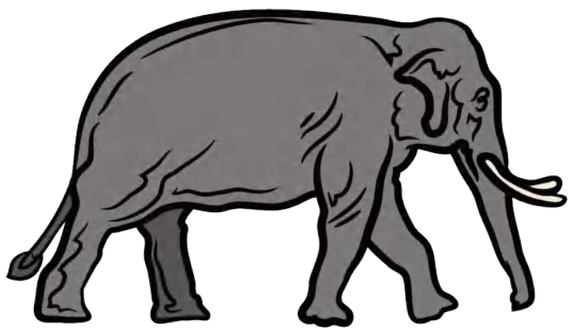


Plate-1: Kaleem Kumki Elephant with its Mahout & Cavady

Plate-2: Chinnathambi Kumki Elephant with its Mahout & Cavady

Plate-3: Muthu Kumki Elephant with its Mahout & Cavady

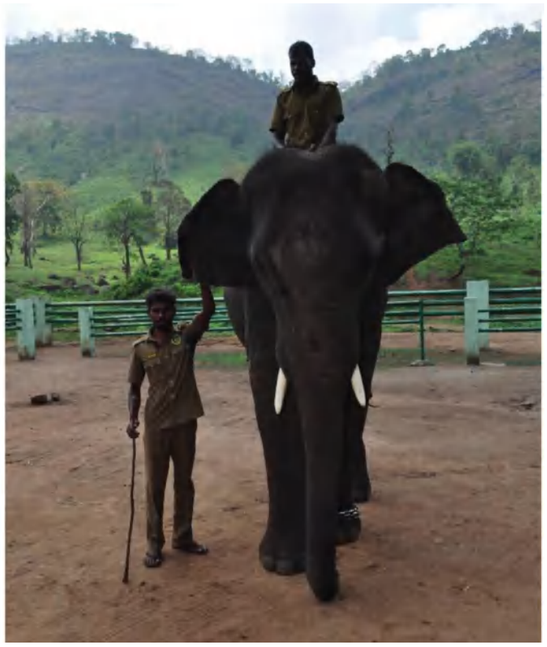


Plate-4: Mariappan & Suyambu Kumki Elephants with Mahout & Cavady

©Dr. Dipankar Ghose/ WWF-India

Habitat Improvement in Chhattisgarh's Tamor-Pingla WLS leads to significant rise in its elephant population

Dr. Kenei Miachieo

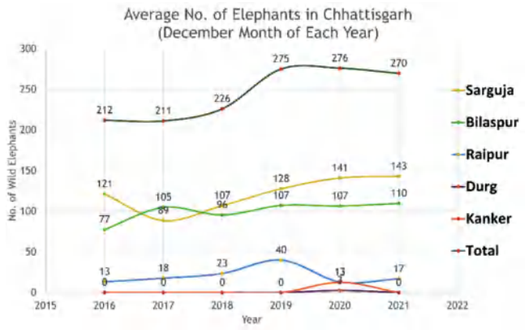
Served as Field Director, Sarguja Elephant Reserve from September 2021 to October 2022; currently Field Director, Udanti-Sitanadi Tiger Reserve, Chhattisgarh

Mrs. Prabhakar Xalxo

Served as Deputy Director, Sarguja Elephant Reserve from September 2019 to October 2022; currently DFO, Koriya, Chhattisgarh

India Has the highest number of Asian elephants and will continue to take a lead role in its conservation. Management of human-elephant conflict continues to be a major issue as it inflicts damages to both human population and elephant population.

Chhattisgarh has seen a gradual increase in elephant population in the last few years, with Sarguja circle and Bilaspur circle having the maximum number of elephants. The landscape has a high population of elephants with maximum being in neighbouring states of Jharkhand (679) and Odisha (1,967).



It was a matter of concern that the number of elephants in non-protected areas was significantly higher than in protected areas, more so because three wildlife sanctuaries i.e Tamor-Pingla WLS (608.51 km²) in Surajpur district, Badalkhol WLS (104.454 km²) in Jashpur district and Semarsot WLS (430.36 km²) in Balrampur district had been clubbed as **Sarguja Elephant Reserve** keeping in view wild elephant management. It was common to hear statements saying "*elephants don't go to the sanctuaries*".

A study of recorded elephant population in various forest divisions and protected areas in Sarguja circle from the period September 2016 to June 2022 was done.

In **Sarguja Circle**, it was found that yearly average number of elephants in the protected areas was quite low 34(2016), 29 (2017), 38(2018), 38(2019). In the corresponding years, the number of elephants outside non-protected areas were 87, 74, 83 and 70.

Surajpur district in North Chhattisgarh is about 2,787 km². While paddy is cultivated throughout the district, the central part of Surajpur has coal mines while the northeast has many sugarcane fields. **Surajpur** has a high incidence of human-elephant conflict,

especially in the north-east (Pratappur Block). In 2021-22, Surajpur accounted for about 44.70% (6,187) of the total number of compensation cases of Sarguja circle (13,843). The opportunity was that in the north-west (Odgi Block) a fairly compact Tamor-Pingla WLS (608.51 km²) is situated and it could play a major role in harbouring wild elephants.

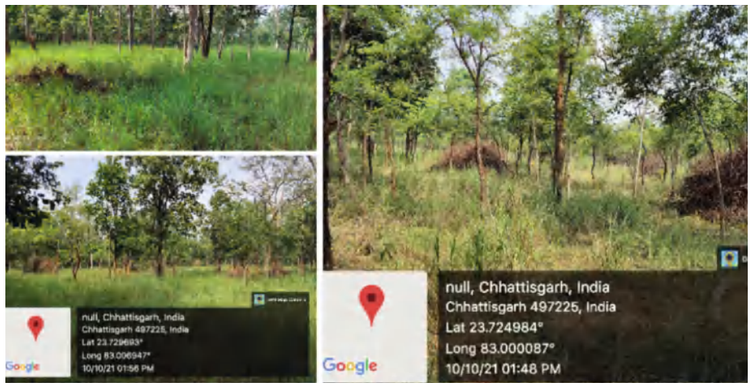
In **Sarguja Elephant Reserve**, habitat improvement works were intensified with focus on elephants in Tamor-Pingla WLS, Badalkhol WLS and Semarsot WLS. Majority of the work was concentrated to Tamor-Pingla WLS. Development of large water bodies, habitat improvement and habitat enrichment were implemented quite intensively. The area coverage for intensive habitat management was increased from 811 ha (1.33% of total area) in 2019-20 to 3,288 ha (5.30% of total area) in 2021-22.

Habitat Improvement Works in Sarguja Elephant Reserve

Work	Area in Hectares			
	2019-20	2020-21	2021-22	Total
Grassland Development	811	1195	936	2942
Regeneration of Degraded Bamboo Forests	0	750	1920	2670
Fruit Tree Plantation	0	30	372	402
Total	**811**	**1975**	**3228**	**6014**
Percentage of Total Geographical Area	0.71%	1.73%	2.82%	5.26%

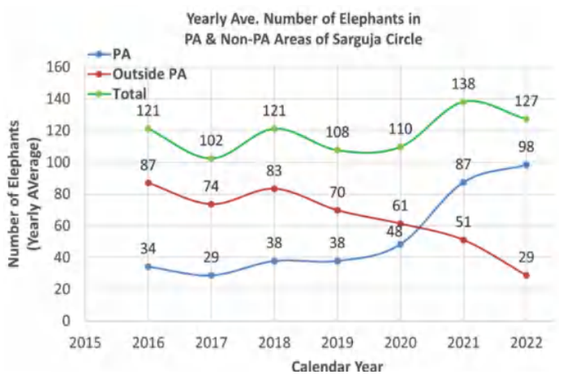
Grassland Development was done in an intensive manner. The procedure included mild ploughing and seed sowing by broadcasting method. Seedball method was also adopted. It was ensured that grass seeds were collected locally. On filed training were conducted and seed sowing operations were done in a synchronised manner.

Regeneration of Degraded Bamboo Forests: Tamor-Pingla WLS has a lot of natural bamboo. Most clumps were found to be damaged. Instead of undertaking bamboo plantations, clump cleaning and earth work were done in the natural bamboo clumps.



Removal of invasive non-palatable species was carried out on a large scale over a three-year period from 2019-20 to 2021-22. Non-palatable species like lantana (*Lantana spp.*), eupatorium (*Chromolaena spp.*) and van tulsa (*Ocimum spp.*) were removed in 16,705 ha.

Development of water bodies were carried out by treatment of 20 streams on ridge to valley method. Approached was also changed from creation of a greater number of smaller water bodies to creation of fewer quantity but larger water bodies. Enrichment of the areas around the water body was experimented by grass seed sowing in up-stream and plantation of fruit trees.



The proportion of wild elephants in protected areas increased compared to non-protected areas. Even though intervention has been for a short period, an intensive habitat management appears to be yielding results as a large number of elephants now. Since October of 2020, which can be regarded as the period when the proportion was reserved, there has been increase in number of elephants in protected areas, mainly Tamor-Pingla WLS, which recorded daily high of up to 120 wild elephants.

Decrease in human-elephant conflict cases of 27.78% was observed in Sarguja circle during the period (9998 cases in 2022-23 to 13843 cases in 2021-22). In Surajpur district, there was reduction in human-elephant conflict cases by 36.47% in 2022-23 (3754 cases) compared to 2021-22 (5909 cases).

The discourse on elephant conservation has been much inclined to human-elephant mitigation measures such as quick response, compensation, elephant-proof barriers etc., with less focus to elephant habitat improvement. Habitat management is part of human-elephant mitigation measures and there is a need to have meaningful discourse on improvement/ enrichment of habitat.

Natural resource managers need to have broad perspectives and make multi-prong interventions. A primary focus may be on whether we can hold wild elephants in forest areas, especially our protected areas. It will be unjustified on the part of a natural resource manager to keep on professing on co-existence without making substantial effort in enriching habitat in forest areas/protected areas, and thereby increasing the possibility of holding wild elephants in these areas for longer periods.

While activities like fruit-tree plantation are costly and expected to take a long time to yield desired results, activities like grassland development and regeneration of degraded bamboo forests costs lesser and yield result immediately after the first rains. Management of invasive species continues to be a challenge.

It is still early to make a statement that the elephants have become permanent residents in Tamor-Pingla WLS. However, the case of Tamor-Pingla WLS and Sarguja Elephant Reserve is of much interest as Chhattisgarh endeavours to provide good habitat to wild elephants.

Health Management in Elephants

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Health is a state of body and mind of an individual where every bodily system and their function performs normally and behavioural expressions show normal standards. Various intrinsic and extrinsic factors influence health of an individual and therefore, formulating a standard operating protocol for health management demands a good understanding of anatomy and physiology of the animal, its nutritional requirements, reproduction, susceptibility to infectious and non-infectious aetiologies of diseases, emotional needs etc. The elephant is a wild animal that has been captured and trained for thousands of years, but continuation of them in captivity still heavily depends upon extraction from the wild, which has been banned in India by the Wild Life (Protection) Act, 1972. This leads to a couple of deductions: All captive elephants are directly plucked from the wild and not bred to imbibe any selective character desirable for domesticity. Second, the present captive population of approximately 3000 elephants in India is bound to decline rapidly, as only a meagre number is being replaced with captive births. Most of the captive elephants in India are above 50 years, so it is a matter of statistical projection to speculate the approximate numbers of years that the captive elephant population continues in this country.

Emotional requirements:

Separate emphasis needs to be placed on the emotional as well as physical well-being of the captive elephants. The elephant is a highly social animal and it has been observed that it requires a social environment for being emotionally content. Merely keeping a large number of captive elephants in one facility is futile. Grazing and swimming as a group, opportunities to play with each other and express species-specific behaviour are very important for their contentment. Vocal and tactile communications, etc. are also integral. Regardless of the luxurious facility provided to a lonely elephant, he or she can never be happy in captivity. While making social groups in a captive facility, attention must be paid to study behavioural compatibility. Normally, a group of all females with one adult male can do well, or at least two females with occasional company of an adult male may be desirable. Some females have shown excellent fostering ability; orphaned or abandoned calves can be assigned to them and the same has shown to be a great boon to the survival of such destitute babies.

Until an arrangement can be made for bringing company, one can provide different kinds of enrichments like toys, logs, truck tyres and stimulate the ingenuity in the animals by encouraging them to find feed and fodder intelligently concealed. Playing in water is a favourite pastime of all elephants.

Physical requirements:

Elephants naturally occur in climates which are moderate in temperature with plenty of water and green vegetation. Because of their crowd pulling potential and many people connecting them with religious rituals and customs, elephants have been in high demand all over the world. Large numbers of elephants were thus extracted from the forests of range countries to transport across different continents of the world and one could find hundreds of elephants in circuses, zoos and amusement parks in extremely temperate countries as well as brutally hot and desert like conditions in some other regions or countries. With poorly developed thermoregulatory mechanisms in this primitive animal, there is very minimal scientific justification for such translocations or transpositions. However, wherever they have been placed for whatever reasons, while designing elephant houses, attempts should be made to minimize the rigors of environmental extremes, cold or heat. In cold countries, provisions should be created for centrally heated housing, with availability of wholesome and warm water. In hot and dry conditions, there should be ample shade created by plantation of evergreen trees and construction of adequately wide sheds with facilities like mistifyers, coolers and fans etc. The floors of sheds should be well drained, that of mud or padded with comfortable mats or carpets. There should be a big enough paddock, with shady trees and swimming pool. The pool should be at least three meters in depth and filled up with clean water up to a two meter level or more.

Nutritional requirements:

Elephants are hind gut fermenters and are poor in their digestive capacity. Predominant food of an adult elephant consists of fodder and requires upto 150-200 kg of green fodder per day. Depending upon quantity and quality of fodder available, an elephant may be given 3-5 kg (Dry matter basis) of properly cooked concentrate food. Clean drinking water should be available throughout the day and the elephant has access to it; depending upon environmental temperature, an elephant drinks 150-200 litres of water in a day. They have high requirement of minerals, and when not supplemented in food, will resort to geophagia, causing multiple complications like gastritis, flatulence, colonic impaction, indigestion or even severe bacterial infection of soil origin.

