



## Evaluation of people's perceptions towards human-elephant conflict in and around Bannerghatta national Park

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### Abstract

An assessment of human attitudes, towards elephant (*Elephas maximus*), is necessary in formulating appropriate policies for conserving wildlife. The aim of this study is to test the extent of how the experience people have of wild elephants influences their perceptions of, and attitudes towards, them, and to identify factors influencing their attitudes towards the conservation of elephants in the wild. This study was carried out in three villages near BNP through in-depth interviews of men (N = 70) and women (N = 20). Farming (49 %) is the major source of income for the local community. The majority of the respondents said that wild elephants caused anxiousness. A majority (58 %) of the people felt that deforestation in BNP (the neighboring territorial forests) has resulted in a higher human-elephant conflict. Variety of cultivated crops have been damaged by elephant, ragi (34%) was raided the most among all the cultivated crops. A variety of traditional mitigating methods are being used to combat conflict, but they were ineffective according to participants. Majority of them suggested regular patrolling (39 %) by the forest department officials and special joint patrolling (with villagers) is highly efficient methods to mitigate problem.

**Keywords:** Attitudes, Bannerghatta National Park, Crop raiding, Perceptions, Solar fences

### Introduction

As stated by Prabal *et al.*, (2008) human-elephant conflict greatly influence the socio-economy of the local people living close to elephant habitats, creating a pessimistic reaction towards elephants, thus hampering conservation efforts. It is important to understand that villagers often complain about the lack of support from concerned agencies during the depredation season. As most of the elephant habitats are surrounded by human habitation, any success in conservation effort depends on the people, their perceptions, and attitude towards the issues that they experience from the wildlife around them (Mehta and Kelert, 1988; Gadd, 2005). There are many methods widely followed to prevent or mitigate human-elephant conflict. These vary depending on several factors including the cost, the fund availability and social acceptance (Sukumar, 1989; Nath and Sukumar, 1998 and AERCC, 2006). Elephant proof trenches; power fences, walls, repellents, etc. have been in use in different areas (Nath and Sukumar, 1998). However, there have also been traditional methods of scaring away

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elephants in India, using sound producing mechanisms like drums, crackers, etc., and keeping watch on the cultivated areas. Although, human-elephant conflict issues has been considered to be one of major conservation issues, little or no emphasis has been given on understanding people's outlook and their participation towards planning, developing management and mitigation strategies. As per the status of human – elephant is concerned; there are two distinct areas of interests: local people's perception and participation. The perception is influenced or triggered by many visible or non visible mechanisms, among these, source of income, economic stability; cropping and damage patterns may critically influence the issue. The factor of people participation in mitigation measures may base on their experiences, need of safe guarding their life and properties, failure, non availability of government initiatives on conflict mitigation measures. An investigation on people's perception of the issue of human-elephant conflict (Mitchell and Slim, 1991; Boonzaier 1996; Harcourt *et al.* 1986; Ogutu 2002) has an immense value for management strategies for species and developing scope of co-existence. As part of understanding the status of human – elephant

