



Human casualties due to man-elephant conflict in and around Bandipur National Park, Karnataka, India: A case study

H. G. Lingaraju ✉ and G. V. Venkataramana

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Abstract

Human injury and death caused by wild elephants are most severe manifestations and very crucial aspects of human-elephant conflict. In the present study survey has been carried out in the fringe villages around Bandipur National Park, Karnataka, in the year 2013 (Jan-May) to study human injury and death. Available forest department records on human fatalities from 2001 to 2012 have been incorporated during analysis. The present investigation revealed, twenty seven human death and twenty one injuries, of the 48 victims, 38 were males and 10 were females. Male victims, were aged between 21-70 years, females were between 25 - 60 years old. Casualties by elephants for men was higher than female, about 79% of these incidents were caused by bulls. Distance traveled by the elephant and number of conflict incidents found to be negatively correlated. People have been killed or injured by elephants include farmers (53%), grazers (18%), dwellers (11%), laboures (16%), etc., 54% incidents had occurred in and around the farmlands and more number of incidents usually have been reported at night. Totally over rupees 37 lakhs has been paid as compensation for these deaths and injuries that have occurred in between 2001 and 2012. Forest department has to initiate steps to avoid reoccurrence of such incidents in the future.

Keywords: *Casualties, ex-gratia, farmland, national park, occupation, victims*

Introduction

An objective assessment of the relative impact of injury or loss of human life due to elephants is hard to achieve. Value of human life should not be compared with the value of crops damaged and property destroyed, nor weighed up against the life of an elephant. However, human injury and death caused by elephants are very rare and most severe manifestations and very crucial aspects of human-elephant conflict and are universally regarded as intolerable events (Tchamba, 1995; Sitati *et al.*, 2003; Malima *et al.*, 2005 and Santiapillai *et al.*, 2010). Human deaths and injuries, although less common than crop damage, it accounts for less than 0.5 per cent of all human-elephant conflict incidents (Tchamba, 1996 and Malima *et al.*, 2005). Incidents resulting in human injury or death are usually 'unfortunate spatial coincidences' when the paths of elephants and people cross each other (Sitati *et al.*, 2003). The risk of being killed by an elephant is very low, especially compared to other

causes of mortality, such as malaria or motor vehicle accidents (Kuriyan, 2002). Although every injury or death due to elephants is a regrettable tragedy, devastating at the household level, it is not a significant problem at the national level. However, even isolated incidents fuel the fear of elephants in rural communities (Kaltenborn *et al.*, 2006) and hampers local perceptions of wildlife and conservation (Thirgood *et al.*, 2005). In most cases casualties occur as accidents under the following circumstances: (i) accidental contact with an elephant at close quarters notably on paths near water bodies; (ii) the frustration of being prevented from reaching fields by crop guarding farmers usually at night (Sukumar, 1989); (iii) when people get too close to elephants which are traumatized, injured, harassed, in musth or females with young calves (Leggat *et al.*, 2001); (iv) settlements and agriculture that block traditional routes also lead to aggressive elephant behaviour and conflict (Naughton *et al.*, 1999) and (v) the continued harassment, when elephants are driven into forests from human dominated landscapes (Madhusudan, 2003). Compared to the numerous studies analyzing

Author's Address

¹Department of Studies in Environmental Science, University of Mysore, Mysore, India.
E-mail: gurusiddappahs@gmail.com

the crop raiding behavior of elephants, there are few studies that analyze the loss of human life caused by elephants. While working in Kodagu district, South India, Nath and Sukumar (1998) recorded average 6 human deaths by elephants per year. From other Asian country in Sri Lanka Jayawardene (1993a) and Santiapillai and de Silva (1994) also have accounted killing of human being in Mahaweli project area and Hadapanagala area in Sri Lanka respectively. Presented below is an analysis of the circumstances under which the encounters took place in Bandipur National Park and briefly these events are discussed in this paper.