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Pre-emptive healthcare:

A good pre-emptive healthcare regimen can keep a captive elephant healthy throughout its existence and ensure a long, healthy life. This involves regular monitoring of behaviour and impulsive activities. Sleep schedule, eating and drinking patterns, depraved appetite, quality and quantity of defecation, urination etc. everything should be closely monitored and any alteration should be investigated. An elephant with impaction of stomach and colon, arthritis or severe debility may not sleep lying down for different reasons. Digestion has a direct bearing with status of the molars; a vet should know the ages of eruption and replacement of molars and accordingly formulate the ration. Very long and heavy tusks may scare away an aged tusker from lying down, as he faces difficulty in raising his head while getting up. Trimming of tusks may thus, give him respite and providing an inclined area at his stable may solve the problem partially. The pond also solves the problem; elephants have been observed to avoid sleeping for months, only ever napping in water. Obviously the buoyancy of water does the tricks to relieve the fatigue of its limbs.

Foot health of captive elephants is also a vital issue. Dr. Subramanian from Madras Veterinary College also had similar findings. Interestingly, we have observed hundreds of wild elephants that had no such foot issue. Therefore, a conclusion can be drawn that the substrate has a direct impact on the foot health of elephants. Like the wild elephants, captives should also have the opportunity to walk in different kinds of terrain and chance to walk into water, as only a balance of dryness and moisture can help captive elephants to keep healthy feet. Regular tethering in the same unclean area must be avoided, toe-nails and coronary band region should be oiled during the dry season and pedicure must be practiced to avoid splitting of toes.

Deworming:

Quarterly, the elephants should be dewormed and their faeces microscopically examined. Geographic prevalence of parasites, vectors and domestic-wild animal disease interface must be kept in mind in formulating a good pre-emptive deworming programme.

Vaccinations:

A well-researched vaccination programme should be followed in a captive elephant facility. Some of the deadly viral infections (e.g. Rabies, FMD) can be prevented by proper vaccinations, yet many other viral infections (e.g. EEHV) do not have any vaccines developed yet. Similarly, many fatal bacterial infections can be prevented by proper vaccinations (e.g. Tetanus, Anthrax, Haemorrhagic septicaemia, Black quarter etc.) however, some others like Tuberculosis do not have any vaccine developed for elephants so far. All these are fatal diseases, their diagnosis is often difficult, drug administration is also challenging in many elephants, and therefore, vaccination option should invariably be utilized for safety of the captive elephants. A vaccination calendar should be prepared for the whole year, keeping some two months gap between each vaccine.

Viral infections:

Several viral diseases have been reported in elephants. Encephalomyocarditis (EMC), Elephant pox, Herpes (EEHV), Foot and Mouth disease (FMD), Rabies, Bluetongue and Rinderpest are known to have affected the elephants. FMD, though infect, is not highly pathogenic to elephants and can be prevented by vaccinations. Rabies is a fatal disease and has attacked elephants, though history of bite was not confirmed. Only solution for rabies is annual vaccinations. At present, the biggest concern is EEHV (Elephant Endotheliotropic Herpes Virus) infections, which attacks young elephants from 2-10 years of age and is highly fatal. Sluggishness, reluctance to eat or drink, swelling of head and base of trunk, injection of conjunctiva and purplish discolouration of oral mucous membrane are early signs. Ulceration of oral mucosa and neurogenic impairment are also recorded. Post-mortem changes reflect systemic and generalized haemorrhagic disease. The infection can be treated with Acyclovir or Famcyclovir at a dose rate of 15mg/Kg body weight, 6 hourly for first three days, 8 hourly for next two days, then 12 hourly for next 10 days. Training of the calves to accept medication is one of the biggest challenges of this treatment. Success of a treatment regimen largely depends upon the promptness of its initiation and acceptance of medications by the untrained sick calves.

Bacterial infections:

There are many bacterial diseases that affect and could even prove fatal for the elephants. Besides the external wound infections, the most important bacterial diseases of elephants are Anthrax, Black-leg (Clostridial infections), Tetanus, Tuberculosis, Pasteurellosis, Salmonellosis and Colibacillosis. Brucellosis was also recorded in elephants.

Salmonellosis and colibacillosis are generally the problems of young calves particularly raised on hand rearing and artificial feeding. They cause severe diarrhoea, loss of appetite dehydration and death. Proper hygiene of feeding bottle or pail is necessary to prevent these. Smaller amounts of milk should be prepared at one time to avoid feeding of leftover milk later. Anthrax outbreaks take place in early rainy season in domestic and wild animals and can affect elephants. Vaccination is the solution. Suspected animal carcasses should not be opened and completely burned instead. For confirmation of anthrax, blood sample is taken from the tip of the ear and fixed immediately. Pasteurellosis (H. S.) is a threat but can be prevented by vaccinations. Tuberculosis is a problem of overcrowding and lack of ventilation and unhygienic surroundings. These issues should be addressed and the handlers should be regularly examined for tuberculosis or other zoonotic diseases and trained on maintaining hygiene, personal as well as in animal houses. Tetanus in elephant is not uncommon and only solution is regular vaccination as many injuries they get while working or moving in hostile terrains go unnoticed.

Surgical affections:

Captive elephants suffer from a number of surgical affections depending upon the tasks assigned to them; some of the most frequent are mentioned below:

1. Abscess: A punctured wound, a faulty intramuscular injection or blunt trauma may suppurate forming an abscess. An abscess is a success of bodily defence mechanism to alienate an infection and prevent a systemic disease or septicaemia. The natural tendency of the pus is to come out to the surface for drainage, however, the thick skin of elephants creates a problem in bursting it open. If not ripened and surgically drained in appropriate time, the proteolytic enzyme in the pus dissolves the hyaluronic acid tissue barrier and migrates towards the dependent parts or areas of least resistance. This may result in the formation of sinuses and fistulas and creates chronic complications.

2. Bursitis: Because of ill-fitting harness used during timber hauling or tourism, uneven pressure and friction over some parts of the elephant's body causes the formation of bursitis or gall (e.g. Furragall). Concrete flooring of night shelter may lead to zygomatic bursitis and making the elephant sit on hard or pebbled floor may lead to olecranon bursitis (capped elbow). Attention to proper harnessing and flooring may help prevent these conditions.

3. Fractures: Contrary to common perception, elephants often suffer from fractures, particularly in the bones of their limbs. Accidentally hit by a slipping log, attack by other elephants, automobile accidents, loading or unloading in trucks may cause fractures. We have tried bone plating (internal fixation), but the same was clumsy due to cancellous nature of medullary cavities of long bones in the elephants with the additional challenges of post-operative management. External fixation has been attempted on several occasions, but often leads to complications. Allowing the animal to walk into a pond and stand in partially immersed state in water has often yielded good results. The buoyancy of water and vertical orientation of the limb bones are animportant rationale for this.

Colonic impactions:

A fairly common problem of feeding coarse fodder like leaves of palm oil trees or coconut trees in some regions of the country; which coupled with weary molars may complicate things. Huge faecal bolus forms and impacts the colon and causes lower bowel obstruction. Intravenous infusion of large volumes of fluid, calcium, systemic antihistamines, neurotropic vitamins, and enema with lukewarm soap solution are used. Metoclopramide (Perinrom) is administered and in extremesituations, parasympathomimetic drugs like Neostigmine can be used.

Flatulence:

Generally uncommon in elephants but does happen. Flatulence may be of stomach or colonic origin and should be treated with antacids and antizymotics if of stomach origin and evacuation of colon after enema in case of colonic flatulence. Oral feeding should be restricted until complete recovery. Status of molars should be examined.

Ocular disorders:

Various kinds of ocular disorders have been encountered in elephants, out of which corneal opacities, cataract, lens luxation, synechia etc. are common. Many ocular maladies are caused by inept handling by mahouts. Some common conditions like keratitis, corneal opacity, conjunctivitis, etc. can be treated in routine manner; however, problems arise when the condition requires surgical intervention. Conditions like cataract, lens luxation can be surgically corrected but, the operated region is difficult to protect from self-mutilation with the very versatile trunk.

Trunk injuries:

We have encountered many trunk injuries in captive elephants beginning from minor abrasions to severe lacerations and cuts. In some appropriate cases we have attempted surgical closure, but almost invariably met with wound dehiscence. The primary line of suture (horizontal mattress) was reinforced with a second line of relaxation suture; however, thehigh mobility of the organ resulted in suture disruptions. We have resorted to hand feeding to avoid use of the trunk, but the ever restive organ could not be made immobile. We have seen few elephants with severed trunks or loss of the trunk tip, yet they could manage to use the trunk for prehension.

Poisoning:

The authors have come across several cases of poisoning in elephants, which are presented in very critical states. If the source and type of the poison can be determined, timely treatment may yield result. If the toxic substance has been taken orally, activated charcoal can aid in its elimination of the poison. Depending upon the poison, Atropine sulphate, antihistamines, calcium, Vitamin B-complex, etc. with large volume of intravenous fluid can be used for flushing out the poisons from the system.

Musth management:

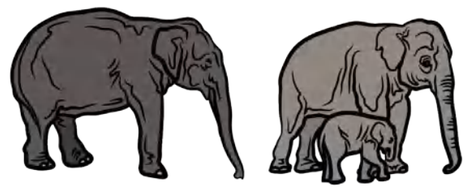
Musth is a periodical phenomenon characterized by aggressive behaviour and temporal secretions by the prime bulls. In the wild state, this may be a welcome occurrence as it is a breeding behaviour by which only the best bulls partake in the procreation process, ensuring passage of superior genes down the generations. In the captive state, however, this is the most dangerous and disturbing period in a bull's life. A good elephant facility therefore should have a musth box to maintain him without injuries and any harm to the handlers. Several intervening approaches are also adopted for its management, viz. anti-testosterones, diuretics, sedatives or GnRh vaccines.

Conclusion:

Developing a firm grasp on the fundamentals of the elephant's unique anatomy, physiology, haematology and biochemistry is vital to develop a foundation upon which further education on healthcare and managerial practices of elephants via theoretical and practical studies, is imperative to become a successful elephant doctor.

A thorough knowledge of the elephant's way of life in its natural habitat is essential to understand their physical and emotional needs when in captivity. Detailed observation of the behavioural patterns of this highly intelligent and exceedingly expressive species itself aids a veterinarian in detection of stressors, excitement as well as in diagnosing many medical conditions.

Access to modern diagnostic and therapeutic technologies enables more efficient management of pathological conditions and adequate hands-on training on basic procedures such as clinical examination, drug administration as well as remote drug delivery, necropsy, etc. are all essential to achieve success in healthcare and conservation of these gentle giants.



Securing the corridors and need for conservation of Elephas maximus in Nagalands

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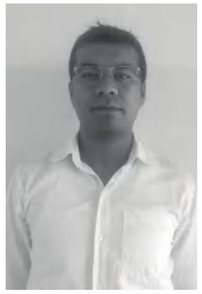

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Asian Elephant (Elephas maximus) an endangered species as per IUCN Red list, has its largest population in India with 29,964 of which 446 shelters in Nagaland (2017 census) finding its habitat range in 2 Elephant Reserves (viz., Intangki National Park & Singphan Wildlife Sanctuary) and 8 districts (viz., Dimapur, Longleng, Mokokchung, Mon, Nuiland, Wokha, Peren & Zunheboto). However even with 16,579 Km2 of forest cover in Nagaland (as per Nagaland report, 2022), the Asian elephants are struggling to survive in Nagaland.

Though elephant presence is rooted in Nagaland for ages, efforts to protect and conserve them were ignored for a long time, until recently. Ground truthing was carried out to look into the amount of work done in Nagaland to identify elephant corridor, its habitat, human-elephant conflict (HEC), population status, etc. Subsequently, the truthing result showed the scarcity of literature on the given area in Nagaland till date apart from some honour mention by researchers of neighbouring state. The research gap seen in the field of wildlife and for elephants particularly paved the way for this article to materialize. During the process of research, it was discovered that the awareness level of the non-affected communities about elephant presence and HEC related cases was very

low, compared with that of the HEC affected villages. This disparity occurred due to lack of sensitization & awareness programmes at all levels, lack of newspapers & media coverage about elephants, HEC, deaths during conflict, etc.

Tribal states like Nagaland have been practicing hunting traditionally since ages as a form of gathering, for livelihood economy, for protein, for trophy, etc. With raising demands for modernized unlicensed weapons like airguns and doing away with the traditional method of sustainable hunting in the past 5-10 years has made the matter worst in the state. Elephants too are often caught in the firing zone during HEC accounting for nearly 70 kills of their kind in the past 20 years which went unnoticed in the state either as an act of revenge for lost crops, family members, or for protein sources.

The Nagaland forest department over the years is gradually developing a positive response in conserving biodiversity. Priorities are made to engage verbal talks and meeting with all stakeholders in order to reduce and manage known habitats and to prevent further fragmentation of elephant habitat. The department is engaged to find alternative ways to provide for sustainable livelihood economy and in spreading awareness on the importance of wildlife. However due to the shortage of forest staff especially trained staff to tackle human-animal conflicts (HAC) and lack of funds to compensate for lost crops, lives, properties, etc, it is derailing the department in connecting with the affected villagers. Deprived or delayed compensation has made the matter worst for the department to build trust in affected areas. Having lost hope in finding help, the affected villagers resort to tackle HEC on their own accord to protect their crops and properties, leading to loss of lives from both ends.

Hence as a researcher, the challenge was taken up with limited available data to step into the field which has been ignored for years in the state. Since 2019, research work started with an objective to trace down all elephants past and present migratory corridors, and number of affected villagers by HEC in Nagaland. The journey started with minute available data on HEC reports received from DFO's of various districts. Due to limited available data, snowballing stratified sampling was adopted to identify all elephant habitats of past and present. Interview schedule was taken to understand people's perception and social responses towards elephants, their habitat and conservation efforts taken up to protect the mammal and HEC that has occurred till date. The still ongoing research has toured so far to 110 villages and with 60 more villages left to be interviewed. The villages were selected on the merit of either have experienced HEC or elephant habitat presence in the past 30 years . Efforts are been made to understand elephants migratory periods in a years, there preferred food, current preferred habitat, etc.

