

Human-Elephant Conflict in Mayurbhanj Elephant Reserve Orissa, India

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Introduction

Habitat fragmentation is a problem faced by many species all over the world due to expansion in urban settlements and infrastructure developmental activities. As a result many species are under threat, some even facing (local) extinction. One of the species facing these problems is the Asian elephant (*Elephas maximus*). As it requires large areas of natural range it is one of the main species to suffer the consequences of developmental activities (Singh & Chalisgoanker 2006). The Asian elephant is a high profile and charismatic species with important ecological as well as cultural associations. It is a keystone species in India where at least 21,000-25,000 wild elephants are still left in forest areas (Lahkar *et al.* 2007). A major conservation problem today is the exploitation of elephant habitat leading to its degradation and fragmentation. Conflict between humans and elephants occurs wherever they coexist, especially in the interface between elephant habitat and agricultural land or human settlements. The state of Orissa holds 70% of the elephant population in eastern India (Patnaik *et al.* 2008). Human–elephant conflict (HEC) is a major problem in eastern India. From 1990-91 to April 2000 in Keonjhar (Orissa) HEC resulted in 86 human deaths and 35 injuries (Sar & Choudhury 2006). Many lives are lost while protecting crops or property from elephants. HEC directly affects some of the tribal people of the district and it influences the attitude of people living nearby reserves. HEC is a spatial phenomenon so it is important to investigate the effects of spatially explicit factors on its distribution. The study was designed to find out the magnitude of the conflict as it is imperative to develop urgent measures for management of this crisis.

Study area

The Mayurbhanj Elephant Reserve declared in 2001, is located in the state of Orissa (Fig. 1). It includes a portion of Mayurbhanj, Balasore, Bhadrak and Keonjhar districts of the state and its Geographical location is 21°10' to 23°35'N latitude and 85°45' to 87°05'E longitude. It covers a total area of 7044 km² and includes the Similipal Tiger Reserve (2750 km²) declared in 1972, Kuldiha Sanctuary (273 km²) and Hadgarh Wildlife Sanctuary (191 km²). The rest of the areas are Reserve Forest, Protected Forest and Revenue Land, which amounts to 3830 km². The forests in this region range from tropical semi-evergreen, to moist deciduous and dry deciduous (Champion & Seth 1968). May is the hottest month when the mean maximum temperature rises to 47°C. December is usually the coldest month of the year where the minimum temperature dips to 4°C. The average annual rainfall of is 1558 mm.

Methodology

Data collection for the present study extended from October, 2005 to September, 2006. Information from 2001 to 2006 from the Forest Department was used to quantify elephant depredations in the Mayurbhanj Elephant Reserve. To get a quantitative measure of economic losses due to the crop raiding and to evaluate people's attitudes, a survey of affected villages in the reserve was conducted. Data was collected through field evaluations, site inspections, interviews, and group discussions with villagers. To find out the nature of the conflict questions were asked about land use pattern, compensation schemes (does the Government pay compensation in time and are they satisfied), details of human death and injury, ethnic composition of the villages and

preventive measures. Distance of the affected villages (in distance classes ≤ 0.5 km; 0.5 to 1.0 km; 1 to 2 km; and 2 to 5 km and above) from the nearest forest area was recorded together with conflict incidents.

Results and discussion

Crop damage and ex-gratia payment

From October 2005 to September 2006 we recorded 89 incidents of HEC from Mayurbhanj Elephant Reserve, where Karanjia was the Forest Division mostly affected by HEC. The highest number of crop depredations occurred in Gourigoda village (15 cases; 6.7 acres) but of the greatest area damaged was in Paliabeda (9 cases; 7.9 acres) (Table 1). In Rairangpur Forest Division the highest number of cases occurred in Sana-Rangamatia village (3 cases; 3.5 acres), and most damage in Khadaribeda village (2 cases; 5.51 acres) (Table 2). A total of Rs. 40,337 (US\$ 733) was sanctioned as ex-gratia payments for the victims of HEC in Karanjia Forest Division (Table 1). The amount for the Rairangpur division was Rs. 25,550 (US\$ 265) (Table 2). Elephants damaged more than six different types of major cultivated plants where rice, maize, sugarcane, and banana were the most common.

Table 1. HEC cases, area damaged and payments in the Karanjia Forest Division.

Village name	# Cases	Area damaged [Acres]	Amount paid [Rs.]*
Talapada	4	2.50	1250
Bisipur	6	2.92	1460
Khandabandha	4	5.15	4650
Andharikhaman	4	2.00	1000
Gourigoda	15	6.70	5327
Jodibil	3	1.65	1650
Padiabeda	9	7.90	7900
Baliposi	2	1.50	1500
Raipada	2	1.50	1500
Keloposi	7	4.50	3600
Jamposi	2	1.00	1000
Bandiraposi	2	2.00	2000
Moudi	2	2.00	2000
Itamundi	4	4.00	3500
Bharadposi	1	1.00	1000
Total	67	46.32	40,337

* Payment by Forest Department; 1 US\$ = 55 Indian Rs.

