

Troublesome Visitors: Human-Elephant Conflict by Elephants Coming into Odisha from Chhattisgarh

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Introduction

The explosion of the human population in the twentieth century in India has generated a growing interface between man and elephant (Sukumar *et al.* 2006; Gubbi *et al.* 2014; Palei *et al.* 2014). Elephant habitat and range in India has reduced due to expanding agriculture, fragmentation of forests and loss of migratory corridors (Sukumar *et al.* 2006).

Elephants range in relation to ecological needs such as food, water and shelter (Sukumar 1989). They are known to explore new areas and extend their range, for which several explanations have been suggested, including local overabundance, habitat loss, shortage of food and water and instinct to explore new areas (Sukumar 1989; Venkataraman *et al.* 2002). The movement of elephants may also prevent habitat degradation due to overuse by them.

In the past, elephants moved between Odisha and neighbouring states but it was not a major concern as vast forest areas allowed free movement of elephants and the tolerance of people was high (Swain 2004). In the last two and a half decades, inter-state elephant movement has attracted the attention of both state and central governments because they pose an increasing threat to human life and property.

Interstate movement of elephants in Odisha at present involves the neighbouring states of Chhattisgarh, Jharkhand and West Bengal. This study analyses movement patterns and conflict with humans by elephants moving between Chhattisgarh and Odisha.

Methods

Odisha is situated in southeast India within 17° 47' to 22° 34' N latitude and 81° 22' to 87° 29' E longitude (Fig. 1). The state has an area of 155,707 km², which constitutes about 4.7% of the country. Odisha holds more than 72% of the elephant habitat in eastern India. There are 30 districts in Odisha out of which 13 are border districts. These border districts have nearly 61% of Odisha's forests and hold 813 elephants, comprising 42% of the population in Odisha (Palei & Rath 2015). There are no resident elephant populations in the study area of Sundargarh and Baragarh Forest Divisions.

The annual rainfall varies between 1200–1600 mm and the mean annual temperature ranges between 25°–37°C. Odisha is an agricultural state with over 75% of people dependent on farming. The major crops are rice, pulses, oil-seed, jute, sugarcane, coconut and turmeric.

The study was carried out from 2010 to 2014. Data were collected using two methods: Human-elephant conflict (HEC) data recorded by Forest Department and rapid field assessment.

The Forest Department recorded claims for compensation from villagers and also monitored and recorded the movement of migratory elephants by trained elephant trackers. We collected this information for 2000 to 2014 from 'elephant record books' maintained by the Forest Department. The elephant monitoring data included the number and group size of elephants, entry and exit locations and duration of stay in Odisha. The conflict data included the