The Nagaland Forest Department has conducted the 'All India Elephant and Tiger Census 2022' using the 'Polygon Search app' designed by Wildlife Institute of India (WII), Dehradun. During the survey, apart from population estimation, efforts were also given to analyze their habitats and habitat vegetation cover. Since the survey started during the monsoon, majority of the areas were inaccessible due to poor road conditions

and high water level. Along the line transect, both direct and indirect count methods were used for the estimation. The estimation survey showed some variations in the population of elephants from the last count of 2017. The variations is bound to be expected due to the timing of the survey since Nagaland experience major influx from neighbouring states majorly from August to mid December every year, other contributing factors for the decrease will be the hunting of elephants for ivory, protein or as a source of community response to protect the agricultural crops.

Through study and analyses it has been observed that many elephant habitats were either fragmented or lost mostly due to unorganised land use patterns, indicated by 88.30% of land being either privately or community owned. Elephant habitats in Nuiland, some parts of Mokokchung, Longleng, Wokha and Mon district are totally cut off either due to population expansion, mono-plantation (viz, rubber, agar, Acacia, teak, tea leaves, palm oil, etc), coal mining, stone quarry, etc. However, there were also villages experiencing HEC recently after a long time. These recent HEC on those villages happened were either of forced migration due to fragmentation in neighbouring habitats, due to food shortage and excess carrying capacity in nearby habitat, or those habitats were once occupied by them.

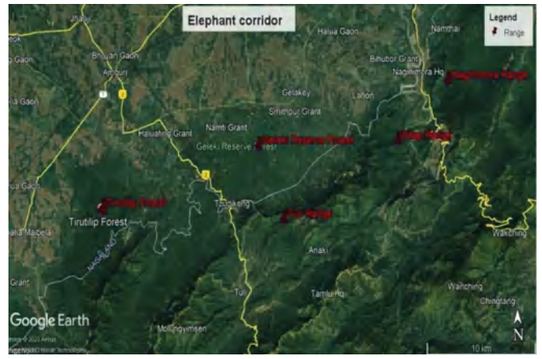
However, scenario of the two elephant reserves (ER) in Nagaland is somehow different from those non-protected habitats. Intangki NP presents rich habitat for numerous species belonging to near threatened to endangered species like the Himalayan serow, marbled cat, hillock gibbon, monitor lizard, mithun, wild gaur, leopard, wild dogs, Himalayan black bear, elephants, pangolins, hornbills, etc. As per the survey carried out for 'prey base abundance of tiger' in past six months, the park looks more promising from the result observed to restore the once lost habitat for tiger with the presences of abundant prey base like the barking deer, sambhar, serow and wild boar. The only negative impact looming on the park is the hunting pressure and disturbance from buffer zone. Implementation of various rural livelihood schemes to reduce dependency on hunting and collection of non-timber forest products (NFTPs) from the park, the park has huge potentials to be a future eco-tourism hotspots in Nagaland like any other national park in the country.

Singphan WS too is rich in its faunal diversity providing habitat for near-threatened to endangered species like leopard, elephant, Himalayan black bear, pangolins, hillock gibbon, binturong, etc. The sanctuary also finds occasional migration of tiger and leaves its pugmarks inside the sanctuary. However, the vegetation cover is a boon which needs restoration with indigenous trees. At present, the vegetation cover is largely dominated by 50-60% of bamboo making it difficult for herbivores faunal diversity to survive due to shortage of food. The sanctuary has been largely affected by earlier logging before it was declared as wildlife sanctuary. Though hunting is still prevalent from fringe villages, the major disturbing issue is the transportation of coal and other heavy machinery to and fro from Tiru valley to Sonari till late night through the sanctuary as the main outlet. This not only causes noise pollution inside the sanctuary but have also affects the nocturnal activities and behaviour of the animals, and not forgetting their disturbed mental health. The sanctuary is also plagued by shortage of staffs and patrolling basics like vehicle to monitor the sanctuary and protect it from hunters, NFTPs collectors and illegal log fellers.

From ongoing four years of study, around 7-8 elephant corridors have been identified. Due to expansion and other anthropogenic activities in Nagaland as well as in counterpart, an important corridor connecting Nagaland from Wokha via Bokajan which is the Nambhor WS corridor to Wokha district was totally cut off and hence the migrated elephants from the sanctuary are unable to return back and became resident elephants in Wokha. Whereas, habitats in district like Nuiland were totally lost due to the conversion of forest to farmlands and settlements. A total of 7 villages in Zunheboto and 5 villages in Mokokchung experienced HEC after a gap of nearly 50 and 20 years respectively, as an after-effect of Doyang Hydro Project which was commissioned in the year 2000. Remaining corridors are also taking a toll slowly with ever-increasing mining, conversion of forest land for fast cash crops, settlement expansion, etc.

Apart from inter-state corridors there is an urgent need to protect the habitats within the state. Increasing habitat fragmentation due to mining, stone quarry, mono-plantation for fast cash, logging, jhum and population expansion are a threat to elephants population and their mental health. Some of the important current inter-district corridors are as follows:

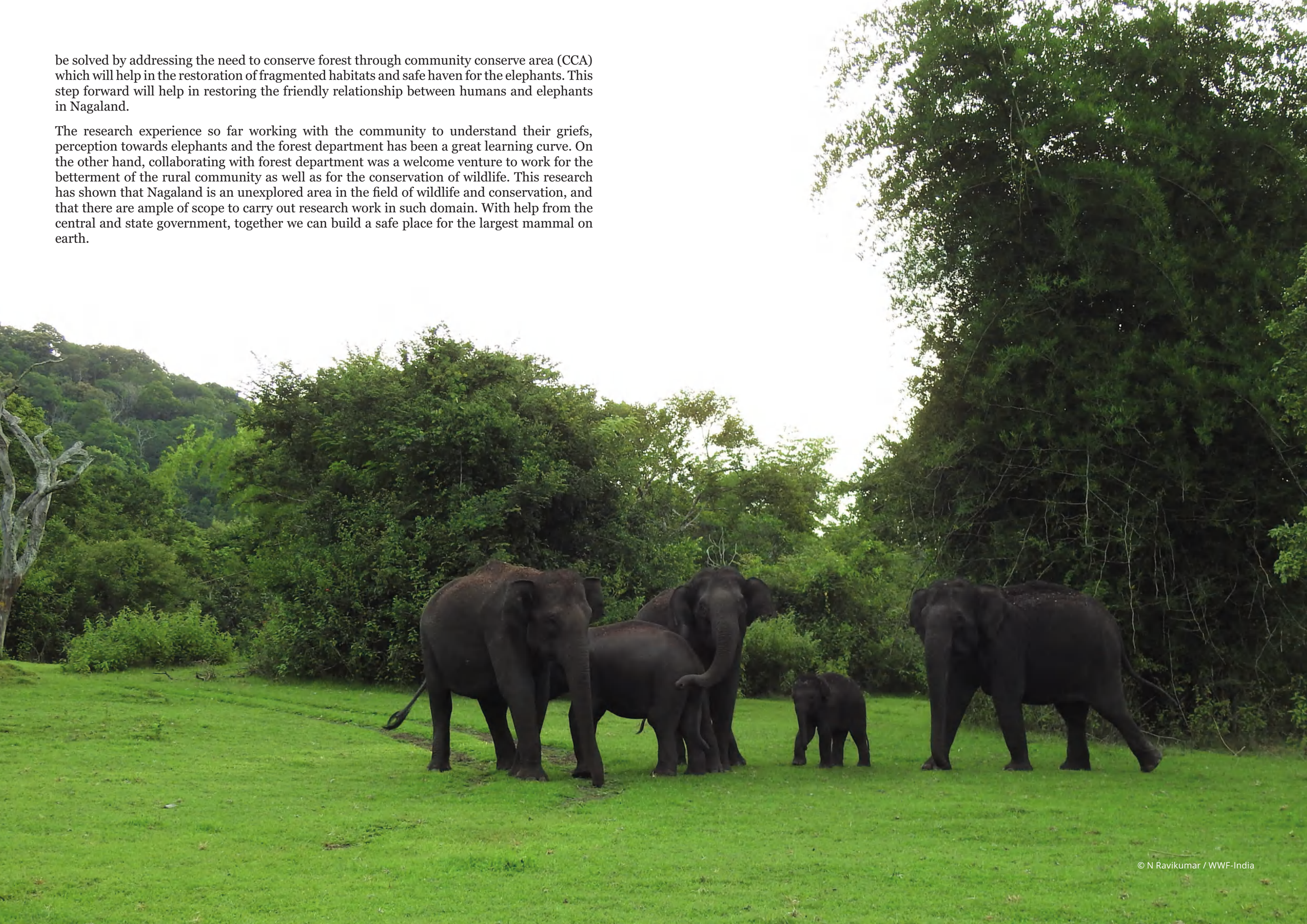
1. Upper range of Wokha connecting with Zunheboto via Doyang river.
2. Doyang beat via Mekokla, Wokha connecting with Changki and Aliba village of Mokokchung.
3. Changpang range, Wokha with Longtho range, Mokokchung.
4. Tuli range, Mokokchung with Sitap range, Longleng.



Apart from the above mentioned inter-district corridors, an important corridor that has been affected badly due to coal mining, stone quarrying, mono plantation apart from jhum cultivation and settlement expansion is the Tuli-Sitap-Naginimora range corridor which has prevented elephants coming from Geleki RF to connect with the Singphan WS in Mon. Thus, the forest department need to do lots of awareness and sensitization programmes in order to protect and secure both the inter-state and district corridors for safe passage of elephants and other wildlife from one habitat to another. The survey so far suggests that the only way to achieve the protection and conservation of the elephant population, corridors and their habitat in Nagaland is by management of HEC which can be done foremost by dispensation of compensation to the affected families (only 20-30% affected families receives, that too at a very minimal rate~10-30% of damage incurred), timely sensitization and awareness campaigns which is currently deprived of, working out of mitigation plans for HEC and habitat management, etc. The adversity of the increasing elephant population and declining habitat due to fragmentation is causing the rise of HEC in Nagaland. This problem can

be solved by addressing the need to conserve forest through community conserve area (CCA) which will help in the restoration of fragmented habitats and safe haven for the elephants. This step forward will help in restoring the friendly relationship between humans and elephants in Nagaland.

The research experience so far working with the community to understand their griefs, perception towards elephants and the forest department has been a great learning curve. On the other hand, collaborating with forest department was a welcome venture to work for the betterment of the rural community as well as for the conservation of wildlife. This research has shown that Nagaland is an unexplored area in the field of wildlife and conservation, and that there are ample of scope to carry out research work in such domain. With help from the central and state government, together we can build a safe place for the largest mammal on earth.



Management of captive elephants during musth

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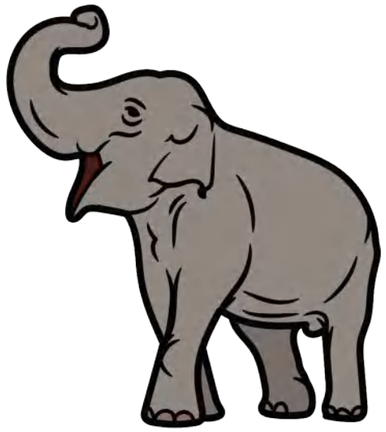


Musth is a physiological phenomenon, occurring annually in male, Asian elephants. Physiological changes are accompanied by changes in behaviour as well. It was observed that musth occurred more regularly, in well-nourished elephants, between the age group of 21- 80 years. Adolescent musth or Juvenile musth was observed in elephants of age group 15-20 years. The training or handling during juvenile musth, moulds the elephant's character. The average duration observed was 2-3 months. However, in some cases upto 5-months duration also observed. Musth period is divided into three phases: pre-musth, mid-musth or violent musth and post-musth. Musth is a very dangerous period for handling. Elephants become aggressive and become out of control and cause damage to life and property. Musth management in captivity, has always been a problem. However, by taking some precautionary measures, it is possible to overcome this problem.

Some measures are discussed below:

- It is essential to chain or restrict the elephant's movements during musth on account of the violent behaviour. The chains have to be tested for their condition. The musth elephant is chained both by the hind and front legs. One of the forelegs is chained to any tree or a pillar in the front. This arrangement makes it safer for the mahout. He can approach the elephant from behind, to clean the tethering area, and also to move the chain from one leg to another
- Elephants may pull and fiddle with their chains during musth. They do not do this when they are not in musth. Therefore, special musth chains must be used. It is ideal to use a chain or fetter with 7/8" diameter links. The chains also must be fitted with ' U ' shaped clamps with strong screws. There must be a distance of 2 feet, 60 cms between the tethering pole and elephant's hind leg. The chains and fastenings must be double checked.
- It is also sensible to keep spare chains, for emergency. A circular loop (a ball and socket like joint) should be present on the chain. This allows the chain to twist without breaking.
- During musth, elephants have to be chained for long periods, until it becomes safe for mahouts to handle. Care should be taken to avoid chain sores on the elephant legs due to prolonged chaining.

  Mahouts must attempt to move the chains up and down the leg, with a long pole. He must stand behind the elephant to do this. Captive elephants should be properly trained to allow chains to be transferred from one leg to another even during musth, to avoid chain sores.

The mahout must check the strength of the tree to which the elephant is to be tethered. The surroundings must be clean and hygienic. The tree must be large enough to provide plenty of shade.

- During musth, elephants are agitated by the slightest noise, from traffic or people. So, they must be left alone.
- A water tank, with constant supply of running water, must be provided. It must be placed at a distance reachable to the elephant's trunk. The tank must not be too close to the elephant, as it may destroy it.
- The elephant must be showered with water at least once a day, to cool it.
- The tethering site must be on a slight incline to facilitate drainage of urine and dung.
- The mahout must be present in the vicinity, throughout the musth period.

I. Pre-musth-Symptoms

- Engorgement of temporal glands.
- Quick response to commands, i.e. quick movements
- Frequent sniffing of mahout and people with trunk
- Swift changes in moods and behaviour
- Fixed gaze. Elephants stare at objects for a long time.
- Saliva dribbles constantly from the trunk.
- Eyes appear bright and red
- Elephants dig around the tethering area
- Discharge observed at the temporal gland openings.

