Human-Elephant Conflict in Sambalpur Elephant Reserve, Odisha, India

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Introduction

The Asian elephant (*Elephant maximus*) is one of the most conflict-prone wildlife species in India, causing large-scale damage to crops and human lives. Each year, nearly 400 people and 100 elephants are killed in conflict related instances in India, and nearly 500,000 families are affected by crop damage. Reasons including habitat fragmentation, degradation and loss, along with developmental projects such as irrigation projects, canal projects, electric power lines, roads, railways, industries, expansion of agriculture, increase of anthropogenic pressure on elephant habitats, and laxity in management of physical barriers have been cited as causes for the human–elephant conflict (HEC) in the country (Sukumar 1990; Johnsingh & Joshua 1994; Williams *et al*. 2001; Jeyasingh & Davidar 2003; Gubbi 2009).

Elephant habitats in central India extend over 17,000 km^2 in the states of Odisha, Jharkhand and southern parts of West Bengal which are situated in the Chota Nagpur plateau in the North of the Eastern Ghats. The state of Odisha harboured 1930 elephants in 2012 (Kar *et al*. 2013) representing about 7% of the Indian elephant population and 72% of the population in the eastern region.

Methods

The Sambalpur Elephant Reserve (SER) is situated on the banks of the river Mahanadi in central Odisha (Fig. 1). This Elephant Reserve was declared in 2002 by the State Government. At the time of its notification it was named Badrama-Khalasuni Elephant Reserve and covered an area of 426.9 km^2. Present plans include its extension to an area of 5847 km^2. The SER is located between 84°10 - 84°35 East and 21°15 - 21°40 North. It is spread over the districts of Jharsuguda, Sambalpur and Sundargarh. It includes the Badrama and Khalasuni Sanctuaries, and portions of Bonai, Jharsuguda, Sambalpur, Rairakhol, and Bamra forest divisions. The reserve has dry deciduous, moist deciduous, and semi evergreen forests. May is the hottest month with a maximum temperature of about 48ºC and December the coldest with a minimum temperature of about 7ºC. The average annual rainfall is 1260 mm.

Forest Department records from 2000-2013 were used to quantify elephant depredations. Data on crop damage and house damage incidents was collected from the Divisional Offices and Office of the Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden, Odisha. Discussions were also carried out with local Forest staff and villagers, to identify HEC incidents. Secondary information collected was verified through personal interviews and focus group discussions with villagers.

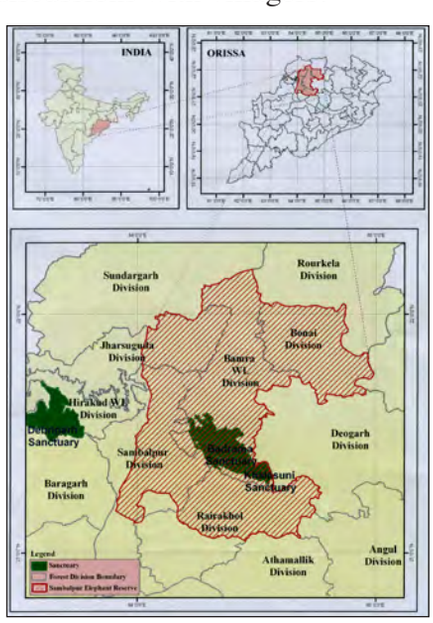

Figure 1. Location map of the SER.

Results and discussion

Crop damage

A total of 1512 HEC incidents were recorded from 2000-2013. Crop damage was the most common, comprising 75% of all incidents. Crop damage included different types of cultivations such as paddy and banana. Paddy was the most damaged crop, consisting of 70% of crop damage incidents. Cop damage was highest in Jharsuguda Forest Division where a total of 1128.45 acres were damaged during 2000-2013 (Fig. 2). Highest crop damage was recorded during November and December, which is in the crop harvesting season. During the months of July, August and September crop damage was moderate and in the other months it was more. More damage was recorded outside the protected area. This was mainly because there were extensive agriculture areas outside. Some tribal villages were present within the protected area but they were more vigilant in keeping watch and guarding against crop raiding.

House damage

During the period from 2000-2013, a total of 199 houses were damaged, of which 95 were fully damaged (the entire house totally damaged, beyond repair) and 104 houses were partially damaged (part of house damaged and repair possible). The highest number of house damages occurred in the Bonai Forest Division (Fig. 3). Elephants normally attacked houses to consume stored food and beverage prepared from mahua flower (*Madhuca indica*). The elephants are attracted to the houses where these beverages are

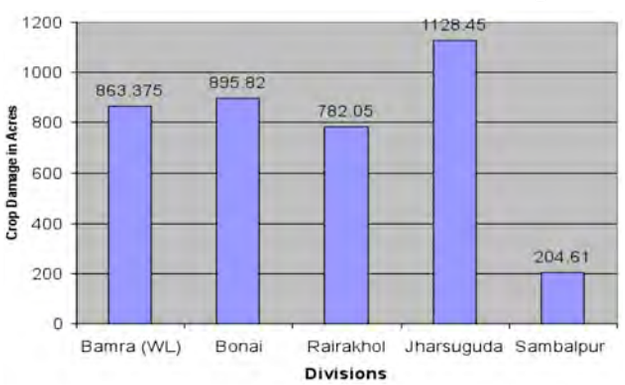

Figure 2. Crop damage due to elephants from 2000-2013.