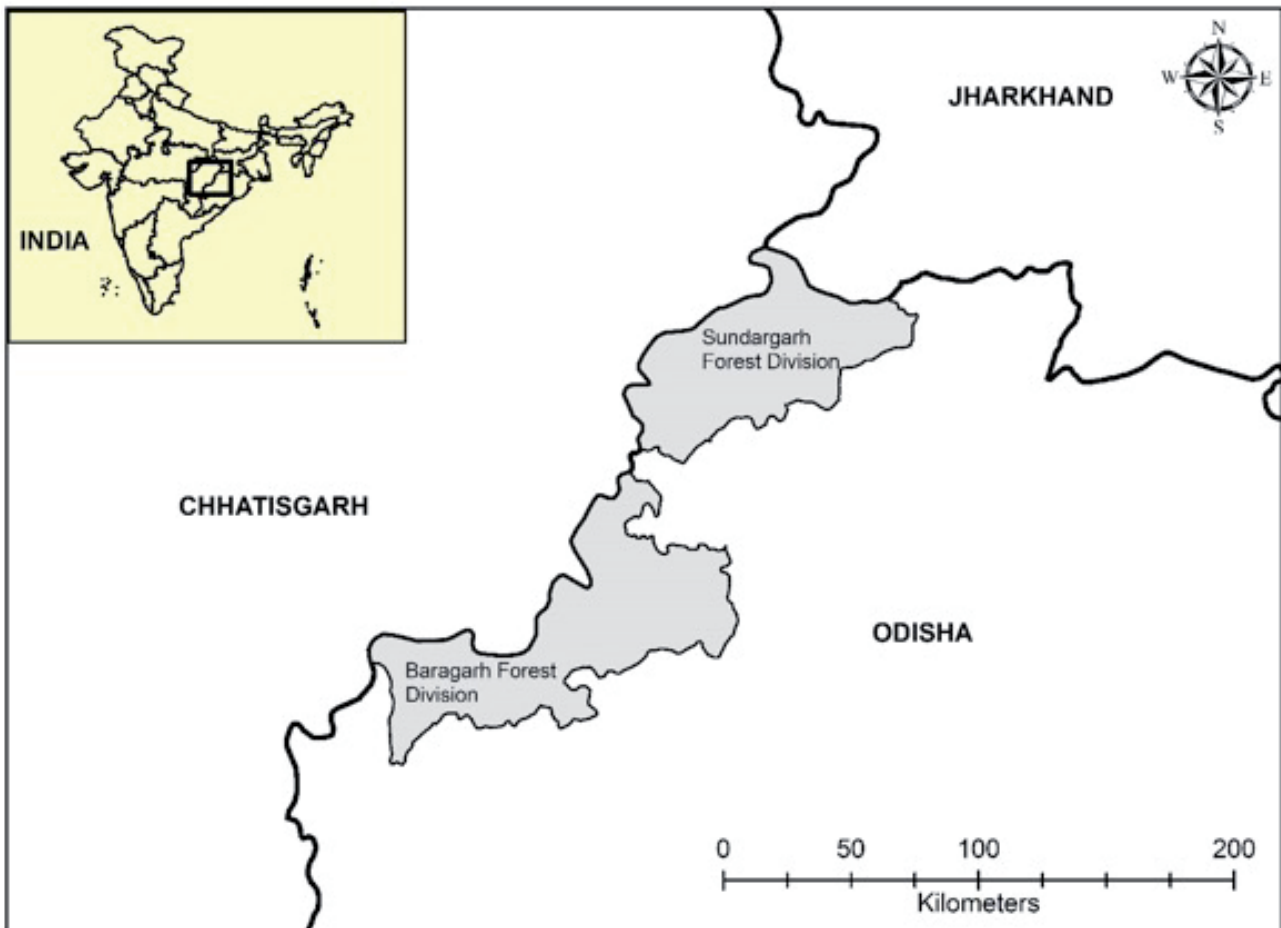


Figure 1. Map of study area and human-elephant conflict localities by migratory elephants.

name of the village, date and time of incident, and whether a human death or injury, and amount and type of property loss. Rapid assessments were carried out during field visits to areas of migratory elephant movement paths and affected villages. In addition, discussions were held with forest officials and villagers.

Results and discussion

Interstate movement paths

Elephants entered Odisha through five forest ranges, Sundargarh, Gopalpur, Lephripara, Hemgiri of Sundargarh Forest Division and Bhatli of Baragarh Forest Division (Fig. 1). They entered Odisha from 26 locations of which 11 were in Sundargarh, 5 in Hemgiri, 4 in Gopalpur and Bhatli, 2 in Lephripara and 1 in Badgaon ranges. In returning to Chhattisgarh the elephants also used 26 locations, of which 10 were in Hemgiri, 8 in Sundargarh and 4 in Lephripara and Bhatli ranges.

Entry and exit instances

During 2000–2014, there were a total 27 instances of entry with an average of two per year. The maximum instances of entry per year were 3 times in 2012 and 2013. Sundargarh forest range recorded 40% of entries, Hemgiri 19%, Gopalpur 15%, Bhatli 15%, Lephripara 7% and Bargaon 4%. The percentage of entries were highest in December with 18%, followed by 15% in September, 11% each in April, August, October and November, 7% in January, and 4% each in February, May, June and July (Fig. 2). The peak of entries in December and September may be linked to monsoon related movement (Sukumar 1989) and harvesting of crops.