This initial discharge is a dirty brown, viscous fluid, with a strong smell. This fluid may sometimes block the temporal opening or the opening may be too small to allow the free flow of fluid. Both these conditions are very uncomfortable for the elephant. It may scratch the region with a twig or any other sharp object. This may injure the area and cause an abscess. The gland on that side may stop secreting fluid and may require surgical/ medical intervention. On noticing signs of discomfort due to blockage, the mahout must assist the flow, by squeezing out the fluid.

- The perineal region, below the tail, enlarges. This is a very obvious symptom.
- The penis will emerge to its full length and elephant will masturbate frequently. The penis strikes against the stomach, resulting in ejaculation of seminal fluid. Sometimes the penis emerges to its full length and trails on the ground. The mahouts may have to prop it up with a cloth, to prevent abrasions.
- Urine dribbles constantly and the medial part of the thigh remains wet.
- Elephant exhibits a tendency to gore any moving or non-moving object that catches its attention. The mahouts must be careful while approaching the elephant. Many ignorant mahouts are unaware of the danger. They get killed or severely injured while approaching the elephant during this period.

II. Mid or violent musth-Symptoms

Initial phase of violent musth

- The secretion of fluid is slow and it is viscous in nature.
- Behaviour continues to be unruly. It disobeys commands and will react violently on hearing mahout's voice.
- The body is stretched, taut and stiff. The trunk is extended forwards as if reaching out for something. The ears are spread out as if listening intently for sounds.

Middle phase of violent musth:

- The temporal fluid flows faster (like teardrops) and has a pungent odour like that of gunpowder or fermented Jasmine and can be recognised from a distance.
- Some elephants may have a red colour around the temporal region.
- Behaviour continues to be aggressive. The trunk is beaten on the ground as an indication of discontent and anger.
- Tendency to pull more violently at chains and tethers.

- Lack of appetite. Some elephants are offered palatable foods like banana stems during these times.

Final phase of violent musth:

- This phase may last for a month.
- The glands reduce in size and the flow of the musth fluid subsides
- Normal urination with protrusion of penis.
- The elephant becomes less aggressive and violent and starts obeying commands.

III. Post musth:

- This is the final stage of Musth
- The gland is regressed and the flow of fluid stops completely
- Urination is normal
- The behaviour reverts to normal and obeys the commands.
- Mahouts must continue to be careful while handling.

The elephant must have restraining chains on its body, while being moved around, right after musth.

Provide *adlibidum* drinking water and shower with water, 2 - 3 times/ day.

Showering water in the temporal region regularly will not only cool down its temperament but also help in removing the block in the temporal opening facilitating easy drainage.

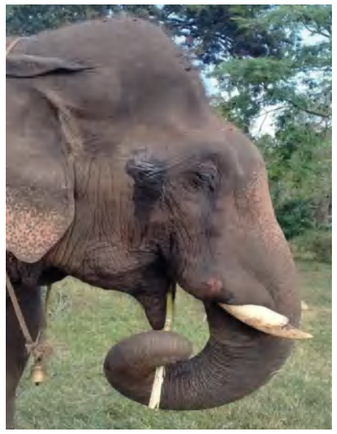
A combination of Flutamide @ 500 mg, Haloperidol @ 100mg and Potassium iodide @ 20mg orally, once a day for 3 days may be effective in therapeutic control of the aggressive behaviour. This should not be used to stop the regular musth.

In a protected and free contact system, the construction of separate musth enclosures/ pens consisting of two compartments divided by a sliding door operated from outside should be considered. This would ensure the elephant is kept safe and able to be shifted between the two compartments of the musth enclosure. Modern zoo facilities provide such enclosures for protected contact management of their males.

STAGES OF MUSTH

Stage	Signs	Period
I. Pre-musth	Frequent rubbing of temporal gland opening with the trunk or other materials. Erection of the penis with enlargement and attempts for masturbation. Enlargement of the temporal gland and oozing of fluid. Swelling at the perineal region. Unruly behaviour and ears are spread out. Aggressiveness	10-14 days
II. Musth (Violent musth)	Penetrating, more viscous, pungent secretion from the temporal glands. Red mark around the temporal region. Dribbling of urine from the un-erected penis. Increased alertness. Unusual vocalization. Stiff and tense body. Charging or destructive tendency. Fully open eyes with rowing eye balls.	30-40 days.
III. Post-Musth	Reduced secretions Normal behaviour and urination	Rest of the period

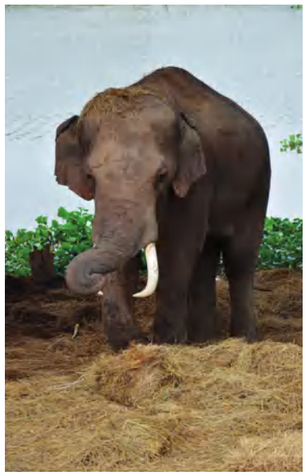
MUSTH ELEPHANTS



Musth Secretion

Tethering Area

Elephant tethered in isolated place with plenty of shade and water



Field Tips for mahouts::

Every elephant has its own onset, duration, periodicity and behaviour during musth.

A mahout must know his elephant's musth period, duration, and temperament during musth. It is advisable to tether the animal in the early stages of musth. Mahout must be able to read the symptoms of musth and take necessary precautions. Arrogance and carelessness on his part will not only endanger his life but also the lives of other innocent people. Elephants do not necessarily exhibit the same behaviour every year. A mahout may be working with a particular elephant for a long time and it may be docile, even in musth. Yet, it is wiser to take precautions to prevent accidents.

If an elephant is handled correctly during the juvenile musth period, it may be manageable in musth, during its adulthood also. Such elephants are manageable even in musth. Mahouts are able, to carry out regular activities such as bathing, fodder collection and work, even in musth. Musth should be a rest period for the animal and it must not be allowed to work, during this time.

After the musth has subsided, the mahout must be very cautious before unchaining the elephant as it is almost like breaking a new, or wild elephant. A mahout must be around his elephant during the entire musth period. This will ensure confidence and improves bondage and trust between them.

Elephant Endotheliotropic Herpesvirus: Major threat for conservation of Asian elephants in India

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Asian elephants, the majestic mega vertebrate being invariably interlaced with the cultural heritage and religious mythologies of the Indian sub-continent, is the national heritage animal of India. Asian elephants are described as an "iconic cultural species" due to their sacred importance in daily lives, cultures, and religious mythologies in several countries. Asian elephants are considered as "keystone species" because of their role in ecosystem balance. By virtue of their large foraging area, conservation of elephants will protect other animals inhabiting the same area and hence they are considered as an "umbrella species." The population of Asian elephants has declined almost 50% over the last few decades. Recent studies reveal that the population of the wild Asian elephants in India ranges from 29,391-30,711 individuals, representing almost 60% of the entire Asian elephant population, which is a declining population trend.

The megafauna is currently categorised as endangered by IUCN report and hence the highest level of protection is conferred. Asian elephants are categorized under Schedule 1 of the Wild Life (Protection), Act (1972) of India as well as listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The population of Asian elephants has plunged over the past decades due to several anthropogenic activities. Habitat loss and fragmentation, poaching, human elephant conflict, natural calamities, infectious, and non-infectious diseases are notable threats faced by the Asian elephant populations in India. Asian elephants are susceptible to infectious and non-infectious diseases.

Globally, the Asian elephant herds are witnessing a dramatic decline in their population statistics due to fatal haemorrhagic disease caused by a herpes virus. The virus was identified as Elephant endotheliotropic herpes virus (EEHV) which causes acute haemorrhagic disease particularly in juvenile Asian elephants (EEHV-HD). The first case for the disease was documented in 1995 from North America. In the last three decades

Asian elephants are facing a serious threat, since, EEHV infection has become one of the main causes of death of juvenile elephants throughout the world including India. It was in 2006 that the first case of EEHV associated fatality was reported from an Asian country, wherein death of a calf was reported from Cambodia. Further, isolated case reports of fatalities of Asian elephant calves in captive facilities have been reported from Myanmar, Thailand, Nepal, China, Laos etc. This has intensified the screening and surveillance of EEHV among Asian elephant populations in these countries.

In 2013, the first case of EEHV-HD was documented from Kerala. Thereafter reports of elephant mortalities with acute haemorrhagic disease were reported from Assam, Tamil Nadu, Odisha and Chhattisgarh etc. The virus is classified under the betaherpervirinae subfamily of the family Herpesviridae under the Proboscivirus genus. Currently, eight distinct genotypes of EEHV have been identified, viz., EEHV1A, EEHV1B, EEHV2, EEHV3, EEHV4, EEHV5, EEHV6, and EEHV7, out of which EEHV1A, EEHV1B, EEHV4 and EEHV5 affects Asian elephants. Transmission of herpes virus is generally associated with direct mucosal contact, but droplet and fomite infection are also common. Aerosol and mucosal spread during nuzzling and licking may be the common mode of transmission among elephant populations in captivity. The trunk secretions can also act as a route for virus transmission.

Recently, it is reported that intestinal contents and saliva also can act as sources for transmission of virus among elephants. The hallmark feature of the disease is the acute onset with systemic multi-organ haemorrhages. The disease is rapidly progressing and the clinical course ranges for a period of one to seven days. Diagnosis of EEHV-HD can be done using clinical signs, pathomorphological lesions, PCR, qPCR etc. Inhouse EEHV diagnostic kits like ELISA using glycoprotein B were developed recently.

Treatment of EEHV-HD is very challenging and mostly antiviral medications often used in human medicine to treat herpesvirus infections are used in this disease but with a poor and unreliable success rate. Herpesvirus infections can be treated using nucleoside analogues such as famciclovir, acyclovir and ganciclovir. The large numbers of non-survivors from the antiviral therapy indicates the need of early detection followed by symptomatic treatment and supportive medical care including fluid therapy, antibiotics, and analgesics.

Major Challenges of EEHV-HD management

- Complex pathology and pathogenesis of EEHV
- Lack of effective routine screening and monitoring procedures
- Lack of detailed knowledge on the prevalence of EEHV subtypes in India
- Circulation of virus in free range elephants
- Challenges or failures in isolating the virus
- Lack of knowledge of disease among forest officials and veterinarians
- Lack of well-developed diagnostic infrastructures in captive facilities
- Non-Availability of commercial vaccines/ diagnostic kits
- Non availability of effective anti-viral drug for treatmentLack of effective biosecurity measures

The Centre for Wildlife Conservation, Management and Disease Surveillance, ICAR-IVRI, Izatnagar, Bareilly was awarded DST-SERB funded project entitled “Patho-epidemiology of elephant endotheliotropic herpesvirus infections affecting Asian elephants (Elephas maximus) in India” in Dec 2020 for three years. Salient achievements of the project are mentioned below:

A total of 267 captive elephants housed throughout India were clinically examined and samples (blood, trunk wash fluids and rectal swabs/dung) from all elephants were screened for EEHV genome by PCR and qPCR. A total of 62 elephants were found positive for EEHV genome. These positive samples were also confirmed as EEHV1A subtype by semi-nested PCR using U38 gene primers. qPCR revealed the mean cycle threshold (Ct) value for clinical samples was 34.0 indicating an average copy number of 1.35 x 10^2 /µl of the sample (10^1 -10^4 viral copies/µl of the sample).

Clinical examination and collection samples in Asian elephants at various captive facilities

Similarly, 100 cases of dead elephant viscera (necropsied or sample received) were screened for EEHV genome, 24 cases were positive for EEHV1. Out of 100 cases of elephant mortalities, 13 cases were suspected to be fatal EEHV-HD with associated clinical signs. Out of the 13 cases of EEHV-HD outbreaks, 3 were captive, 7 were of free-range condition and 3 elephants were wild rescued and rehabilitated. All the elephants that succumbed were calves and sub-adults. The clinical signs of EEHV-HD associated death were observed like lethargy, anorexia, fever, recumbency, shivering, cyanosis of tongue and buccal mucosa and oedema of the head were observed. However, the calf succumbed to death within 12h. Gross lesions of EEHV-HD includes swollen face and neck due to subcutaneous oedema, diffuse cyanosis and petechiae of the buccal mucosa and tongue, acute vascular changes like congestion and haemorrhages were evident in majority of the visceral organs.

Major changes were noted particularly in the microvasculature comprising the capillaries, venules, and arterioles. In a few cases microthrombi formation was noticed in the vasculature of heart, liver, lung, and kidney. The endothelial cells showed swelling and denudation with apoptotic bodies. Most of the apoptotic endothelial cells were denuded and accumulated in blood vessel lumen. Amphophilic to basophilic intranuclear inclusion bodies in endothelial cells lining the vasculature of tongue, heart and liver was observed. Immunolabelling for EEHV DNAPol proteins revealed intense signals in the microvasculature, mainly capillaries and venules of various organs. The viral load in EEHV1 confirmed necropsy tissue samples was quantified using qPCR. The cycle threshold (Ct)value in tissue samples ranged from 16.6 to 27.24 in EEHV-HD cases. The mean viral copy number was highest in heart (viral copy number = 7.4 x 106 /µg of tissue sample) and least in brain (viral copy number = 9 x 10^3/ µg of sample). The positive samples (both carrier and EEHV-HD cases) were sequenced for EEHV1 specific genes (U38, TER1/U60, HEL1/U77 and vGPCR1/U51) in were done. The sequences were blast analysed at NCBI database and found gt;99% identity with EEHV 1A.

From the above findings it was concluded that:

- Percentage positivity of EEHV1 is 23.22% (clinical study) with highest percentage positivity obtained in rectal swabs followed by trunk wash fluid and blood. Therefore, a rectal swab is the best sample of choice for screening.

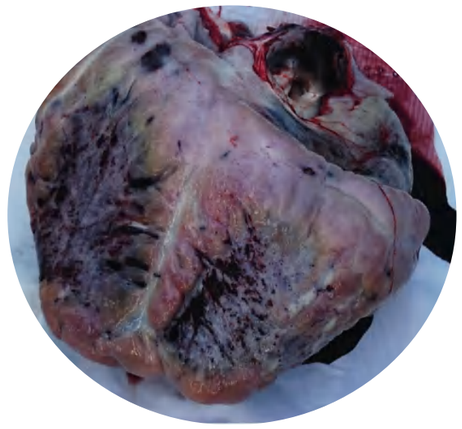
- The amount of viral load obtained in the clinical samples indicate that adult healthy elephants can act as asymptomatic carriers.
- Fatal cases of EEHV-HD occurred in both captive and free-range elephants with typical pathomorphological changes.
- The heart had the highest mean viral load and may be targeted as a sample of choice.
- EEHV 1A subtype is circulating predominantly among captive and free-range elephants in India

It is important to protect the Asian elephants from the lethal disease. More intensive screening is needed to establish the status of the disease in the wild as well as in captive populations. A holistic approach will be required to create a point of care diagnostics to confirm the lethal virus at the sub-clinical stage. The key knowledge gaps concerning the occurrence and epidemiology of EEHV subtypes circulating among Asian elephants in India remains unexplored in large populations or region wise. Similarly, it is important to develop specific antiviral therapy or vaccines to protect the endangered Asian elephant population in India.

