Mobile Technology for HEC Mitigation in Anamalai Hills, Tamil Nadu

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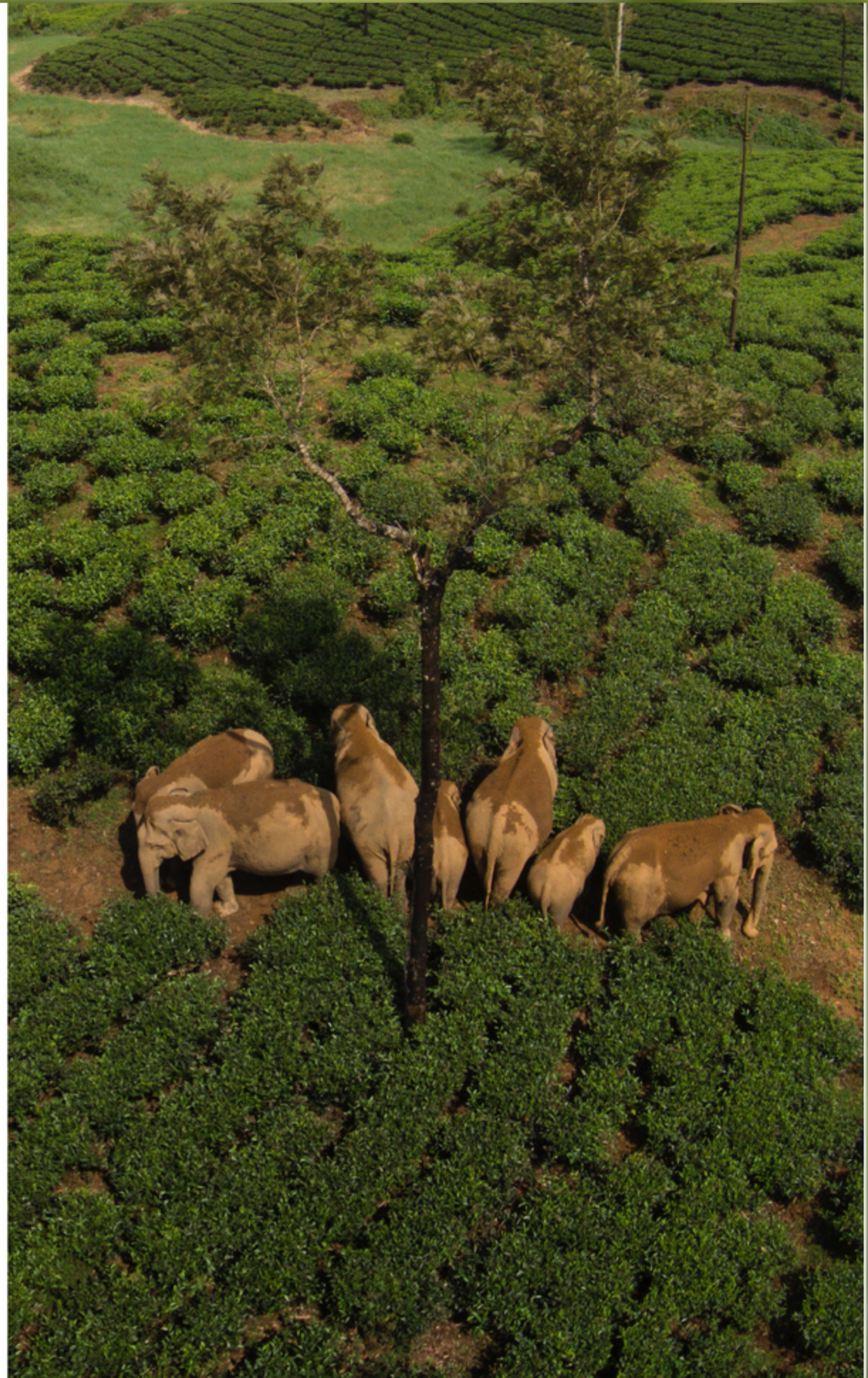
Understanding human-elephant interactions is critical for conservation of elephants outside Protected Areas. Conflict incidents frequently lead to use of reactive measures such as chasing elephants, capture and translocation, or retaliatory persecution, but these often fail to resolve conflicts on a sustained basis, empower communities to implement solutions, or help in conservation of elephants. In India, thousands of people and hundreds of elephants interact with each other on an everyday basis in many landscapes. Aspiring for inviolate spaces (exclusive zones) for people and elephants would not be possible as both protagonists are interconnected strongly over resources. The only way is to promote human-elephant coexistence in overlapping landscapes.