Elephant number and composition

A total of 348 elephants in 22 groups from Chhattisgarh entered Odisha between 2000 and 2014. The numbers of elephants per year ranged from 1–39, with an average of 23 (Fig. 3). The

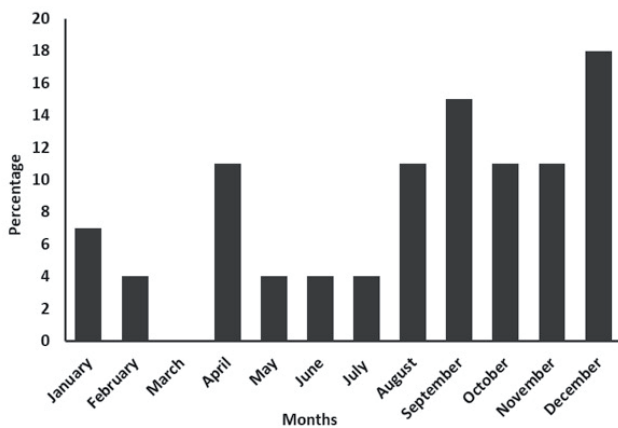


Figure 2. Entries of elephants in different months in the study area from 2000 to 2014.

composition of elephants, which entered from Chhattisgarh during the study period, was 74 males (21%), 186 females (54%) and 88 young (25%).

Occupancy days

The total number of days elephants stayed in Odisha was 1130, ranging from 5 days in 2000 to 174 days in 2013 (Fig. 4).

Human casualties, crops and houses damage

From 2000 to 2014, 100 human casualties by elephant attacks were recorded including 81 deaths and 19 injuries (Fig. 5). A total of 5577 acres of crops were damaged by elephants during the study period of 15 years, with an average of 372 acres per year and with a maximum of 1278 acres in the year 2010 (Figs. 6 & 7). A total of 866 houses were damaged by elephants, with an average of 57 house damages each year with a maximum of 131 in 2012 (Figs. 8 & 9).

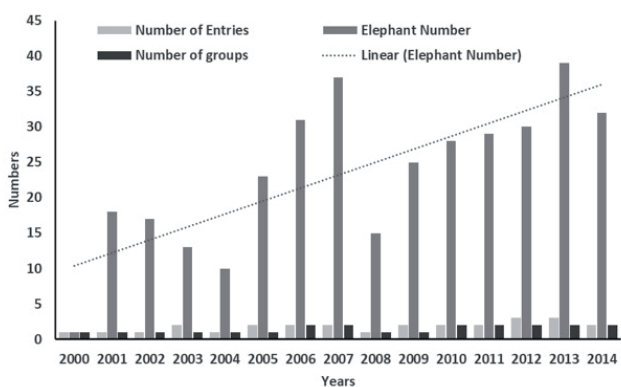


Figure 3. Annual number of elephant entries, numbers and groups.

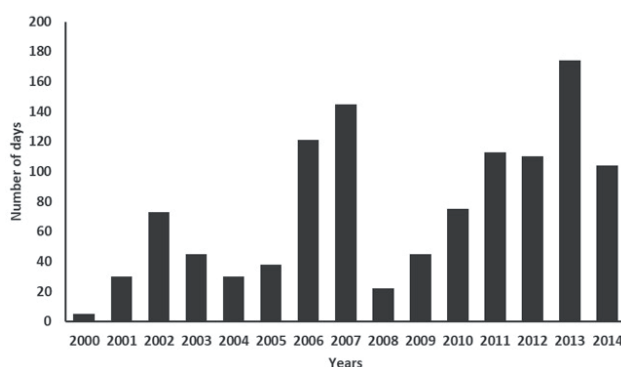


Figure 4. Total number of days elephants stayed in the study area each year.