Carcass of elephant calf with swollen face and neck (ERRC, Surajpur)

Free range sub-adult elephant with cyanotic buccal mucosa (Nazimabad Forest Division, Uttar Pradesh).

Diffuse cyanosis of tongue in elephant calf died of EEHV-HD (ERRC, Surajpur)



Diffuse epicardial haemorrhages in the heart of elephant calf died of EEHV-HD (ERRC, Surajpur)

Tusks and fences: the dilemma of human-elephant coexistence

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As their huge stature suggest, elephants have a huge role in shaping and maintaining various ecological functions. Elephants in general are also known as 'ecosystem engineers' because they help in structuring and regenerating the ecosystem, maintaining the habitat heterogeneity and biodiversity, and enhancing nutrient cycling. Moreover, they are keystone species that help to maintain the rich biodiversity of the landscape that they inhabit by helping the survival of many other species directly and indirectly. However, the human developmental activities threaten the survival of these gentle charismatic species majorly through habitat loss, fragmentation and poaching.

Is elephant really a villain?

How would you feel to know that the path you used to roam around daily and the places you reserved to play and eat, suddenly vanished and taken over by a multinational company for constructing a shopping complex? What if you have no other ways to move around other than crossing the shopping complex? As a human being, with advanced intellect, we may adapt to the new surroundings slowly, or construct an alternative path for moving, or in the worst scenario, abandon the area and move out in search of a new place for living. Now, imagine a herd of elephants in the same situation.

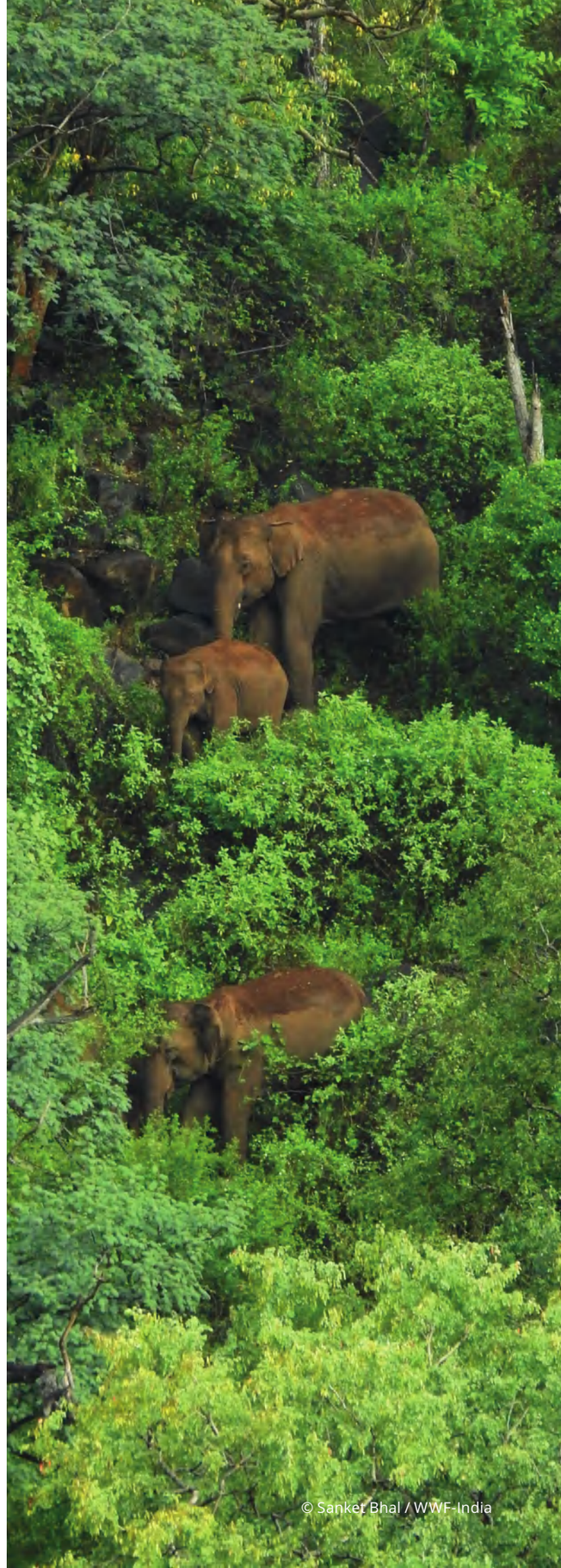
How would they feel when all of a sudden, the natural forest they inhabited for years is fragmented or converted to a concrete jungle, the path they regularly used for movement vanished leaving no alternate paths. Unlike humans, elephants have a wide home range and require vast area for sustaining their dietary and reproductive requirements. In such a situation, these large mammals have to either adapt to the surroundings and utilize the available resources, probably creating a conflict environment with humans or shift their home to a different geographical location which in turn can create conflict in the new location. In addition to these 'developmental' activities that lead to fragmentation or loss of functional habitats for elephants, there are several other issues faced by elephants within their habitat.

Herd of Asian elephants moving from Hosur, Tamil Nadu towards Karnataka State

The increased grazing pressure by livestock is one such emerging threat to Asian elephant (Elephas maximus) population. Livestock grazing pressure can indirectly affect the elephant population in two ways: firstly, the risk of invasion of weeds like Lantana camara and Prosopis juliflora, increase with the grazing pressure of livestock that will in turn decrease the abundance of native plant species (including elephant fodders), eventually forcing the animal to move outside the forest for food.

Since elephants consume around 150 kg of vegetation in a day, their presence outside the forest area, especially in agricultural lands will lead to increased crop damage and the associated loss. Secondly, the possibility of spreading disease from livestock to the wildlife as a result of shared resources can lead to threatening the life of the animal. In the long run, it may lead to the shrinkage in the range of the species or can even result in the extinction of the animal itself because of the inbreeding and demographic/environmental stochasticity.

Due to the increased resource-use overlap with the elephants and humans, the risk of human-elephant conflict is also more, taking a toll on both the lives and welfare of humans as well as elephants. When humans face loss in terms of crop depredation, life or property, they tend to retaliate by poisoning or electrocuting the animal. In fact, Asian elephant is one of the top-ranked large mammal species in the wild that causes economic burden to the local people in India and the most common form of the human-elephant conflict is crop-raiding. But do you know the underlying reason behind this? Although elephants are used to feed on wild vegetation, once they catch the taste of cultivated crops that is rich in sugar and low in fibre content, these animals get attracted to crops in the agricultural areas located adjacent to forests. For them, agricultural crops provide instant, nutrient-rich, easy palatable food. Moreover, the effort and energy invested to obtain the cultivated crops in forest fringes are worth compared to regular wild vegetation.



It will be like having biriyani instead of the regular meals (rice/roti with curry) that we usually have! So, it seems rational for the elephants to go in search of agricultural crops in such areas! But this is not the only reason for human-elephant conflict. The increased human interventions near and inside forest habitats are another major reason. India is now the most populated country in the world according to UN and holds the largest population of Asian elephants. In order to fulfil the needs of growing human population, developments in the form of road and rail networks, housing areas, agriculture and infrastructure facilities are essential for welfare and improved life standards of humans. Although the principles of development for the welfare of all humans is ideal, the reality is otherwise.

The ownership and the distribution of natural resources are not equitable in our country and these are influenced by the forces of market, economy, capitalism, political ideologies and policies. Therefore, the increased fragmentation and encroachment of forested areas in the name of developmental projects are not justified both ethically and ecologically. Adding injury to insult, these interventions also have an adverse effect on the life and survival of wildlife inhabiting in these habitats especially large mammals like elephants.

As long as there is human population expansion, unequal distribution and exploitation of resources, and developmental activities continuing to fragment forest ecosystems, human-wildlife conflict is bound to happen and it will increase in future. A sustainable alternative to curb this issue of conflict is to understand the problem from an ecological as well as anthropological perspective, develop a transdisciplinary approach by the involvement of all stakeholders including those affected and create a sustainable future where there is co-existence instead of domination by humans.

Western Ghats and human-elephant conflict

The entire range of Western Ghats especially the states of Kerala, Tamil Nadu, and Karnataka host the highest densities of Asian elephants in India.

Contiguous forests of Protected Areas (PAs) are the primary habitat for the elephants. Because of the limited expansion of PAs, elephants utilize the buffer regions of PAs and Reserved Forests for their regular movements and migration. However, there are numerous human settlements inside and adjacent to these protected areas, particularly in the buffer zones of the PAs. These inhabitants are mostly dependent on forest and its resources including firewood, herding livestock, water, non-timber forest produces, religious needs, medicine and fodder for living. Moreover, the environment of these forest areas has been subjected to developmental activities such as the construction of hydro-electric power stations, mining, and quarrying, alteration of natural forests for the cultivation of monoculture crops such as tea, coffee, eucalyptus and wattle.

In these landscapes where natural forests have undergone immense modification to monoculture plantation, human-elephant conflict is inevitable. Bringing down the incidents of conflict and damage to a tolerable limit can be achieved only through effective implementation of mitigation measure by giving attention to the landscapes and movement pattern of elephants. This appears to be a viable solution to ensure harmonious existence of people and wildlife in such forest ecosystem.

Conflict management strategies

In India, forest departments have initiated several measures to alleviate the human-elephant conflict such as electric fences, Elephant-Proof Trenches (EPT), relocation of conflict animals, and monetary compensation schemes. However, these measures have not provided a long-term solution or hope to the existing conflict issues. Moreover, it is imperative to address the issues related to the PA management for effective conservation of the Asian elephant. In addition to this, cheaper and harmless potential mitigation measures such as bio-fencing, usage of natural deterrents, masking the smell of the crops or agents that can repel the animals, changing crop pattern etc. can be used to mitigate conflict in households to an extent. Furthermore, Early Warning Systems (EWS) using mobile technology and drones can be applied in the high conflict areas to aid elephant drives.

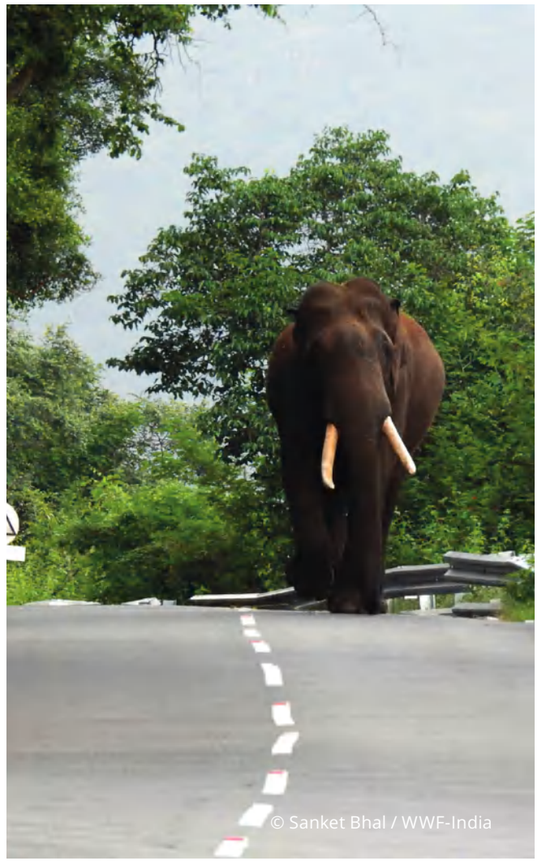
Solar fence to mitigate elephant conflict at Hosur Forest Division, Tamil Nadu

The human-wildlife interface areas between the forest and agricultural landscape needs to be given conservation importance in terms of minimizing the wildlife conflict, by avoiding encounters between humans and wildlife while maintaining the free movement of animals.

Some of the practical solutions to add up to the existing mitigation measures would be to make use of the novel technologies and information to identify priority conflict hotspots and the ecological and anthropogenic determinants of human-elephant conflict. Moreover, studying the level of success achieved by the employed conflict mitigation measures and making suitable changes and improvements to it can provide better solutions for human-elephant conflict. Many places succeeded in minimizing the conflict with the selective combination of mitigation measures (e.g., combination of EPT and solar fencing) by considering the type of conflict and the landscape. However, the complete eradication of conflict was not possible. Providing timely compensation to the affected household is also an important mitigation measure to minimise the negative attitude of local communities and promote conservation attitude in them. Without the support of the local communities in conflict area, it is nearly impossible to successfully implement or initiate any mitigation strategies. Changing the cropping patterns, using early warning systems through mobile technology, radio collaring and drones in the high conflict areas can also help to reduce human-elephant encounters and conflict to an extent. Radio-collaring technique has recently been in the news when it was used by Kerala Forest Department for monitoring the activities of a translocated rogue elephant (locally called 'Arikomban'). When the radio collar is fixed with accelerometer, the exact activity and movement of the animal at a particular location can also be studied.

Conservation of elephant or any other species in wild will be incomplete without conserving their habitats. For elephants, conserving the elephant corridors, identifying the bottleneck areas and habitat restoration of the degraded forests can effectively improve the occupancy, gene flow and viability of the population for long-term conservation. These conservation efforts will also reduce the conflict between humans and elephants as elephants can once again carry out their biological requirements like movement and foraging inside the forests. Initiatives for minimising tourism activities in large mammal corridors should be undertaken. Elephant dispersal can further be improved by planting timber trees along the corridors located in private lands. Decreasing the livestock grazing pressure and eradication of weeds within the forest boundary is another important measure to improve the habitat quality for elephants. The habitat quality can be improved by constructing artificial water holes, especially in the drier areas. The appropriate location for the water holes in drier landscapes can be identified using soil-water isotope-based approach, so that chances of animal roving outside the forest areas for water will be reduced, especially in dry seasons.