Material and Methods

Study area: Bandipur National Park lies in Chamaraajanagar district of Karnataka, India. The study area comes in between the latitudes 11° 35' 34'' N and 11° 57' 02'' N and the longitudes 75° 12' 17'' E to 76° 51' 32'' E. Covering an area of 868.63 sq km (Fig. 1) it shares its boundaries with Nagarahole National Park (Karnataka) to its northwest, Mudumalai Wildlife Sanctuary (Tamil Nadu) to its south and Wynaad Wildlife Sanctuary (Kerala) to its southwest. All these protected areas form the Nilgiri Biosphere Reserve, which is the favourable ground for the Asian elephant. Two national highways connecting Mysore - Ooty and

Mysore - Calicut passes through the park. Elevation ranges from 680 meters to 1455 meters (Himavad Gopalaswamy Hill) from the mean sea level. The average annual rainfall is between 914 mm and 1270 mm. The Kabini dam marks the boundary between Bandipur Park and Nagarahole National Park; the Moyar river separates the park from Mudumalai Sanctuary. In the year 1973 this park was brought under Project tiger. Three main seasons observed in the area, Monsoon from June to mid October when most rainfall occurs. Winter season starts from November to February and summer season is in between March and May. Approximately 200 human settlements lie near the Park boundary in the northern side.

Data collection: Basic information on human death and injuries in a study area were collected through the complaint received from the local people and compensation paid to them. This information was obtained from the records of the ranges of concerning forest divisions for the period 2001 to 2012 to make comparative study and to get a broader picture on human casualties in conflicts with elephants. The patterns were analyzed for determining factors responsible for encounters with elephants.

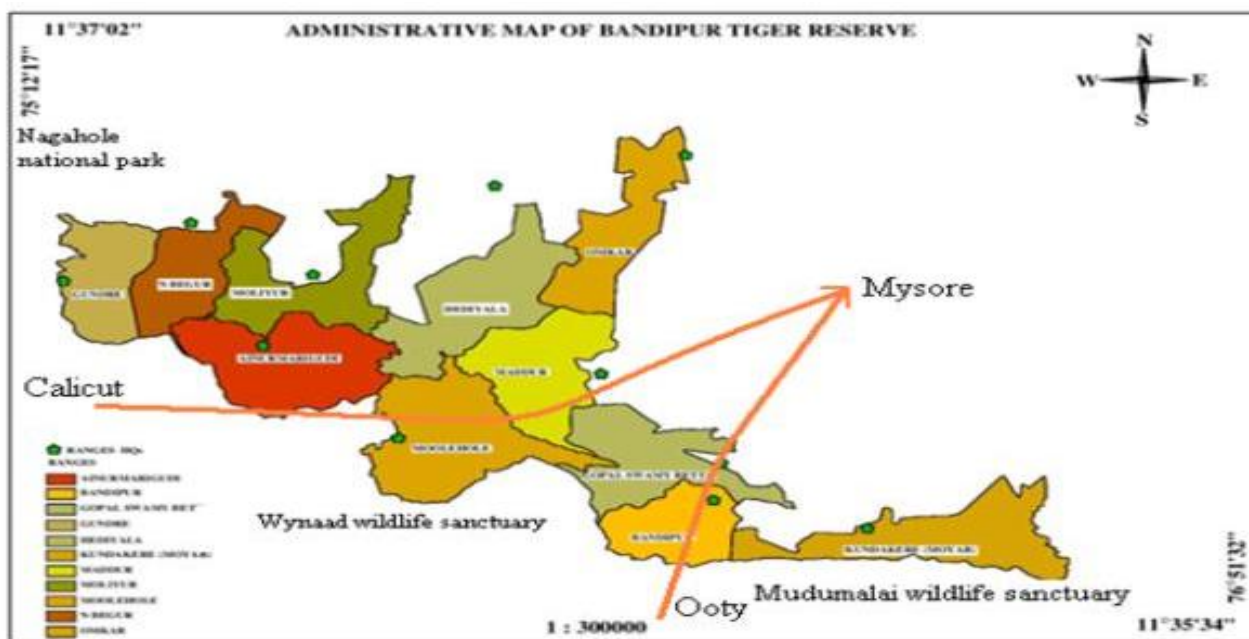


Fig.1: Map of the study area



Interviewing local people: Interview was conducted with the victims or their family members or bystanders or forest staff using Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) method (Chambers, 1994). Date and time, site of incident, age and sex of elephant involved, age and sex of person died, nature of death, kind of injury (if injured), cause of incident etc., were recorded. Spearman rank correlation (Sitati *et al.*, 2003) was used to check linear relationship between human casualties and distance from the park boundary.

Results and Discussion

In total, 48 incidents have been reported, of which twenty seven human death and twenty one injury were recorded within a period of twelve years, at an average rate of 6 to 7 human casualties per year by the wild elephants. The number of human casualties by elephants were sporadic, does not show a clear trend within study period, casualties increased gradually from 2001 to 2008 and then decreased gradually (Table. 1). Among the injury cases 27% was major (Fracture of bone, head injury, loss of limbs etc.) and 73% minor (mostly in the form of scratch, sprain, bruises etc). The number of incidents reported in the study area is very less, if we compare these results with other areas. Williams and Johnsingh (1996a) recorded total death and injury of 115 incidents from three districts of Garo hills, Meghalaya between 1984-95. Datye and Bhagwat (1993b) reported a total of 208 human deaths between 1980 and 1991 from south Bihar. From year 2001 to 2004 data related to injuries were not available from the forest department.

