MAN AND WILD ELEPHANT CONFLICT IN ORISSA

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Introduction

Man and wild Elephant conflict is as old as human civilisation. A motif on the wall of Udaygiri cave (Bhubaneswar) shows a herd of wild Elephants raiding a village tank full of lotus and people appear frightened. The motif indicates man and wild Elephant conflict as early as 1st century B.C. Now the Elephant habitats are fragmented and the future of the Elephant is threatened in many placed due to human encroachment of the Elephant habitat. Crops raiding by Elephants and human deaths due to wild Elephants are the two major problems which arise as a result of this conflict. In this paper causes of human-Elephant conflict are identified and means to mitigate the problems are suggested.

Crop raising of Elephants

Depredation of crops by wild Elephants is common along the fringe villages of Elephant habitats. Crop raiding by African Elephants has been described by Allaway (1979). McKay (1990) reported the damage to agriculture by Elephants in Sri Lanka. Blair (1980) and Blair *et al.* (1979) described the details of agriculture-Elephant interface in peninsular Malaysia. In India, Mishra (1971) assessed damage to crop by Elephants in Palamau District, Bihar. Nair (1990) and Vallil (1990) have described the problem of crop raiding in Kerala. Sukumar (1989; 1990) reported crop raiding behaviour in relation to the Elephant's life history strategy in South India. In Orissa crop raiding of Elephants is quite common. The death of a herd of Elephants in the night of 06.11.1973 while consuming crops sprayed with insecticides in Dhenkanal Forest Division is fresh in our memory. However, no study has been undertaken to determine the quantum of damage to crops by wild Elephants in Orissa. The present study assesses crop damage due to Elephants and compensation paid between 1991 and 1995 (Table 1).

It would appear from Table 1, during the four years (1991-1995) in 15 divisions, 275.8 ha crops were damaged by Elephants. The cost of damage was assessed to be Rs. 3,60,006 out of which actual compensation paid amounted to Rs. 1,88,464. The rest of the amount Rs. 1,71,542 could not be paid because of want of allotment of funds and want of report from concerned Tahsildar and Range Officer in time.

In Sundargarh Division, though there is no permanent Elephant population, herds of Elephants from the adjoining Bamra Division visit this division during crop season resulting in crop damage and human death.

Out of 275.8 ha of crop damaged (Table 1), paddy constituted the bulk of the crop, that is over 250 ha. Next to paddy was Sugarcane which covered about 20 ha

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Table 1

Area of crop damage by Elephants and compensation paid in Orissa during 1991-1995

Division	1991-1992		1992-1993		1993-1994		1994-1995	
	A	B	A	B	A	B	A	B
Athgarh	3.20	4,000	-	-	6.00	7,375	12.00	14,780
Angul	-	-	25.20	31,032*	-	-	-	-
Athmallik	-	-	5.50	6,750	5.50	6,750*	15.50	19,130*
Balliguda	-	-	-	-	-	-	0.10	125
Boudh	-	-	-	-	6.10	7,500*	15.00	10,000
Bonai	-	-	1.20	1,475	12.50	15,400*	-	-
Dhenkanal	9.40	22,340	-	-	4.40	5,400	-	-
Deogarh	-	-	1.10	1,340	-	-	6.00	*745
Ghumusar North	1.10	1,312	23.10	28,352	11.40	4,005*	6.40	*7.825
Kalahandi	-	-	14.60	27,930	-	-	-	-
	38.00	79,105*						
Karanjia	-	-	-	-	**	15,000	-	-
Paralakhemundi	-	-	3.90	3,470	15.20	11,040	1.70	1,180
Raygada	-	-	7.90	9,745	3.50	4,300	-	-
Rairakhol	-	-	1.60	1,000	-	-	-	-
Sundargarh	-	-	2.60	3,150	16.10	8,400	-	-
Total	13.70	27,652	124.70	83,212	80.70	51,515	56.70	26,085
		110,137*		33,705*		27,700*		

A : Area of crop damage in hectares.
B : Compensation paid in Rupees.
* : Compensation assessed in Rupees but not paid due to want of funds and other reasons.
** : Damage to stored crop, details not available.

and the remaining 5.8 ha had crops like maize, ragi, coconut plantations etc. Taking into consideration the depredation of crops from 1991-1992 to 1994-1995 for these 15 divisions the yearly crop damage is 69.0 ha amounting to Rs. 90,000.