Human-elephant conflict is not an issue that should be viewed in isolation, instead it has to understood as a result of numerous human driven modifications of forest ecosystems. The spread of invasive species, encroachment of forest lands for various mining and quarrying activities, agricultural activities in the forest fringes and rapid urbanization and plantation activities in areas where it was once lush green forests have all contributed to this problem. There is no one solution to solve this conflict. Moreover, ecological problems should be understood from various perspective and viewed as a multifactorial issue so that the mitigation measures should be carefully developed to address all these factors. Furthermore, the understanding and attitude of people towards elephant conflict should be scientifically addressed and any pseudoscientific concerns should be discouraged. Without understanding the anthropogenic influence on the problem as well as on the solution, it is very difficult to progress into a sustainable and co-existing society.



Herd of Asian elephants moving in Coimbatore Forest Division, Tamil Nadu

340 days and counting: Aiding elephants seeking a home in Maharashtra.

Shri Sunil Limaye

IFS, Ex-Principal Chief Conservator of Forests (Wildlife) & CWLW, Maharashtra

Ms. Neha Panchamiya

Founder and President, RESQ CT

Shri Nachiket Utpa

Director – Human-Wildlife Interactions, RESQ CT

Shri Tuhin Satarkar

Director– Wildlife Management, RESQ CT

I took over as the Chief Wildlife Warden of Maharashtra in July 2021 and biggest challenge before me was human-animal conflict especially tigers and panthers, as well as crop depredation by herbora but suddenly in October a mighty herd of elephants entered on the canvass of Maharashtra's landscape. All of sudden the entire forest department was put on critical alert mode. I had a detailed talk with our honourable Chief Minister and a simple directive was provided by him "don't drive them anywhere, just take care of our people from any attacks and let the animals go where they want to on their own". That was a great decision by the green government.

As the news poured in, a herd of nearly 23 wild elephants wandered across the Chhattisgarh border to the forests of Gadchiroli in eastern Maharashtra. They entered Maharashtra near Kanhargao Tola village, about 25 kilometres from the Chhattisgarh border, trampling some farmland but eating nothing from near human habitations and attacking no one. Initially, they were bound for the surrounding forests which are thick and mixed with old growth, offering the elephants their favourite young green bamboo shoots and leaves interspersed with patches of grasslands within the forests. As time passed, they began wandering in and out of the reserve forest, chancing upon paddy fields and hamlets and then disappearing back into the safety of forests. Their movements seemed to indicate a preference to avoid human habitation.

While the local community was apprehensive, I spoke with my friend Neha, who runs an organisation called RESQ Charitable Trust. I regard her more as "forest officer" in the civil society and so I sought her assistance to forest department in tracking the elephant movements to avoid human-elephant conflict. I visited the villages in Malewada and nearby hamlets with local forest officers, spoke with the locals, discussed our strategy with them.

Then I had a detailed discussions with revenue and police administration and ensured their full support to the forest department. Efforts put in by the Maharashtra Forest Department and with the government support contained any major retaliation in the area and by February 2022, the herd had moved back to Chhattisgarh.

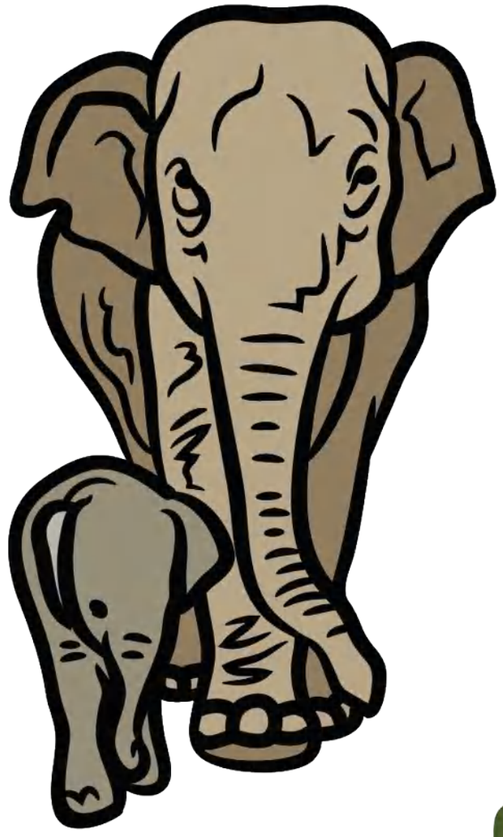
This herd has been monitored for over a decade by Odisha and Chhattisgarh states, and while the reason for their steady southward movement is unclear, it was obvious that the constriction in the forested areas, unrestricted construction of infrastructure projects, and mining in those states have finally forced the elephants to keep moving. But we were sure that in 2022 again the same herd with more elephants would certainly visit Maharashtra as this landscape is one with forests, ample water and vast expanses of paddy fields. These make an excellent habitat for elephants and we were totally prepared to welcome these guests.

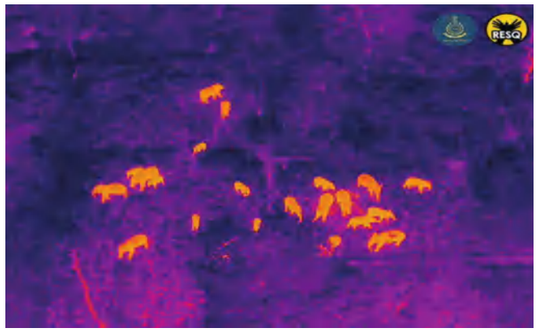
In July 2022, the same herd returned to Gadchiroli, Maharashtra and while they remained close to their movement path from 2021, they began exploring newer regions in the eastern part of the state. Human injuries and deaths due to the elephants were minimal, however, crop raiding had gone up greatly and the tolerance of the community had been massively fluctuating between ignorance to flare-ups and retaliation.

Once again the forest department began actively communicating with local people, district administration and forest officers of Chhattisgarh. For more reasons than one, Gadchiroli is a challenging landscape to monitor wildlife on foot, and thus the herd composition, behaviour and movement patterns of this elephant herd remained largely unknown. Last year we had observed that when they were at the Brahmapuri and Wadsa border, the forest department teams on ground prepared to manage any situation that would arise but predicting where the herd was and where on-ground efforts should be focused was a challenge. Here the entire team of RESQ, spearheaded by Tuhin Satarkar, who manages all wildlife-related field operations at RESQ CT had been using Thermal drones (UAV) effectively to manage human-leopard conflict situations in western Maharashtra for over a year. Thermal drones (UAVs) make the invisible visible when you need it the most.

So as per my request Satarkar headed to Gadchiroli with the RESQ team. They worked with the Gadchiroli and Wadsa Forest Division officers as well as other NGOs like Stripes and Green Earth Foundation (SAGE) and Farmers for Forests, each who played a crucial role in handling a species that was relatively new to the community there.

The elephants would rest during the day in the forest areas and their movement would generally begin post dusk. It was risky for a limited number of individuals to track this herd on foot in the landscape there. Using the thermal drone, we were able to safely observe the elephants' herds composition and behaviour from a distance. Also, it does not disturb the animals as it is quite silent and works well even if observed from a 100+ feet height from ground. Most importantly, its thermal ability allows for safe monitoring at night which is what is needed for elephants and this really helped us to alert locals to avoid any possible interface with elephants.



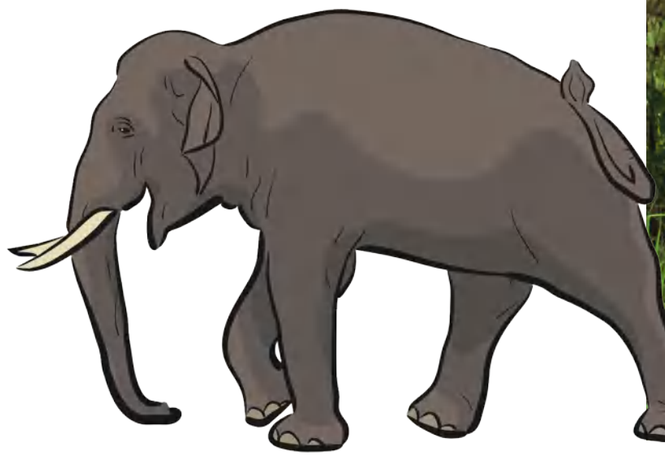


This is the first time in India that wild elephants have been monitored using thermal UAV. From multiple captures of the thermal drone, we got to know that the herd is 23 in number which includes 6 young calves. We also got to know that if left relatively undisturbed, the herd does far less crop damage in the fields and that they only need to be deterred if they come too close to villages. Wild elephants are new to the people there, to avoid human casualty and harm to the animals, we, as a welfare department actively worked on ensuring speedy compensation. The teams on the ground were also proactively conducting community awareness programs to sensitize villagers and educate them about safely living around wild elephants.

One of the challenges that my staff and the RESQ team faced was the heavy rains, because it is not possible to fly the drone when it is raining. The thermal drone is a complementary tool in the management of human-wildlife conflict and can be used in conjunction with other management tools like early warning systems (EWS), on ground tracking, community outreach efforts, forest development etc. which we as the Forest Department actively enabled.

Human-elephant conflict or HEC creates considerable economic hardships for the affected farmers and has proved to be quite intractable and managing HEC is a big problem for forest officers and frontline staff, who have to deal with it, often on a regular basis. Often, they have to face the ire of the affected farmers, especially when there is a human death or severe injury. There are innumerable incidents when frontline staff have faced the ire of affected people due to HEC, sometimes at risk to their personal safety. Considering these factors, management of HEC is one of the most important issues that need to be addressed in a planned way for conservation of elephants and protection of the community, which is relatively new to dealing with HEC. Going forward, I am certain that as the forest department with the total support from the State and Central government and help from NGOs like RESQ CT, SAGE will deal with upcoming issues successfully.

Now this herd of 23 wild elephants have completed more than 330 days stay in Maharashtra. They are currently in Navegaon National Park, which is in Gondia district of eastern Maharashtra and have been there for over 50 days. There is ample availability of elephant friendly trees and water bodies which are a boon for them. Special Tiger Protection Force personnel and Gondia foresters along with SAGE team are tracking and monitoring them on a regular basis. The first visit of wild elephants to the state via Gadchiroli began on 21st October 2021 and it lasted for 148 days. The elephants came back to state again on 12th August 2022 and are continuing their stay barring a brief crossing of state border rather peacefully. The herd has one tusker, six calves and all the rest are adolescents and adults. While their earlier long stays were in Tipagarh area in Malewada, Gadhchiroli, now Navegaon is their new long stay destination. Our efforts are geared towards ensuring that they remain in this area so that human-elephant conflict is kept at the minimal.



Groundtruthing of Elephant Corridors across India

India is one of the megadiverse country and homes to variety of species from small animals to the large animals like elephants. Wildlife conservation is ingrained in our ethos and has been an integral part of Indian tradition and culture. Right from the historic times, we have been conserving wildlife in the form of Gods.

One of the largest land animal on earth, the Asian Elephants (Elephaus maximus) is also regarded as “Cultural Symbol” of India, as it has been depicted in various religious traditions and folklores. It is deeply rooted in the Indian culture and worshiped as lord Ganesha. Deservedly, it was declared as National Heritage Animal of India.

Elephants play an important role in balancing natural ecosystems. They are an integral component of the biome and play a crucial role in maintaining forest ecosystems and biodiversity. They are referred as “keystone species” as they disperse seeds and supports large assemblages of invertebrates. They are known as ecosystem engineers as they control resource availability for other species by modifying the physical environment around them and in doing so transform, maintain, and create habitats.

Since, elephants inhabit and roam in vast areas, their protection also covers myriad species within their range, due to which they also are known as an umbrella species. Therefore, conserving the elephants is not only about conserving a particular species but conserving the whole ecosystem.

India has around 60% of the global population of Asian elephants and as per the last census conducted in the year 2017, 29,964 elephants were enumerated. To ensure the long-term survival of the population of elephants in their natural habitats by protecting them, their habitats and migration corridors, Government of India has initiated several steps. Once widespread in India, the species is now restricted to four general landscapes:

- North-eastern India
- Central India
- North-western India
- Southern India

These regional elephant populations are highly fragmented and not connected to each other within the landscape due to several factors including habitat loss, degradation and fragmentation which in turn lead to increasing conflicts between humans and elephants. In order to minimize the Human Elephant Conflicts, it is essential to provide safe passage for elephants from one habitat to another. Long-term conservation of elephants can be ensured only by maintaining viable population within viable habitats which could be maintained by linking the fragmented habitats by protecting and strengthening the existing corridors.

Elephant Corridor could be defined as “a linear two dimensional landscape element that connects two or more patches of wildlife (animal) habitat that have been connected in historic times; it is meant as a conduit for animals” (Soule and Gilpin, 1991)

The criteria for categorizing an area as an elephant corridor is the structural and functional connectivity between two viable patches of habitats used by elephants. Usage of corridors by an elephant may be regular, seasonal and occasional.

Addressing the concern, the Ministry had initiated the task of identification and groundtruthing of elephant corridors in India by following certain parameters and by involving the officials of the State Forest Departments, Elephant Cell, WII and other experts. During the period between April-July, 2023, the groundtruthing of 72 elephant corridors was conducted and completed in the States of Jharkhand, Meghalaya, Kerala, Nagaland, Uttarakhand, Karnataka, Andhra Pradesh, Odisha, Maharashtra and Bihar. New elephant corridors were also reported during the field validation which elephants have started using in the last one decade. The identification and protection of the elephant would entail protection to movement of other wildlife as well.

Gaj Utsav, 2023

India is one of the 17 mega diverse countries of the world. With only 2.4% of world's land area, it contributes about 8% of the known global biodiversity. This rich biodiversity is due to diverse ecological habitats found in the country namely forest, grassland, wetland, coastal and marine and desert ecosystems. India is home to several species of wild animals, birds and plants that are unique to the country. Wildlife conservation is ingrained in our ethos and has been an integral part of Indian tradition and culture. Right from the historic times, we have been conserving wildlife in the form of Gods.