Season, time and location of incident: The seasonal analysis of events revealed that maximum casualties occurred in the rainy season (July-October) (Table. 2). Reports from various news papers (Elephant news India, 2010) also suggest that high number of human casualties occurs in the month of April to August due to sudden unprovoked attacks by lone tuskers. This is also the period considered to be the mating season of elephants in this region, when many adult bulls are in their musth state (Nanjappa, 2010). During this musth phase tuskers become violent and aggressive toward all other animals even to its own kind. Elephants seem to enter farmlands mostly during

night time. The time of attack was recorded for all the incidents, 14% incidents took place at dawn, (during our study, findings revealed that poor people in this region prefer a little bushy lonely area near their dwelling places to attend nature call in the early morning and that is probably one of the reasons of elephant attack in the morning hours). 17% was reported in the second quarter (0600hrs-1200hrs), while 23% occurred in the afternoon and 46% at night (Fig. 2). Poor visibility at night has been blamed for the accidental encounters (Datye and Bhagwat, 1995c; Nath and Sukumar, 1998 and Sukumar, 2003). Elephants are difficult to see in the dark and farmers frequently blunder into them when crop guarding. They may assume that all the elephants have been chased away when one or more could be using the cover of darkness to continue feeding. However, there were some accidental encounters also where both humans and elephants were unaware about each other's presence due to obscurity at night and suddenly came across. Surprisingly, 40% encounters took place in the daytime so it is likely the people either failed to sense the presence of elephants or did not realize the danger of going close to them when they saw them. Most of the human deaths had occurred in and around the farmlands (54%) while guarding crop (Fig. 3). Occurrence of these incidences in farmlands perhaps related to availability of crop and their subsequent harvest. Some bulls react aggressively to being chased away from crop fields and annoyed by torch light or the barking of a dog, this may explain the large number of mortality in farmlands (Sukumar, 1989). 19% of incidents have recorded near road which is adjacent to the forest boundary, when victims were on the way to home or farmland or outside the village for some work or waiting at the roadside for a bus or walking from the bus stop to their house in the evening. From the studies undertaken in southern India (Sukumar, 2003) reported 15% of casualties associated with roads during commute. 15% incidents were reported from reserved forests. Proximity to reserved forest increases the chance of encounters with elephants. Elephants that driven away from croplands may become more confident and even aggressive when encountering people in forests (Hoare, 2001a and Treves, 2007). Elephants are known to distinguish between 'safe' (forests) and '



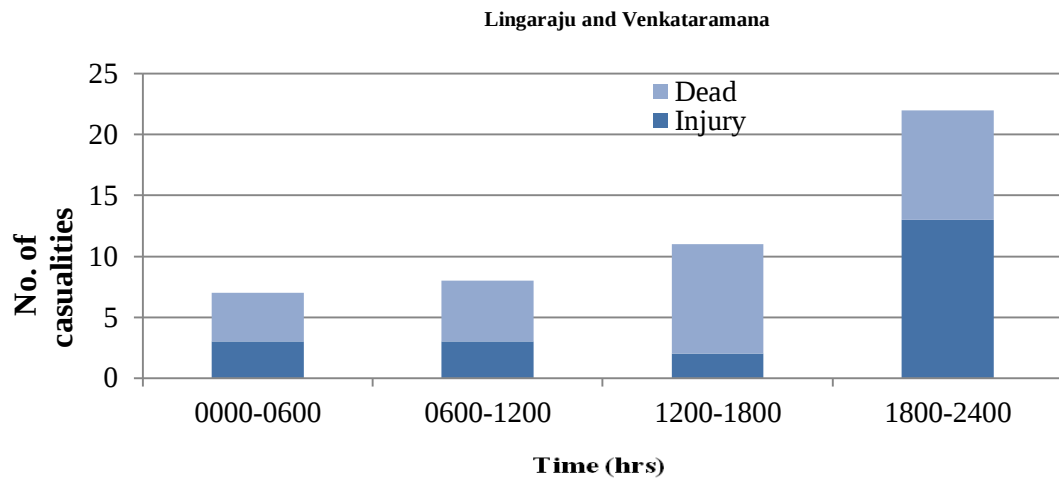


Fig. 2: Showing time of incidents that occurred between 2001 and 2012 in Bandipur National Park (n= 48).