During 2000–2014 the total numbers of human deaths due to elephants in Odisha was 859 (Palei & Rath 2015). In the 13 border districts of Odisha 184 deaths due to elephants were recorded, of which 81 were due to elephants from Chhattisgarh. HEC is a relatively new experience to villagers in the districts of Odisha bordering Chhattisgarh, which may be the reason for the high number of human deaths in the region.

The study shows that the HEC has progressively increased over the last 15 years. Conservation of the elephants moving between Odisha and Chhattisgarh depends on effective mitigation of HEC.

Activities in the fringe villages that could help include:

- Eco-tourism to develop a more cordial relationship between the villages and Forest Department, provide livelihood opportunities for people and reduce forest dependency.
- Awareness programs and expeditious compensation of loss of life and property.

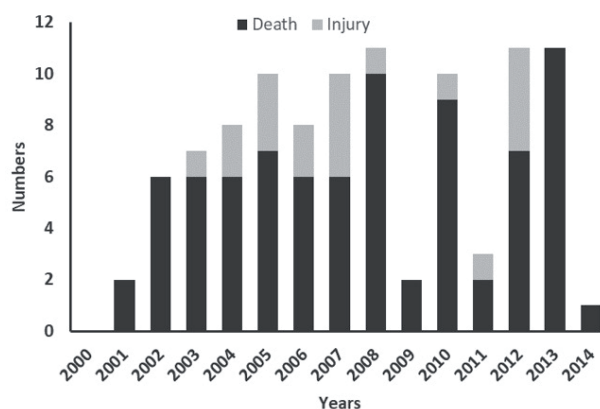


Figure 5. Annual number of human deaths and injuries by elephants.

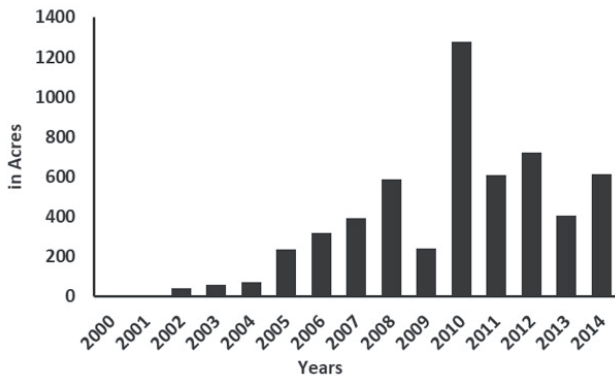


Figure 6. Annual crop damage (in acres).

- Capacity building of Forest Department staff and local villagers to mitigate HEC.
- Establishing barriers such as electric fences and trenches to prevent damage.

At district level, the thirteen border districts which experience elephant migration impacts should have a separate management plan for elephant conservation including establishment of inter-state elephant corridors with rigid enforcement.

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Figure 7. Crop raiding elephants.

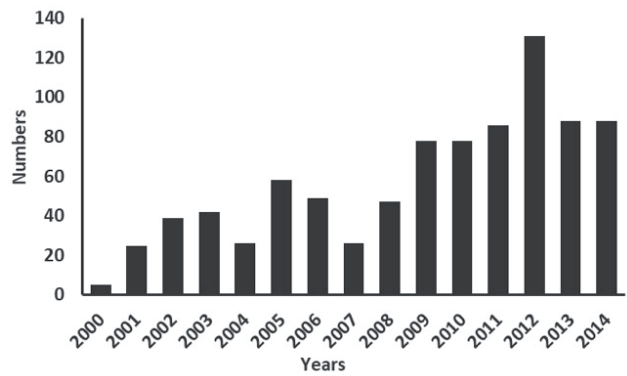


Figure 8. Annual house damage by elephants.

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Figure 9. House damaged by elephants being assessed by government officials.