Nature of damage

Some of the damages were due to raiding while others were accidental due to cultivation in the path of elephant movement. Crop damage mainly occurred within a distance of 0.5 km from the forest. But incidents also occurred up to 5 km

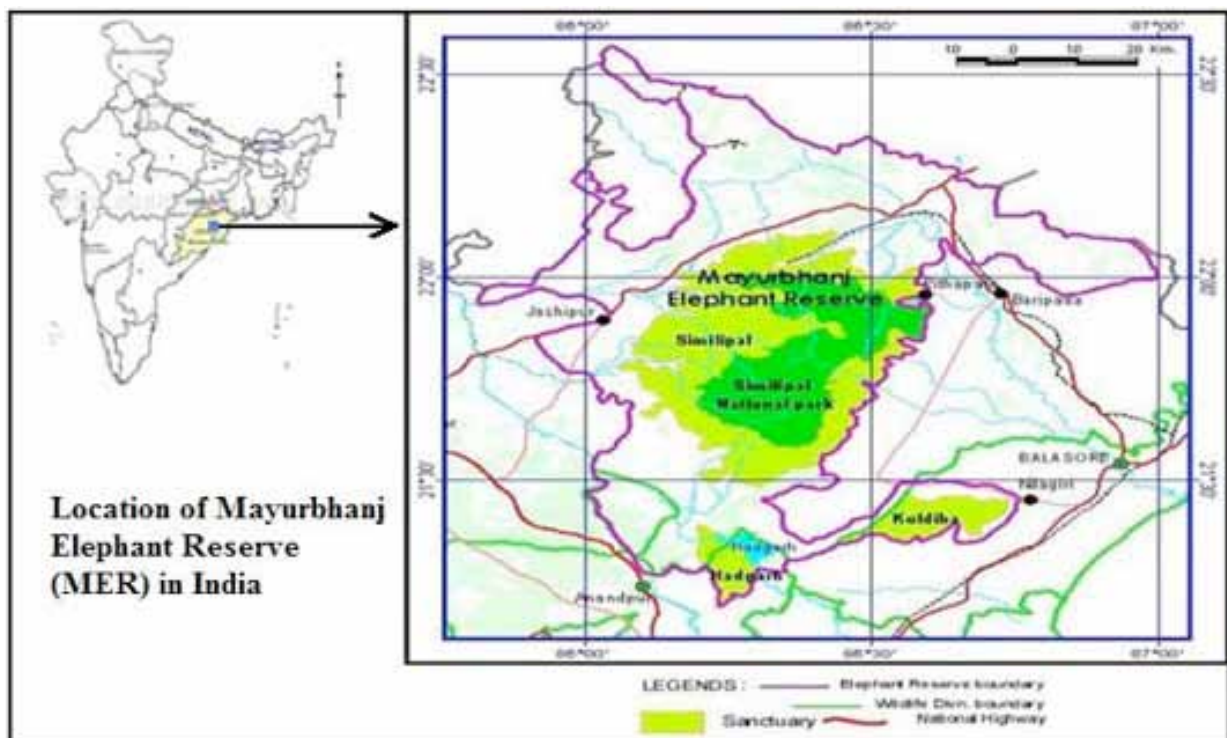


Figure 1. Location map of Mayurbhanj Elephant Reserve in Orissa, India.

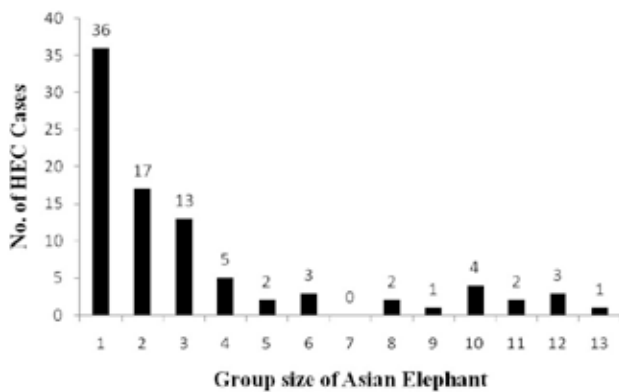


Figure 5. Group size of raiding elephants.

and injuries centrally at Divisional Offices and maintaining a database by the Chief Wildlife Warden would facilitate monitoring and mitigating HEC. Compensation paid is inadequate in the case of human death, injury, crop damage and house damage. Delay in relief and scantiness of the amount directly create negative attitudes among the affected people. Therefore increased amounts and quick settlement of claims would be of benefit in mitigating HEC.

As elephants used water sources in human areas, creating water availability inside the forest by constructing check dams and game tanks maybe of value in mitigating the conflict. The main cause of HEC was anthropogenic pressure, which leads to the loss of elephant habitat. Therefore, rigid protection of elephant habitat is essential (Fig. 6). It is especially important to protect the corridors of elephants for their safe movements. Awareness programs and capacity building of local villagers, to reduce their dependency on elephant habitat are likely to be of much benefit in mitigating HEC and conserving elephants.

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Figure 6. Elephant herd in the Kuldiha Wildlife Sanctuary of the Mayurbhanj Elephant Reserve.