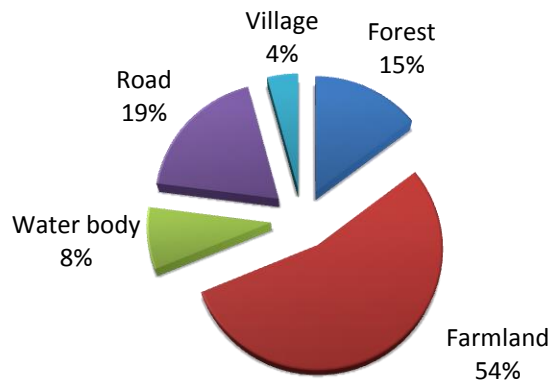


Fig. 3: Human kill and injuries by elephant at various locations from 2001 to 2012 in Bandipur National Park (n= 48)

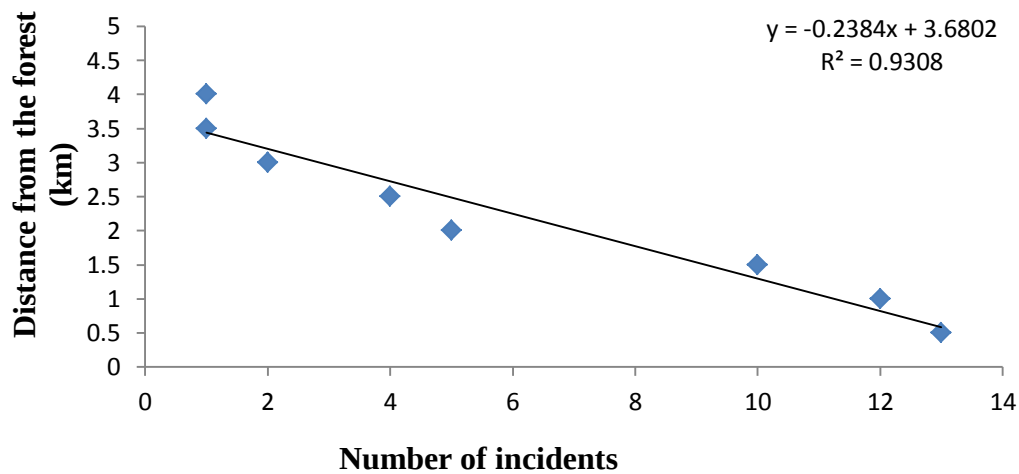


Fig. 4: Relationship between number of human casualties and the distance from forest (n= 48)

Table 1: Number of human casualties reported and ex-gratia amount paid to victims between 2001 and 2012 due to conflict in Bandipur National Park.

Year	Human Death		Human Injury		Total	
	No.	Amount (Rs.)	No.	Amount (Rs.)	No.	Amount (Rs.)
2001	3	3,00,000	*	-	3	3,00,000
2002	4	4,00,000	*	-	4	4,00,000
2003	4	4,00,000	*	-	4	4,00,000
2004	1	1,00,000	*	-	1	1,00,000
2005	1	1,00,000	1	25,000	2	1,25,000
2006	1	1,00,000	2	6,403	3	1,06,403
2007	3	4,50,000	3	19,248	6	4,69,248
2008	4	6,00,000	3	32,717	7	6,32,717
2009	3	4,50,000	3	37,867	6	4,87,867
2010	-	-	3	1,16,360	3	1,16,360
2011	1	1,50,000	4	56,000	5	2,06,000
2012	2	3,00,000	2	49,520	4	3,49,520
Total	27	33,50,000	21	3,43,115	48	36,93,115

*No data

Table 2: Seasonal pattern of human kill and injuries by elephants in Bandipur National Park between 2001-2012

Year	Season						Total
	Winter (Nov-Feb)		Summer (March-June)		Rainy (July-Oct)		
	No.	%	No.	%	No.	%	
<u>Human death</u>							
2001-2012	11	41	7	26	9	33	27
<u>Human Injuries</u>							
2001-2012	5	24	5	24	11	52	21



Higher risk (open grasslands, farmlands, villages areas and their behavior vary accordingly (Foley, 2002 and Douglas-Hamilton *et al.*, 2005). In some (8%) cases, a water body was located close to the location of incident, the remainder reported from village (4%).