But the fact is that most of the crop damages remain unreported. People in the fringe villages have become accustomed to such damaged and do not complain unless their houses are damaged and human deaths occur. Once the State Government starts payment for crop damage liberally, people will make more and more such complaints to the authorities.

Human deaths due to wild Elephants

Human deaths due to attack by wild Elephants have been reported by Datye (1993) from Central India, by Appayya (1993) and Sukumar (1989) from Karnataka, Veeramani *et al.* (1996) from

Kerala and by Dey (1991) from North Bengal. Santiapillai and Jackson (1990) reported that Elephants kill about 100-200 people each year in India. In reporting human deaths due to attack by Elephants nobody has reported the eating of human flesh by Elephants. But a recent newspaper report (Hussain, 1999) states the bizarre incidence of wild Elephants turning man-eaters in Assam. However, no such incidence has been reported from Orissa.

Except for an information of killing of human beings and cattle by Elephants and other wild animals in the ex-state of Mayurbhanj in its Annual Administrative Report no such study has been reported from Orissa. From 1933-1934 to 1941-1942, nine persons and six cattle were killed by wild Elephants in Mayurbhanj State. In order to ascertain the human casualties due to attack by wild Elephants in Orissa information was collection from the records of the Divisional Forest Offices and is furnished in Table 2.

Besides human deaths mentioned in the Table 2, persons injured due to attack by Elephants in different divisions during 1990-1991 to 1995-1996 numbered 21. Three cattle were also reported to have been killed during 1993-1994, one in Bonai

Table 2

Human deaths due to wild Elephants in Orissa during 1990-96

Forest Division	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
Athgarh	-	-	-	1	-	-
Angul (W.L.)	-	1	1	-	-	-
Angul (T)	2	1	-	-	-	-
Athmallik	-	-	1	-	1	-
Balliguda	-	-	3	3	2	-
Bonai	-	-	-	2	-	-
Deogarh	-	-	1	1	-	-
Dhenkanal	1	1	1	-	-	-
Ghumusar North	1	5	6	3	-	-
Kendujhar	-	-	-	-	-	13
Kalahandi	1	-	-	-	2	-
Karanjia	-	-	-	4	-	-
Paralakhemundi	-	-	-	1	4	1
Phulbani	1	-	1	2	-	1
Raygada	3	1	2	1	1	-
Sundargarh	-	-	-	6	1	-
Total	9	9	16	24	11	15

W.L. - Wildlife; T : Territorial

Forest Division and two in Karanjia Forest Division. With the death of 74 human beings and injury to 21 persons during the six years under study, Rs. 6,80,000 compensation was assessed except for 3 persons who were killed by wild Elephants inside the Reserved Forests for which no compensation is paid according to rules. Out of the above sum, compensation amounting to Rs. 2,72,000 could not be paid up to the end of 1996 because of either want of allotment of funds, or want of legal heir of the deceased, or want of enquiry report from the concerned Superintendent of Police.