Our long term research (2002-2020) on the Valparai plateau in the Anamalai hills, enabled us to understand elephants' use of fragmented habitats, their movements and conflict with people, and implement site specific conflict mitigation measures in collaboration with the Tamil Nadu Forest Department that help promote human-elephant coexistence.

Right: Aerial view of elephants in a tea estate.

Photo: Kalyan Varma



The Valparai plateau in the Anamalai hills

The Anamalai hills in southern Western Ghats is a critical conservation area for elephants, holding the second largest Asian elephant population (*Elephas maximus*) across their range in India. The Valparai plateau, a of 220 km² landscape matrix dominated by tea and coffee plantations interspersed with rainforest fragments fall under the jurisdiction of the Anamalai Tiger Reserve in the Anamalai hills. The plantations are owned by six national and multinational companies supporting the livelihood of 70,000 people. The Valparai plateau with its undulating terrain and perennial water resources is surrounded by Tiger Reserves, Reserved Forests and wildlife sanctuaries in the states of Tamil Nadu and Kerala. The plateau has been historically used and continued to be used by elephants and forms a critical area for elephant movements across plantations into surrounding Protected Areas. Annually, the plateau has been intensively used by 100-120 elephants which contiguous with elephant populations in the surrounding Protected Areas. The natural vegetation in the form of rainforest fragments and riverine patches, occupying less than one percent of the plateau, act as refuges for elephants. The juxtaposition of commercial plantations and natural vegetation with a human density of 455/km² in widely scattered habitations became the source for human-elephant conflict on the Valparai plateau.

Top: Valparai plateau with rainforest fragments and tea..

Photo: Kalyan Varma

The unique geographical position of the plateau with interspersing plantations, rainforest fragments, and residential places, it is inevitable for both humans and elephants to share resources.

Human-elephant conflict

The primary issue in human-elephant conflict is loss of human lives due to elephants besides damage to buildings which store food grains such as rice, sugar, salt, and lentils.

A. Human deaths due to elephants

Loss of life/injury due to elephant elicited fear, trauma, and anger in local people towards elephants in the Valparai region. Between 1994-2020, 47 people have lost their lives in direct encounters with elephants. Majority of fatal incidents occurred on roads when people walked between workplace and home. Though there were no patterns in the occurrence of deaths in relation to time of the day, but 30 of 47 cases (64%) occurred in a three month period between December and January, indicating a peak conflict period on the plateau. In 37 of 47 cases (64%) people were unaware of elephant presence and their movements in their surroundings in plantations.

B. Property damage by elephants

Unlike in many other landscapes, there is no crop damage by elephants but damage to buildings which store food grains such as ration shops, noon-meal centres, and residential places which has been a cause of concern on the Valparai plateau. Incidents of property damage by elephants varied annually ranging from 150 incidents in 2011 - 2012 to 68 damages in 2019-2020. A majority of property damages occurred between October and February, a period of high elephant movement on the plateau.

Dealing with human-elephant conflict on the Valparai plateau

Our long-term research identifies the need for a strong 'information network' to communicate about elephant presence and their movements to people as the accidental encounter is the main reason for loss of human life due to elephants. Secondly, to develop a positive attitude in local communities. Finally, to encourage community participation to prevent fatal encounters with elephants.

