Assessment of the impact of human-elephant conflict (HEC) distribution using geostatistical approach and development of community-based mitigation strategy in Keonjhar forest division, India.

Keonjhar forest division (Odisha province) in Eastern India, has patchy forests which support 60-75 elephants and act as their movement paths to neighboring states. This province is one of the crucial landscapes for elephants in India, especially for breeding tuskers and is possibly the best prospect for securing a future for Asian elephants. It occupies nearly 57% of the elephant habitat of central India, with 1976 elephants.

But Human-Elephant Conflict (HEC) in Keonjhar forest division has escalated to an alarming level. In spite of investments in mitigation efforts and years of research on mitigation of HEC, the implement ability and sustainability of most projects are questionable due to certain aspects such as lack of accessible data and little to no prior understanding of the trends and patterns of HEC. Most of the mitigation projects are designed around human-centric worries rather than understanding the nature of conflict. Deficiency of a baseline can delude our perception of HEC impacts, also limiting our ability to plan robust and temporally adaptive management strategies. Less attention has been paid to analysis of the spatial distribution of crop-raiding and estimation of HEC hotspots in this region, which is essential in detecting the regions and populations under high-risk of HEC.

Human-elephant conflict is dramatically on the rise in many forest fringe regions of India, that is adversely affecting the rural communities (especially the famer communities). These cases have given rise to a major issue, which makes it even more difficult to find a balance between development of poverty ridden communities and conservation of the endangered elephants.

Summary report
Collaboration with Forest department & local NGO, and elephant movement observation.

This report discusses about the current status of the project, progress made since fund reception, the challenges and future objectives.

STATUS

Although, Rufford had transferred the funds to SARP in April, 2021 due to certain taxation and remittance issues, I received the money in June, 2021. However, I had already started working on the project since the beginning of this year.

PROGRESS

I'm collaborating with the Keonjhar Forest Division office, where the head of department has assured to help me in all project related matters, while also taking the pandemic situation into consideration. Several staff members of SARP NGO are also working in partnership together in carrying out project activities. We have already visited four villages, which are highly impacted by elephant attack, where we talked to the famer community and the head of village. We discussed the problem they are facing in detail and the actual hidden impact of HEC, despite receiving compensation from the administration. We are planning to collect information (such as; the general perception and attitudes of villagers towards elephants; the major challenges they face in improving their quality of life, due to elephants; how are they benefitted by continuing to live in these hotspot regions; and we are trying to understand whether their socio-economic status is driving HEC, etc.). Also, one of the other intentions of surveying these highly affected villages was to differentiate how the people surrounded by resources that are utilized by elephants, perceive elephants than people lacking these resources. We are working to figure out the factors, like wealth, health, education, food security, satisfaction with services, access to services, that are determining the local wellbeing.

We are tracking the elephant positions five to six times a month. We are also trailing their footprints and dung to maintain their positional data base and understand their space-use in the landscape. We have found that there are 35-40 beats (a sub-unit of forest department) in the Keonjhar forest division. Each beat has few rangers accompanied by patrolling staff, who keep track of elephant movement through VHF. We make sure that we visit these beats frequently to get updates on elephant positions, so that we can follow them and assess their probable movement, whether it is directed towards any villages or the forest. We have developed a format for recording and maintaining the elephant position data, which is updated after each observation. The data on previous HEC incidences are being collected from the divisional forest office. We are only focused on the incidences that occurred since 2001.

Immediately after a victim's report regarding a particular incident, the information was usually registered on the spot by a Range Officer from local forest division to then report to the District Forest Officer, according to the Wildlife Protection Amendment Rules (2002) (Odisha Province), compensation shall be paid to the victims for the damages caused by wild animals to encourage the public for voluntarily reporting the losses suffered from wildlife. These reports consist of locations, forest range, date, crop damage, frequency of crop raiding, number of houses damaged (partial/fully), human death, human injury and amount of compensation paid to victims.

Another member of our team is classifying the 20 years' data in to four categories; human casualties (death and injury), house damage and crop raiding. Also, these data are being additionally categorized in to the three major seasons (winter, summer and rainy) mainly observed in Keonjhar forest division. Moreover, the HEC incidences have been grouped into three temporal phases such as HEC1 (2001-2006), HEC2 (2007-2012) and HEC3 (2013-2018) for analyzing the trends of HEC pattern over different phases of time in this landscape. As Keonjhar forest division has seven forest ranges, we are also grouping the incidences as per the forest range.

CHALLENGES

- The first major challenge is the ongoing pandemic situation in India. The lockdown has majorly restricted our plans for frequent visits and surveying., Also we are unable to get the necessary permission from the village heads and forest department to carry out the field observations and query the villagers' situations, which are major steps in continuing our study. However, we have been able to continue tracking elephant positions, five-six times a month while strictly adhering to all COVID protocols. However, elephants are megaherbivores, who can move up to certain kilometers each day to fulfil their basic requirements. That is why it is proving to be slightly difficult to follow them, especially during this time. Similarly, after getting permission from the police as well as village heads, we are planning to visit the affected villages and their farmland to conduct the surveys.
- Apart from that, the other major limitation is our reliance on compensation data as it may not reflect actual intensity of conflict. All the victims of HEC might not have claimed compensation and there could also be instances where damage due to other wildlife are reported as damage from elephants. These instances can lead to a false estimation and mislead the interpretation outcome. Also, compensation schemes vary on factors like; economic status of the country, political scenario, degree of awareness, literacy and sometimes also gender, religion etc., which could restrict voluntary reporting by victims.
- The absence of HEC spatial locations is also a challenge, which may lead to some spatial error in estimating hotspot zones, resulting in a small degree of variation on the ground level. Although there was no spatial information in the collected data sets, we geocoded the incidents by assigning the centroid coordinate of the village where the incident had happened and prepared a geodatabase for further spatial analysis.

FUTURE OBJECTIVES

We are planning to,

1. derive the annual trends of various forms of conflicts from 2001 to 2020;
2. assess differences in HEC intensity in all the forest ranges;
3. statistically analyze the association of maximum conflict occurrence based on season.
4. analyze the spatial distribution of HEC
5. find out the vulnerable zones and number of people under threat of elephant attack
6. continue elephant tracking,
7. survey peoples' status and impact of HEC on their wellbeing

Latitude: 21°42'60"N
Longitude: 85°28'56"E
Altitude: 573.07±21 m
Accuracy: 13.6 m

Latitude: 21°42'59"N
Longitude: 85°28'55"E
Altitude: 604.03±29 m
Accuracy: 11.3 m

Latitude: 21°58'24"N
Longitude: 85°45'54"E
Elevation: 408.59±7 m
Accuracy: 4.0 m

Latitude: 21°9′ 3″ N
Longitude: 85°27′ 31″ E
Elevation: 112.92±8 m
Accuracy: 5.1 m