Victim's age, sex and occupation: Of the 48 victims, 38 were males and 10 were females. Male victims, were aged between 21-70 years, females were between 25 - 60 years old. In the present study record of human casualties by elephants for men (83% fatalities, 71% injuries) was higher than female (17% fatalities, 29% injuries), this is a similar pattern that has been reported by Sukumar (2003) and Datye and Bhagwat (1995) in southern India. Men commonly go into the forest to graze cattle by day and guard crops at night might be a reason for higher occurrence of male mortalities. Elephants probably do not distinguish between gender or age of the people they attack and kill, most of the victims were engaged in some work related activity at the time of the encounter. The accounts of the circumstances in which people have been killed or injured by elephants include farmers (53%) attempting to defend their crop near fields, grazers (18%) entering forest or forest boundary for grazing their domestic animals, dwellers (11%) entering forest for collection of fire wood or forest produce. Labourers accounts 16%, who work in the fields near forest. In one case the forest watcher (2%) was participating in elephant drive operations, while running he slipped and fell and killed by elephant. The threat particularly to staff may be increasing due to growing densities of elephant in many protected areas (Nel, 2004). None of the victims was intoxicated at the time of the incident as best as we could confirm. Fig. 4 attempts to draw out the correlation between the distance traveled by elephants from the forest and the number of incidents. It is evident from the fig. 4 that almost 80% of the incidents fall within the range of 2 km. There may not be significant correlation between the distance traveled by the elephant and number of conflict incidents.

Composition of elephant group: The identity of the elephants involved in fatalities is largely unknown in most of the cases (ANCF, 2011). Details regarding kind of elephant involved in

human killing and injury for the present study were obtained only for thirty two cases by interviewing the eyewitnesses or family members in case of death and victims in case of injury. For remaining cases it was not possible to identify the sex of the individual elephants due to the fact that some incidents took place at night. Among confirmed cases about 79% of the incidents were caused by bulls. Sukumar (2003) reported bull elephants that wait near villages for nightfall to eat crops have been known to kill people, 13% by females and the remainder by a herd member (probably sub-adult male or female). Sex biasness in the elephant responsible for human killing was comparable with following literature. Several authors have accounted bulls were responsible for human killing (Thouless, 1994; Sukumar, 1989a; Williams and Jhonsingh, 1996a and Chowdhury *et al.*, 1997) due to their bad temperament and boldness. de Silva (1998) also recorded similar kind of observation in case of man slaughter in Sri Lanka, while others have reported the herds involvement (Thouless, 1994; Datye and Bhagwat, 1993b and Kumar, 1995) particularly with young calves.

In the majority of the human death/injury cases most of the elephants responsible were either in the state of musth, injured or a rogue individual. So it appears that elephants might have been in an aggressive mood at the time of encounters that resulted in human deaths or injury. Some times injury or disease may provoke elephant to attack human (Durrheim, 1999). In our observation in the study area no such case could be found. In an attempt to kill man, elephants usually first grab the victim with their trunk and then crush them by putting under pressure of their foot. Sometimes they throw them from high lifting position on the ground followed by trampling. Younger male victims struggled more to escape from the trampling attempt and therefore sustained more extensive injuries. Females and older men are less likely to put up much resistance. Das and Chattopadhyay (2011) recorded similar findings in their study in West Bengal.

Ex-gratia payment: Relief amount of rupees one lakh per victim till 2006, then increased to rupees one lakh fifty thousand per victim till 2012 is being paid to the victim or victim family by the state



government as early as possible to take care of the family and prevent retaliation against elephant conservation (Table. 1). The average delay in compensation was 4.5 months in case of human death while it was 11 months in case of injury. In case of injury to the person, the entire hospitalization and medical expenditure was reimbursed, the victims have received aid up to Rs 30,000 from the forest department. If there is permanent disability the amount usually paid is Rs.50,000 along with the necessary medical treatment. Totally over Rs. 37 lakhs has been paid as compensation for these deaths and injuries that have occurred in between 2001 and 2012. The present compensation is quite inadequate and the ex-gratia needs to be increased (interviews with victims).

Conclusion

High rates of killing results fear among people that hamper their ability to work and live normal lives. Most outdoor activities cease by 6 pm in the severely affected areas, as people are too scared to venture out, because elephants normally move out of the forest at that time. People of low socioeconomic group especially farmers living adjacent to forest boundary are vulnerable to wild elephants attack and they should be extra careful and vigilant in the afternoon and at night. Reduction of human elephant conflicts especially the human kills in Bandipur National Park will be essential to elicit people's support for elephant conservation.

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