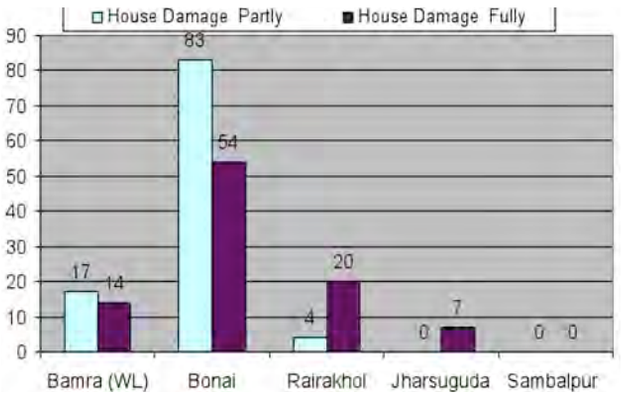

Figure 3. House damage due to elephants from 2000-2013.

stored by the smell, which they are able to detect from a distance. Elephants also attacked houses to consume salt from kitchens.

Human deaths and injury

A total of 71 human deaths and 7 cases of human injury occurred during the period from 2000-2013 (Fig. 4). Tuskers were responsible for 65% of such incidents. The highest number of human deaths occurred in Jharsuguda and Bonai Forest Divisions (Fig. 4). Most of the human deaths occurred in crop fields.

Elephant mortality

A total of 75 elephants were killed from 2000-2013 (Fig. 4). Mortality rates fluctuated within a year (Fig. 5). Higher mortality was recorded from October to January coinciding with crop harvesting. The causes of death were poaching (21%), accidental (20%), electrocution (34%), natural causes (10%), disease (10%) and unknown (5%). The 75 elephant deaths recorded included 18 adult males (24%), 34 adult females (45%),

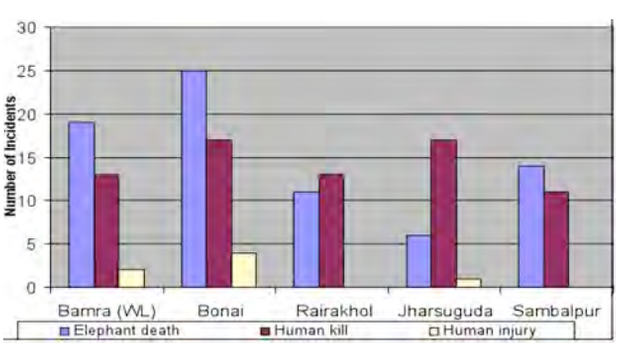

Figure 4. Division wise elephant deaths, human deaths, and human injuries from 2000-2013.

3 whose sex was unidentified, (4%) 11jveniles (15%) and 9 calves (12%).

Electrocution deaths of elephants

Electrocution was the most common cause of elephant deaths in Sambalpur Elephant Reserve. Poles supporting high tension wires passing through the forest area being placed far apart result in sagging of wires. Elephants passing under, accidentally touched the wire, getting electrocuted. High tension wires were also illegally tampered with by local people and used as a means to prevent crop raiding by elephants causing the death of 12 elephants. Electrocution as a means to kill elephants is known in India from all parts of the elephant range (Sukumar 1989; Gubbi 2009). Normally this is a crop protection endeavour or a retaliatory killing. Electrocution as an organised poaching method has only been documented thus far in rhinos on any scale that would cause concern (Menon 1996). However, a few elephants have also been electrocuted for their tusks in Odisha. Since increasing numbers of elephants are dying each year due to electrocution and as per the present study a total of 25 elephant deaths have taken place in this Elephant Reserve, authorities concerned should be required to maintain high tension lines so that adult elephants cannot reach them. Award schemes may also be initiated for persons providing information relating to sagging of power lines, which may help prevent accidents.

Acknowledgements

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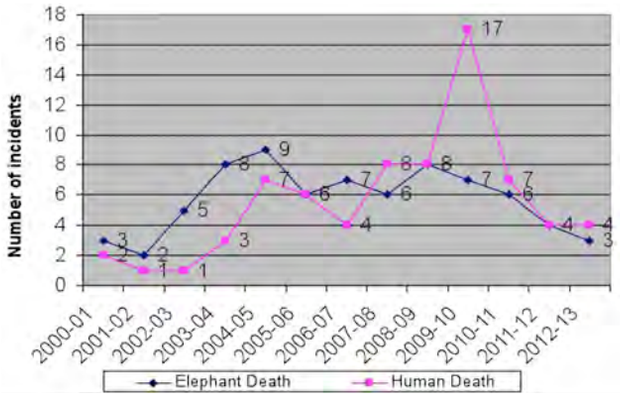

Figure 5. Year wise elephant and human deaths.

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