The Constitution of India, made the State responsible through Article 48A of the Constitution of India, to protect and improve the environment and safeguard the forest and wildlife of the country. Article 51 A (g) of the Constitution makes it a fundamental duty of every citizen to protect and improve the natural environment including forests and Wildlife.

The Wild Life (Protection) Act, 1972 and serves as the foundation for conservation of wildlife in the country. The Government of India has initiated several focused programs on project mode such as Project Tiger, Project Lion, Project Lion, Project Dolphin etc. These National Conservation programs which are aimed to conserve and protect the flagship species such as tiger and elephant etc. have achieved great heights during the last few years.

One of the largest land animal on earth, the Asian Elephants (Elephaus maximus) is also regarded as "Cultural Symbol" of India, as it has been depicted in various religious traditions and folklores. It is deeply rooted in the Indian culture and worshiped as lord Ganesha, deservedly, it is declared as National Heritage Animal of India. Considering the importance of elephants, the Government of India protected elephant under the Schedule 1 of Wildlife Protection Act,1972 and accorded highest degree of Protection.

There are three species of elephants distributed across the world and the Asian Elephant are present in the 13 countries. Compared to other Asian elephant range countries, the elephant range and populations continue to be stable in India. Once elephants was widely distributed, at present it has been disappeared from many countries. However India holds 60 % wild Asian elephant population.

We have four major regional population, Northern population which is around 2000 elephants, In east central regions which has around 3000 elephants, North eastern region has about 10000 elephants and the largest population found in Southern region which is around 14,000 elephants. As per the last all India elephant estimation in 2017, there are around 30,000 elephants in the wild and around 3000 elephants in the captivity in India.

After the successful initiative of Project Tiger, the Government of India had launched Project Elephant in the year of 1992 as a Centrally Sponsored Scheme with the mission to protect the elephants and its habitats and improve the connectivity through the protection and restoration of corridors. The main mandates of the program included:

1. to protect elephants, their habitats and the corridors
2. to address issues of man–animal conflict and
3. to improve the welfare of the captive elephants

The Programs launched not only to protect the wild elephants and also to ensure the welfare of elephants in captivity. Since the launch of this program, the Government of India has been taking various measures to achieve the objectives and mandate of the Project Elephant. Financial and Technical assistance have been given to the state Governments, guidelines and Standard Operating Procedures have been issued to tackle the human elephant conflicts. Elephant habitats are being consolidated and corridors are being identified.To ensure the

welfare of captive elephants guidelines and manual has been prepared and issued to the states. Measures are being to curb the illegal transport of elephants.

In the last two years, three Elephant Reserves namely Lemru ER in Chhatisgarh, Agasthiyamalai ER in Tamil Nadu and Terai ER elephant reserve in Uttar Pradesh have been notified with an area of 6265.319 Sq.km. A total of 33 Elephant Reserve have been notified in the country with the area of 80777.778 Sq.km, spread in 14 States.

To commemorate the successful completion of 30 years of Project Elephant in 2022 and to give more impetus to conservation efforts, the Ministry decided to celebrate Gaj Utsav, 2023 at Kaziranga National Park on 07th-08th April, 2023 by bring together various stakeholders. The programme was inaugurated by Smt. Droupadi Murmu, Hon'ble President of India, on 07th April, 2023.

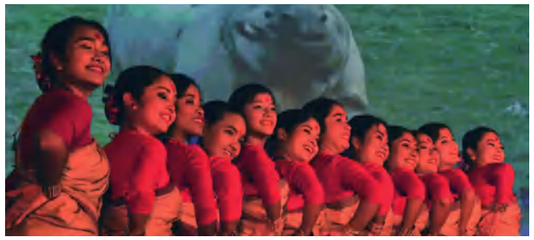
The Gaj Utsav, 2023 celebrations begun with the cultural programme at Kohora, Kaziranga National Park on 06th April, 2023. Then inaugural session on 07th April, 2023, followed by 18th Steering Committee Meeting of Project Elephant and Plenary Session on "Taking the Elephant Conservation Forward in Modern India". The Gaj Utsav, 2023 ended with a 3 technical sessions and discussion on the matters related to Elephant conservation in the country by comprising experts from the Government of India, State Forest Departments, scientists, bureaucrats, policymakers, lawmakers, NGOs, and members of civil society. All the discussions resulted into recommendations on various aspects of Elephant Conservation.

Cultural Evening

Gaj Utsav, 2023

6th April, 2023
Kaziranga National Park

Ahead of Gaj Utsav 2023, cultural events were organized in the evening of 6th April, 2023 by the Government of Assam at Kohora Forest Range, Kaziranga National Park. The event was graced with the esteem presence of Smt. Droupadi Murmu, Hon'ble President of India. Along with her, Shri Gulab Chand Kataria, Hon'ble Governor of Assam, Shri Bhupender Yadav, Hon'ble Union Minister of Environment, Forest and Climate Change, Shri Himanta Biswa Sarma, Hon'ble Chief Minister of Assam, Shri Ashwini Kumar Choubey, Hon'ble Union Minister of State for Environment, Forest and Climate Change, Shri Chandra Mohan Patowari, the Environment and Forest Minister, Assam and other officials of the Government of India and Government of Assam witnessed the beautiful traditional dance forms such as Bhortal, Jhumur and Bihu, which were performed by local artists from different parts of the State. The programme ended with the National Anthem which was played by women band of Assam Police.



Inaugural function

Gaj Utsav, 2023

7th April, 2023
Kaziranga National Park

It was indeed a moment of pride when the Hon'ble President of India, Smt Droupadi Murmu inaugurated the Gaj Utsav-2023 on 7th April 2023 at a glittering function organized at the Kohora High School, Kaziranga National Park.

The inaugural function of the Gaj Utsav 2023 started with the ceremonial lighting of the lamp by Smt. Droupadi Murmu, Hon'ble President of India and other dignitaries present on the dais including Shri Gulab Chand Kataria, Hon'ble Governor of Assam, Shri Himanta Biswa Sarma, Hon'ble Chief Minister of Assam, Shri Bhupender Yadav, Hon'ble Union Minister of Environment, Forest and Climate Change, Shri Ashwini Kumar Choubey, Hon'ble Union Minister of State for Environment, Forest and Climate Change, Shri Atul Bora, Agriculture Minister and Shri Chandra Mohan Patowari, the Environment and Forest Minister, Assam among others.

In the welcome address, Shri Chandra Mohan Patowari elaborated on the salient features of Project Elephant and mentioned that the Gaj Utsav, 2023 had been organized to commemorate the successful completion of 30 years of Project Elephant. He also highlighted the efforts taken by the Government of Assam for the protection of elephants and their habitats.

Shri C.P. Goyal, Director General of Forest and Special Secretary, Ministry of Environment, Forest, and Climate Change, Government of India gave the keynote Address on "Thirty Years of Project Elephant". He briefed about the recent initiatives of the Government of India towards the conservation and protection of elephants and their natural habitats including steps initiated for reduction of human-elephant conflict. He also briefed about the steps initiated by Government of India for the welfare of captive elephants. He also mentioned about the steps taken by the Ministry for mitigation of the Elephant train hits in the country.

Shri Himanta Biswa Sarma, Hon'ble Chief Minister of Assam felicitated the Hon'ble President of India with a traditional '*Gamocha*' and an elephant painting, taken from an ancient Assamese Manuscript entitled "*Hasti Vidyarnaba*".

Shri Gulab Chand Kataria, Hon'ble Governor of Assam unveiled three publications prepared under the Project Elephant and presented the first copy of each to the Chief Guest of the Inaugural Function, Smt. Droupadi Murmu, Hon'ble President of India. The publications included:

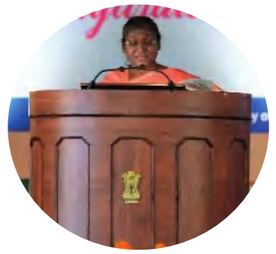
1. Field manual for managing Human–elephant conflict (Assamese language)
2. Management Effectiveness Evaluation (MEE) of the Elephant Reserves in India
3. Necropsy and carcass disposal of Asian elephant: Recommended operating procedure

Shri Bhupender Yadav, Hon'ble Union Minister of Environment, Forest, and Climate Change, in his address, mentioned about the breathless beauty and bio-diversity of Kaziranga National Park and appreciated the people of Assam for living an environment-friendly LIFE, which is always advocated by Shri Narendra Modi, Hon'ble Prime Minister of India. He informed that India's success in setting up as many as 33 elephant reserves during the 30 years of Project Elephant is not the end. Shri Yadav also elaborated on the technological and human interventions initiated by the Government of India and the State forest departments and other line departments of the respective states in managing Human-Elephant conflict and for the conservation and protection of Elephants and their habitats in the country.

Shri Himanta Biswa Sarma, Hon'ble Chief Minister of Assam, in his address said that the inspiring presence of the Hon'ble President Smt Droupadi Murmu in Gaj Utsav, 2023 is indeed a matter of pride and respect for the people of Assam. He also thanked the President on behalf of the grateful Assamese people for taking the Jeep Safari in Kaziranga National Park the previous day. Giving a detailed account of the place of pride occupied by elephants in Assam's history, culture, art, and literature, Shri Sarma thanked the Union Ministry of Environment, Forest, and Climate Change for giving Assam the opportunity to commemorate the three eventful and successful decades of Project Elephant. The Chief Minister also gave a detailed account of the efforts made by the Assam Government to mitigate the Human-Animal conflict and to create safe corridors for elephants and other wild animals. He advocated close coordination between Indian Railways and Forest Department to protect the lives of wild elephants from unfortunate accidents. The Chief Minister ended his speech by offering special thanks to the Forest Department of Assam for successfully organizing Gaj Utsav, 2023.

Shri Gulab Chand Kataria, Hon'ble Governor of Assam, in his address profusely thanked Hon'ble President of India for taking time to grace the auspicious occasion of Gaj Utsav, 2023 organized in honour of elephants that always occupies a place of respect in the Indian ethos. He also thanked the Union Ministry of Environment, Forest, and Climate Change for selecting Kaziranga National Park for this important event.

In the end, Smt. Droupadi Murmu, Hon'ble President of India highlighted the fact that respect for nature is embedded in Indian culture and elephant being the national heritage animal of India and a symbol of prosperity, it is our responsibility to conserve and protect the Elephants.



Hon'ble President of India also said that the actions which are in the interest of nature, animals and birds, are also in the interest of humanity and Mother Earth. The forests and green areas of Elephant Reserves are very effective carbon sinks. She highlighted that all of us would be benefited by the conservation of elephants and it will also help in facing the challenges of climate change. Participation of society along with the government is necessary in such efforts.

Hon'ble President of India said that the 'Human-Elephant Conflict' has been an issue for centuries. And when we analyze this conflict, it is found that a barrier created in the natural habitat or movement of elephants is the root cause. Therefore, the responsibility of this conflict lies with the human society.

While saying that animals and birds can give us important life lessons on the virtue of selfless love, the Hon'ble President of India said that we should have the same sense of sympathy and respect for elephants and other living beings as we have for our fellow humans.

Taking note of Assam's distinction in having the second largest population of wild elephants in the country, the Hon'ble President of India said that Kaziranga National Park, an invaluable heritage of the whole world, is a very appropriate place for organizing the Gaj-Utsav.

She emphasized that for the success of Project Elephant and Gaj-Utsav, all the stakeholders would have to move forward together.

Plenary Session
Gaj Utsav, 2023

7th April, 2023
Kaziranga National Park

Plenary Session "Taking the Elephant Conservation Forward in Modern India" was organized in the meeting venue at Kohora, Kaziranga National Park on 07th April, 2023.

Shri Bhupender Yadav, Hon'ble Minister, EF&CC chaired the plenary session and Shri Ashwini Kumar Choubey, Hon'ble Minister of State, EF&CC co-chaired the session.

After the felicitation programme, Shri Ashwini Kumar Choubey, Hon'ble Minister of State, EF&CC initiated the discussion by talking out the cultural and ecological value of Elephants.

He also talked about the need for conservation and protection of elephants.

Shri Bhupender Yadav, Hon'ble Minister, EF&CC talked about various aspects of elephant conservation such as scientific management, cultural values, ecological importance of elephants in the ecosystem etc. He also highlighted the importance of local communities, mahouts in conservation of elephants in the country. He also briefed about the steps taken by Government of India for the conservation and protection of elephants in the country.

18th Steering Committee meeting of the Project Elephant

7th April, 2023
Kaziranga National Park

The 18th meeting of the Steering Committee of the Project Elephant was held on 07th April, 2023 at Mihimuri Conference Hall, Kohora, Kaziranga National Park under the chairmanship of Shri. Bhupender Yadav, Hon'ble Minister, Ministry of Environment, Forest, and Climate Change, Government of India and in presence of Shri. Ashwini Kumar Choubey, Hon'ble Minister of State, Ministry of Environment, Forest, and Climate Change, Government of India & Vice Chairman of the Project Elephant Steering Committee.

The meeting was part of the Gaj Utsav, 2023 celebrations which was inaugurated by Smt. Droupadi Murmu, Hon'ble President of India on 07th April, 2023 at Kaziranga National Park, Assam.

The meeting deliberated upon further strengthening elephant corridors and management of elephant reserves and emphasised on efforts to deal with human-elephant conflicts in a responsive manner. The proceeding of the meeting are at Annexure.

Glimpse of 18th Steering Committee meeting of the Project Elephant

Technical Sessions & Working Group Discussions Gaj Utsav, 2023

8th April, 2023
Kaziranga National Park

During the concluding day of the Gaj Utsav, 2023, three technical sessions were organized and discussion were held on the matters related to Elephant conservation in the country by comprising experts from the Government of India, State Forest Departments, scientists, bureaucrats, policymakers, lawmakers, NGOs, and members of civil society.

All the discussions resulted into recommendations on various aspects of Elephant Conservation which is at Annexure.

Recommendations of Gaj Utsav, 2023

Annexure

The National Conservation Programme "Project Elephant", was launched in 1991-92 with an aim to conserve and protect the Elephants and their habitats in India. To commemorate the 30 years of Project Elephant, the Ministry of Environment, Forest and Climate Change, Government of India and the State Forest Department, Government of Assam celebrated the Gaj Utsav, 2023 at Kaziranga National Park, Assam on 07th & 8th April 2023. The programme was inaugurated by Smt. Draupadi Murmu, Hon'ble President of India on 07th April, 2023.