Causes of Man-wild Elephant conflict

1. *Conflict due to habitat encroachment* : The prime cause of man-Elephant confrontation is the encroachment of Elephant lands by human beings. Elephants react sharply to activities which are not natural to its habitat. Bharatpur forest block in Chandaka Elephant Sanctuary was once full of forest growth and Elephants moved freely. But due to expansion of Bhubaneswar City, the capital of Orissa, the forests of Bharatpur forest block have been degraded to the state of bushy growths. Now Elephants are confined to Chandaka forests about 7.5 km away from Bharatpur forests as the crow flies. However, the Elephants have not forgotten the Bharatpur forests presently covering about 10 km^2. Elephants during the period of paddy crops, raid the crops in the night and take shelter during the day in the Bharatpur forests. It is a common experience that whenever temporary structures are erected inside this forest block for the purpose of nursery or otherwise these are attacked by the Elephants. The author was the State Silviculturist from March 1993 to August 1998. During 1996 it was decided to develop a medicinal garden in Bharatpur forest block for *in-situ* and *ex-situ* conservation of medicinal plants. A 50 ha land was surveyed, demarcated and fenced with R.C.C. pillars and barbed wire. A thatched house was erected for watch and ward. It was observed that Elephants damaged the barbed-wire fencing and demolished the thatched house in the first year of their erection. It is an established fact that Elephants attack any intrusion into their habitat at the first opportunity. Because of the rising human population and encroachment on the habitats of Elephants, man-Elephant conflicts are on the increase.

2. *Conflict due to migration of Elephants* : Elephants are wandering animals. There is movement of Elephants within the habitat and from habitat to habitat. So during their movements Elephants come across human habitations and their agricultural land. Consequently there is damage to crops and houses as well as human casualties. During June, 1993 to July, 1997 Elephants from Roam Mosabani of Bihar came a number of times to Deuli Range of Baripada Forest Division through Midnapore in West Bengal and did considerable damage to human settlements.

3. *Delicacy of crops and intoxication due to brewed Rice and Mohua flower* : Elephants have a penchant love for paddy, Sugarcane, brewed Rice and 'Mahua' flowers. Paddy crops along the fringes of Elephant habitats are raided invariably by them. Similar is the case with Sugarcane. It has also been observed that Elephants raid tribal houses for brewed rice and country liquor made of Mahua flower. After drinking the brew, they run amok destroying fields and huts.

Elephants also crave salt. The author had the occasion to observe in the early hours (at 1 AM) of 30.08.1992 a male adult bull entering the kitchen of Chahala Forest Rest House inside Similipal forests to lick salt kept in the kitchen for cooking. On another occasion a herd of three female Elephants took away a bagful of Mahua flowers from the Range Office of Chahala.

4. *Need of water* : During the peak of summer season there is shortage of water inside the forested area. Wild animals depend on the available water in the nearby irrigation dam and village ponds and Elephants visit these water sources during night and in the process they damage the crop fields and huts on the way to the water points. Elephants have the ability to smell the availability of water from a distance (Allaway, 1979; Leuthold, 1977). Elephants are known to risk their lives in search of water. During February 1998 there was scarcity of water around Bharatpur forest block. A tusker which was residing there during that period used to come up to a tank near Baramunda bus stand of Bhubaneswar city in the dead of night. It even tried for water in the campus of the State Silviculture Garden where the present author was residing. It was observed that it came close to the well in search of water. The Elephant was ultimately found dead possibly due to electrocution while it passed through the horticultural garden of Orissa University of Agriculture and Technology while in search of the water tank near the Baramunda bus-stand. During the summer of 1996 an Elephant damaged the water pipe of the Social Forestry nursery at Bharatpur to drink and play with the water that poured out of the pipe.

Resolution of conflict

1. *Elephant-proof barriers* : The most prevalent Elephant-proof barriers are trenches and high voltage power fencing. Elephant proof trenches are an age old practice to keep off Elephants from Forest Rest Houses deep inside the forest. The size of such trenches is 3 metres deep, 2.5 metres across at the top and 1 metre to 1.5 metres at the base. Such trenches have been dug along the boundary of Chandaka Elephant Reserve. About 20 man-days are necessary for digging one metre of such trench, costing Rs. 600.00 at the rate of Rs. 30.00 per manday. Further regular maintenance of such trenches is necessary as very often they are filled up with soil during the rains and the effectiveness is decreased. The annual maintenance of such trenches is 50% of the cost of the initial investment. Because of the high cost of digging and maintenance of Elephant-proof trenches and possible danger of trenches turning into ravines when dug along the contour, the practice of Elephant barrier has been discouraged.