A. Implementation of early warning systems

The Nature Conservation Foundation (NCF) in collaboration with the Tamil Nadu Forest Department and plantation companies has established Elephant Information Network (EIN) and deployed early warning systems to mitigate human-elephant conflict. These systems are simple, adaptive, and participative to help increase safety for people and elephants and instil a sense of responsibility in the local communities for the positive management of human-elephant conflict. Our study focused on proactive conflict mitigating measures based on long-term scientific understanding of the needs of elephants and people, involving local communities to promote human-elephant coexistence in the Anamalais. The following steps have been implemented in this regard.

1. Use of Television network: Elephant locations received from daily tracking, informants from local communities, and Rapid Response Teams of the forest department is displayed as a 'text crawl or ticker' on a local cable TV channel every day to reach out to people as an early intimation. Currently, the cable channel reaches nearly 5,000 families on the Valparai plateau.

2. SMS service: Since 2011, bulk SMS service has been implemented to send out text messages alerts about elephant presence and their movements to peoples' mobile phones on a daily basis. An average of 2000 text messages/day is being sent in English and Tamil to people who reside within 2 km radius from daily elephant locations, covering 4500 families. These timely alerts helped subscribers to spread elephant presence as both protagonists are interconnected strongly over resources." alerts to others in their locality and encouraged people to take adequate precautions to avoid direct encounters with elephants and safeguard their property.

3. Installation of GSM-based alert beacons: Mobile operated LED-light alert beacons were installed in 35 strategic locations in plantations to signal the presence of elephants.

Right: Valparai- Kalyan Varma

These alert beacons are visible from a distance of 1 km and helpful for people who have not availed SMS alert service. These beacons are equipped with a SIM card and can be operated remotely from a registered mobile phone. At least two persons chosen by the community at each light locality, were involved in operating lights from their registered mobile phones, when elephants are noticed in the vicinity. During the past seven years, the local community involved in an average of 98% of light operations, indicating their active participation in human-elephant conflict management.

4. Voice call alerts over mobile phones: Information about the presence of elephants is disseminated using outbound voice call systems for people on their mobile phones. These voice recorded alerts are uploaded using a web-based interface are sent out in the form of an MP3# file. Approximately an average of 1500 voice alerts are being sent every day since its inception in 2015.

B. Rapid Response Teams and helpline from Tamil Nadu Forest Department The Anamalai Tiger Reserve has established Rapid Response Teams as a part of disaster management in the Valparai region. These teams are trained in tracking of elephants and crisis management techniques such as crowd control, alerting residents of elephants movements, and protection of property in tea and coffee estates. Emergency helpline number was established for people to seek help from the teams during critical times.

C. Proactive steps by the plantation companies

Tea and coffee companies have been conducting awareness programmes for the estate workers with the help of research organisations, deployed watchers to locate elephants, shifting of workforce from tea fields where elephants are located, and adoption of no elephant drive as a part of their management policy.

D. Public outreach programmes Awareness and sensitization programmes for estate workers and street plays helped communicate the importance of elephants and precautionary steps to be taken to minimize chance encounters between people and elephants. Regular interactions between Tamil Nadu Forest Department, plantation management, and scientific and conservation organsiations enabled the rapid response teams to quickly act to the needs of people in conflict prone areas and enhanced safety to people's lives and their property on the plateau.

Right: Valparai- Kalyan Varma

Impacts of early warning systems on the occurrence of human-elephant conflict incidents

Human death incidents gradually declined from the average of three persons/year between 1994-2002 to an average of less than one person between 2017-2020. Over a long term, the average number of human death incidents remained one person per year for the past 15 years (2003-2020). This is the seventh consecutive year where accidental deaths due to elephants remained nil.

Proactive steps involving stakeholders aided by early warning systems have created a win-win situation for elephants and people as property damage by elephants continued to be less than 50% for the past several years as compared to 2011 (150 damages).

Valparai plateau is one of few places where human-elephant conflict has been minimal and a model landscape for many other interface areas of people and elephants in India.

The study suggests a shift from reactive measures of 'problem-animal approach' to a pro-active 'problem-location approach' with sustained participation by stakeholders which could pave the way for coexistence in modified landscapes.

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