As part of the Gaj Utsav, 2023 celebrations, three technical working groups deliberations were carried out on 8th April 2023 at three different venues. The working groups were constituted based on three broad themes relevant to conservation and management of elephants namely:

Working group-1 Human–Elephant interactions – Broader issues, challenges and approaches towards resolution

Chair	**Shri. Sandeep Kumar, PCCF & CWLW, Assam**
Co-chair(s)	**Shri. P.C. Tyagi, PCCF & HoFF (retd). Tamil Nadu & Member, PE Steering Committee**
Moderator	Dr. K.M. Selvan, Scientist E , Project Elephant, MoEF&CC
Members	Shri. M.K Yadava, PCCF & HoFF, Assam, Shri. Subash Chandra, CEO, National Authority (CAMPA), Dr. Satyendra Singh, APCCF, Assam, Dr. Anumpam Sarma, WWF-India, Dr. Biputhi Lakhar, Aaranyak & Member, Project Elephant Steering Committee, Shri. Shri. Rajesh Kumar, APCCF, West Bengal, Shri. Jatinder Sarma, Filed Director, Kaziranga NP, Shri. Robin Sarma, Consultant, Kaziranga NP, Shri. Aditya Bisht, Consultant-B, Project Elephant, Shri. Chiranjeev Jain, ACF, Assam.

Key recommendations

Working group-1 (presented by Shri. P.C. Tyagi)

1. Regional or landscape-level human–elephant conflict management plans to be prepared for better and efficient management of human– elephant conflicts. The structures and the formats to be uniformly followed
2. Elephant reserve conservation management plan to be prepared to achieve the objectives and core values of the Project Elephant
3. To mitigate human–elephant conflict, participation of all the stakeholders in planning, management and implementation is critical
4. Mitigation strategies proposed should align to the existing Government policies and legislations
5. Barriers should not obstruct free movement of elephants in dispersal areas
6. To mitigate human–elephant conflict in tea and coffee plantations where Government lands have been leased to the companies, action to be initiated for constituting them as conservation areas
7. Compensation for human deaths and injuries to be rationalized and promptly paid to the victims
8. Human–elephant conflict should be declared under the category of disaster under the State disaster management authority to activate their response mechanism during conflict-related emergency situations
9. The linear infrastructure agencies such as the Railways, Power, Road transport and others should follow the guidelines to minimize elephant deaths
10. The Elephant Reserves should ecologically ameliorate the habitats based on the carrying capacity of the reserve
11. Capacity enhancement for the frontline staff, mahouts, and veterinarians on aspects related to management of elephants and their habitats
12. Rewards at the local level to be institutionalized for recognizing the efforts of the field staff

Key recommendations

Working group-II Habitats, corridors and connectivity

Chair	**Shri. Virendra Tiwari, Director, Wildlife Institute of India**
Co-chair(s)	**Shri. Pravin Agarwal, CWLW, Tripura and Shri. Hridesh Mishra APCCF, Assam.**
Moderator	Dr. Lakshminarayanan, Project Scientist (WII)
Members	Shri. Ramesh Pandey, IGF, Project Elephant, Dr. Anil Singh WWF-India, Dr. Sandeep Tiwari, WTI, Shri. Manoj Shukula, CF, Najibabad, UP, Dr. Lalit Sharma, Scientist, ZSI, Ms. Monica Pasupaletti, DCF, Social Forestry, Shri. Sandeep Bende, DFO, Diburgargh,Assam, Shri. , Shri. Arun Vignesh C S, DFO, Sonitpur East Division, Shri. Ritu Pawan , ACF, Kaziranga, Assam.Shri. Kaushik Baruah, Member-SBWL, Assam, Shri. D D Gogoi, CCF (Retd), Assam.

Working group-2 (presented by Shri. Hridesh Mishra)

1. Legal protection to corridors by considering the following options

- Provisions of Environmental Protection Act, 1986 by declaring the corridor as ecologically important
- Declaration of corridors as community/ conservation reserve under the Wildlife (Protection) Act, 1972
- Include the corridors into existing PA boundaries
- Use provisions of the autonomous district councils

2. Smart green measures incorporated in infrastructure projects passing through corridor area

- Regulate land-use change in the corridors that is incompatible for elephant movement
- Innovative incentive mechanism for communities to address land-use changes
- Mitigation plans to address impact of linear infrastructure on vegetation in addition to fauna
- Inclusion of plans to secure elephant corridors in the existing management plans and working plans
- Strict law enforcement and active community engagement to prevent encroachment of corridors
- Continuous monitoring of the identified elephant corridors through participatory approaches that include civil society members
- Evaluating from time to time the structural and functional effectiveness of the identified/demarcated corridors
- Transboundary coordination with neighboring countries in case of elephant movement across international borders

Key recommendations

Working group-III Improvement of captive elephant health and welfare

Chair	**Shri. Vedpal Singh, CWLW, Nagaland.**
Co-chair(s)	**Shri. N Tam CWLW, Arunachal Pradesh**
Moderator	Ms. Kasturi Prashant Sule, DFO Sivsagar, Assam.
Members	Shri. R P Singh, APCCF, Assam, Dr. K K Sarma, Prof. & Head, Surgery & Radiology, Assam Agriculture University & Member of Steering Committee, Dr. Parag Nigam Scientist-G, WII, Dr. Gowri Mallapu, CZA, Ms. Parbati Barua, senior mahout, Assam, Dr. Ratin Barman, CWRC, WTI, Shri. Ranjit Ram, DFO, Digboi, Assam, Shri Tejas Maraiswami, DFO, Cachar, Assam, Dr. Yadhuraj K, Senior Veterinarian, Radhekrishna Temple Trust, Gujarat. Sri. Piraisoodan, DFO, Nameri TR, Assam.

Working group-3 (presented by Shri. Ved Pal Singh)

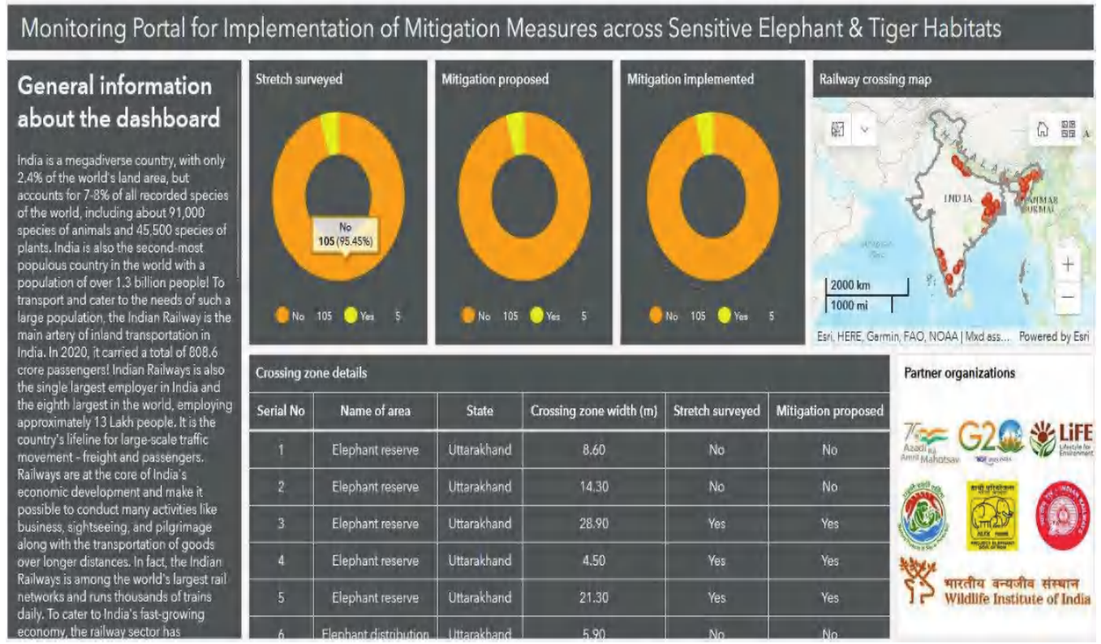
1. Capacity enhancement for the State Forest Departments and the veterinary institutions to improve response mechanism to reports of wildlife diseases
2. Creation of comprehensive database on reported incidences of various wildlife diseases
3. Enforcement of the guidelines related to welfare of elephants in captivity, particularly in religious institutions and under private custody

- As training of elephants follows "guru-shishya" approach, specific rules flowing from this fact may be framed for recruitment of mahouts and other frontline elephant handlers
- The Institution of the mahout remains poorly understood. Thus, more attention to be paid to welfare and capacity enhancement of the mahouts so as to ensure welfare of elephants in captivity.

Conservation News

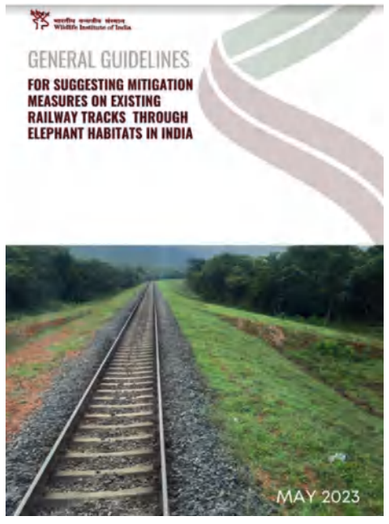
Coordination with Ministry of Railways

To avoid the elephant deaths due to train hits, sensitive railway stretches have been identified and shared with the respective State Forest Departments and the Ministry of Railways. To prioritise the planning and monitor the implementation of mitigation measures a portal was launched by Hon'ble Minister, EF&CC and Hon'ble MoS, EF&CC on 19th May, 2023. It's a multi-stakeholders initiative which involves the active cooperation from the Government of India, State Governments and the Indian Railways.



Release of Guidelines and other documents:

- The General Guidelines for Suggesting Mitigation Measures on Railway Tracks passing through Elephant Habitats in India have been prepared and circulated to all the States/UTs for implementation in May, 2023. These guidelines would be a guiding document for the Railway and Forest Officials in designing and choosing between different structural mitigation measures in the identified critical elephant zones intersected by railway lines. The choice of mitigation measures can be based on landscape, topography, railway track height, and other logistics.
- During the Gaj Utsav, 2023, Shri Gulab Chand Kataria, Hon'ble Governor of Assam unveiled three publications



prepared under the Project Elephant and presented the first copy of each to the Chief Guest of the Inaugural Function, Smt. Droupadi Murmu, Hon'ble President of India. The publications included:

1. Field manual for managing Human–elephant conflict (Assamese language)
2. Management Effectiveness Evaluation (MEE) of the Elephant Reserves in India
3. Necropsy and carcass disposal of Asian elephant: Recommended operating procedure

1. Human–elephant conflict manual (Assamese):

Human–elephant conflict is a management challenge of high concern as it negatively affects elephant conservation and human welfare. There are several time-tested practical options available to address HEC. Often, the field personnel in the frontline are hampered by lack of information on tackling HEC. Recognizing this lacuna, the Project Elephant along with WWF-India and WII had come up with a pictorial, ready-to-use manual on HEC management. The English version of the manual was released by the Hon'ble Minister, EF&CC during the 16th Steering Committee held in Dehradun. Due to overwhelming demand for the manual, it was planned to bring out a Assamese version of the manual so that it can reach field teams effectively. The manual would be translated into other regional languages too.

2. Management effectiveness evaluation of the Elephant Reserves in India:

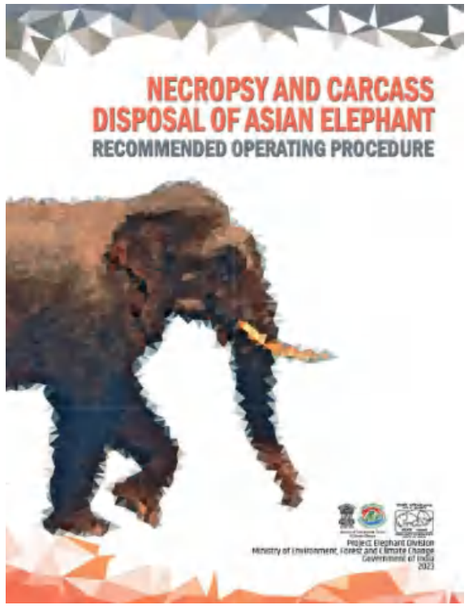
Elephant Reserves are the fundamental management units for the Project Elephant. As elephants are wide ranging animals, the concept of the Elephant Reserves emanates out of the landscape approach that may include forest areas, corridors that connect forest patches, and also villages affected by human–elephant conflict. To streamline management approaches and provide a platform for sharing best practices in managing elephant habitats, the document titled 'Management Effective Evaluation (MEE) of the Elephant Reserves in India' attempts to provide the conceptual, administrative and legal framework for objectively evaluating the elephant reserves.

The Ministry has identified the following four sites considering the geographic diversities and constituted the teams to conduct the pilot 'Management Effective Evaluation (MEE) of the Elephant Reserves in India'.

- Shivalik Elephant Reserve, Uttarakhand, Northern Region
- Kaziranga-Karbi Anglong Elephant Reserve, Assam, North-East Region
- Simplipal Elephant Reserve, Odisha, East Central Region
- Nilgiri Elephant Reserve, Tamil Nadu, Southern Region

Necropsy and carcass disposal of Asian elephant: Recommended operating procedure:

Carrying out a systematic necropsy and safely disposing elephant carcasses is important, but challenging in the field conditions. To provide assistance to the field personnel, the Project Elephant has come up with ready reference manual that provides detailed information on the procedures and techniques required for conducting an elephant necropsy, including anatomical considerations and sample collection. The manual would be a valuable resource for frontline personnel involved in care and management of elephants.



Repository of database of captive elephants in India

As part of the project on creation of a repository of database of captive elephants in India, the collection of data and the DNA profiling of more than 300 captive elephants from different parts of the country have been completed. The process has been competed in the States/ UTs of Delhi, Haryana, Chhattisgarh, Uttarakhand, Tripura, Rajasthan and Punjab. The sample collection has been partially completed in the States of Tamil Nadu, Bihar, West Bengal, Uttar Pradesh and Odisha. The data collection and DNA sample collection is being initiated in other parts of the country as well.