The present practice of high-voltage electric fence of a non-fatal type is being increasingly used against Elephants (Blair *et al.*, 1979; Hoare, 1992; Jayawardene, 1995; Sukumar, 1989). The present author estimated a solar power fencing system along the periphery of the 50 ha medicinal garden established inside the Bharatpur forest block to be Rs. 3,00,000 at the price prevailing in 1997. Thus the cost of a very good sophisticated power fence with alarm system against theft of wire and other materials would never cost more than 20% of the cost of trench fencing. The annual maintenance cost would be 10 to 20% of the initial investment. Power fence raised

along some portions of the Chandaka Elephant Sanctuary became ineffective due to lack of maintenance. Nowadays several firms have come up to undertake installation of power fencing and its repair. Arrangements could also be made with Orissa Renewable Energy Development Agency of installation and maintenance of solar power fencing. The success rate of such power fencing is better than trench fencing. Elephants are known to be able to get past these fences using their ingenuity. Nevertheless, proper maintenance and regular and continuous patrolling especially at night are necessary to make such fences effective. Gallagher Ltd. (Anon., 1989) enumerated the advantages of power fencing over conventional fencing as follows :

(i) Easy to construct as lighter materials are required.
(ii) Alarms can be fitted to monitor fence breaks.
(iii) Construction is cheaper and proceeds more quickly in rough terrain.
(iv) Designs can be changed easily.
(v) Electrified components can be attached to the existing fences.
(vi) Longer life due to reduced physical pressure on the fence.
(vii) Aesthetically more pleasing.

2. *Removal of encroachments* : Encroachment in any form into Elephant habitats must be discouraged. Human settlements not only deprive Elephants of the use of significantly large areas of the habitat but also deprive them of significantly preferred habitats as people and Elephants both prefer areas close to water source (Desai and Baskaran, 1996). Habitations existing deep inside the forest should be relocated for betterment of both wild animals as well as people.

3. *Provision of water during scarcity* : Water-holes should be created inside the forest so that Elephants do not have to come out in search of water and compete with the people and cattle for water from the village ponds and irrigation tanks. For places of high water scarcity as in Badrama Wildlife Sanctuary possibility of availing ground water through boring may also be explored and provided to Elephants deep inside the forest on experimental basis.

4. *Discouraging chasing of Elephants* : Traditional methods like lighting of torches, beating of drums and exploding crackers are sometimes successful for chasing away wild Elephants from the crop fields. But these practices make the Elephants revengeful and do not work against experienced raiding Elephants. Notwithstanding, experiments could be conducted on the use of high frequency sound 'beepers' (Piesse, 1982) or noise frequency intolerable to Elephants (Sukumar, 1989). A domesticated, trained Elephant squad should be created to drive out wild Elephants from the problem areas.

5. *Capturing rogue Elephants* : The habitual and major problem Elephants should be captured through drug immobilization and domesticated.

6. *Social Security Schemes* : Loss of life and property of the poor people living inside forests and along the fringes should be compensated adequately. As per the provisions in the Wildlife (Protection) (Orissa) (Amendment) Rules, 1991, in case of death of a human caused by the attack of an Elephant within a forest area or within a belt of 5 km from the limit thereof, a compassionate payment of Rs. 10,000 for the death of an adult and Rs. 3,500 for a minor can be made. Compassionate

payment on account of (a) permanent injury to an adult is Rs. 10,000 and to a minor is Rs. 5,000 and (b) temporary injury irrespective of adult or child is Rs. 1,000. In case of death of cattle, compassionate payment amounts to Rs. 1,500, Rs. 2,000 and Rs. 5,00 for cow/bullock, buffalo and calf respectively. In case of crop damaged by wild Elephants within a belt of 5 km from the limits of a forest area there shall be compassionate payment of Rs. 500 per acre of crop damaged and in case of damage to a house Rs. 3,000 in case it is totally damaged and Rs. 1,000 in case of partial damage. The quantum of compassionate payment is very meagre considering the present cost of living. Sometimes the earning member of the family dies or is permanently incapacitated due to attack of an Elephant. Therefore, an insurance scheme should be introduced with necessary premium being borne by Government. This will create confidence in the interface of people as the present quantum of compensation is negligible to the loss sustained by them.

7. *Educating the people* : The people of interface should be educated about the Elephant-man conflicts through various mass contact systems e.g., seminars, 'padyatras', forming committees, various programmes on All India Radio, Television programmes, show of films etc., so that people will be more compassionate to the Elephants.

Ecotourism is potentially another powerful tool for increasing employment and income of interface people and in return can enhance local support for forest protection and conservation (Swain, 2000). Besides generating valuable foreign exchange to boost national economy, ecotourism will attract direct financial support for conservation of Elephant in general and payment of adequate compensation for loss of life and property of poor people in particular. Ecotourism can educate visitors and local people alike on the value of conserving Elephants and Elephant habitats.

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SUMMARY

Man and Wild Elephant conflict is as old as human civilization. With the increase in human population and fragmentation of Elephant habitats this is felt more frequent at present than ever before. In this paper crop raiding of Elephants and human deaths due to Elephants in Orissa have been discussed. Out of 275.8 ha of crop damaged during 1990-1991 and 1995-1996, paddy constituted over 200 ha. Next to paddy was Sugarcane covering about 20 ha and remaining 55 ha had crops like maize, ragi, coconut plantation etc. Similarly, human deaths due to attack by wild Elephants in Orissa were 74 and injury to 21 persons. The causes of man-wild Elephant conflict are encroachment of Elephant lands by human, conflict due to migration of Elephants, delicacy of crops and intoxication of Elephants due to brewed Rice and Mahua flower and shortage of water inside the forested area. For the resolution of man - wild Elephant conflict it is suggested to construct Elephant-proof barriers, removal of encroachments, especially on their corridors of migration, provision of water where scarcity of water occurs

during summer, capture of rogue and troublesome Elephants, social security schemes against damages caused by Elephants, education of the interface people and ecotourism.

उड़ीसा में मानव और जंगली हाथी टकराव

देवव्रत स्वैन

सारांश

मानव और जंगली हाथी टकराव मानव सभ्यता जितना ही पुराना है । जन संख्या में वृद्धि और हाथियों के प्राकृतावासों में विखण्डन होने से पहले की अपेक्षा इस समय यह अधिक बारम्बारता से अनुभव किया जाने लगा है । प्रस्तुत अभिपत्र में हाथियों द्वारा उड़ीसा में फसलों पर हमले और उनके कारण मानवों की मृत्यु का विवेचन किया गया है । 1990-91 और 1995-96 के दौरान हानि पहुंची कुल 275.8 हेक्टे० फसल में धान की फसल 200 हेक्टे० से अधिक रही । धान के बाद आती है गन्ने की फसल हानि जो 20 हेक्टे० रही और बाकी का 55 हेक्टे० मकई, रागी, नारियल रोपवन आदि का रहा । इसी तरह उड़ीसा में जंगली हाथियों के हमलों में 74 लोग मरे और 21 लोग घायल हुए । मानव-हाथी टकराव के कारण हैं हाथियों की भूमि में मानव अनधि प्रवेश, हाथियों के प्रव्रजन के कारण टकराव, फसलों का नाजुक होना, चुआए चावल और महुआ पुष्पों से हाथियों का नशे में आवारा और जंगल लगे क्षेत्र के अन्दर पानी की कमी/मानव-जंगली हाथी टकराव को मिटाने के लिए हाथियों से न टूट पाने वाली अवरोक बनाना, अनधि प्रवेश दूर करना, विशेषत: उनके प्रव्रजन गलियारों से, जहां गर्मियों में पानी की कमी पड़ जाती है वहां पानी का प्रावधान करना, बदमाश और परेशान करने वाले हाथियों को पकड़ना, हाथियों से होने वाली क्षति के लिए सामाजिक सुरक्षा योजनाएं आरम्भ करना, लोगों और पारिस्थिकीय पर्यटन में आमना-सामना करने की शिक्षा देना उपाय स्वरूप सुझाए जाते हैं ।

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