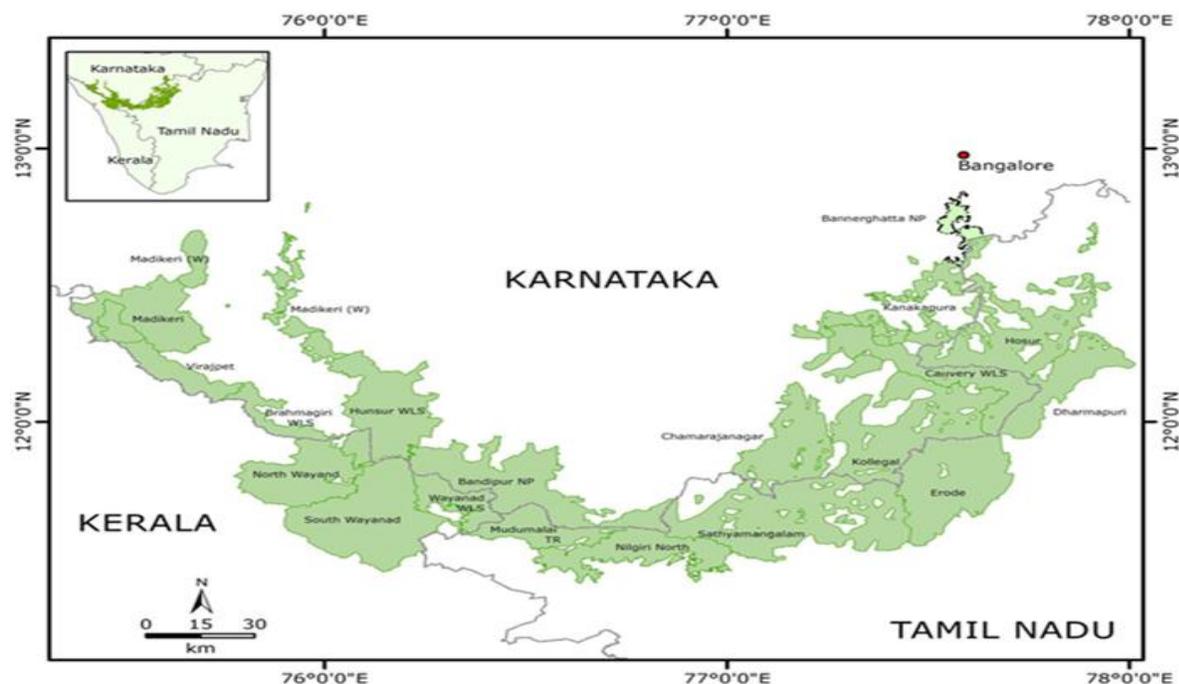


conflict issue, an attempt was also made to investigate the level of awareness and attitude of local people towards elephants in and around Bannerghatta National Park.

### Material and Methods

**Study area:** Bannerghatta National Park (BNP) is one of the smallest National Park in the country measuring about 103 km<sup>2</sup> in area (Singh, 2008). The park is highly irregular in shape and measures a maximum of 26 km in length from North to South and varies between 0.3 and 5 km in width from East to West. The park lies between 12° 34' N and 12° 50' N latitudes and between 77° 31' E and 77° 38' E longitudes (Rajeev, 2002). Though politically a small National Park, geographically the park is contiguous in the south with the largest remaining scrub forest of the country – the Hosur forest division of the Tamil Nadu state to the South-East and the Kanakapura forest division of the

Karnataka state to the South-West. These two further connect to larger forest tracks of the Cauvery Wildlife Sanctuary (Fig. 1) eventually joining the Nilgiri Biosphere Reserve of Western Ghats forest at Nilgiris stretching through Malaimahadeshwara hills, Biligiri Ranganatha Temple Sanctuary, Kollegal forest division and Sathyamangala forests (Singh, 2008). The park is further divided into three forest ranges namely the Bannerghatta range, Harohalli range and Anekal range for administrative purpose. The terrain of the park is highly undulating with a mean altitude of 865 m and ranges between 700 and 1035 m above mean sea level. The park receives an average annual rainfall of 937 mm ranging between 728 mm and 1352 mm. The park experiences rainfall across 8 months (April-November). The maximum rainfall (50 %) is received between August and October. January, February and March are the peak dry months.



**Fig. 1:** Map showing Bannerghatta National Park (BNP) along with other adjoining forest divisions

**Data Collection:** To understand the people's perception on human-elephant conflict, questionnaire survey was conducted for a period of a week in each of the three villages from three forest ranges. For this, a data sheet was prepared with several parameters (socio-economic aspects of

the villagers, extent of human-elephant conflict, preventive measures, alternate income source, conservation value of elephant, views of the villagers on responses of forest department in terms of mitigation measures, the compensation schemes, current methods of mitigation and suggested

methods for mitigation were also noted). With the help of a field assistant, acting as translator, we interviewed participants. Each interview took approximately 40 minutes to complete. Participants were chosen on the basis of the order in which they were met as we walked through the village visiting each compound in turn. Only one adult member of a household was interviewed. Only those people who were willing to participate were included in the survey (Ogra, 2008).

## Results and Discussion

### 1. Respondent Demographics

Thirty people were interviewed from each village from each forest range. This resulted in a total of 90 respondents. Households typically included the father as the male head of household, one or more wives, unmarried children, and often, other extended family members. Out of 90 questionnaire participants, most (78 %) were male due to the nature of the male-dominated society. The majority of all respondents (47 %) were under 40 years old, 36 % were between 40 and 60 years old, and 16 % were over 60 years of age.

### 2. Source of income

The results show that agricultural farming (49 %) to be the major source of income for the local community. This indicates that agriculture constituted the backbone of the economy of these areas.

This was followed by employment as agricultural labourers (22 %) and cattle keeping (13 %). Employment as casual laborers was found as a source of income for nearly 7.5 % of the respondents. Around 4% of the community was involved in business such as running petty shops, cable television network services, carpentry and quarrying. The results also show around 4% of the population was employed in the nearby private small scale industries.

### 3. Human-elephant conflict extent

According to the villagers interviewed, human-elephant conflict has been increasing 51 % to 75 % of damage was experienced by 41 % of the villagers, followed by 37 % villagers with 26 to 50 % of damage, 7 % villagers with 76 to 100 % damage and 5 % of the villager's experienced 1 to 25 % damage. About 5 % of the villagers reported no damage to crop while 5 % of the people had no opinion about the status of conflict during this survey. A majority (58 %) of the people felt that deforestation in BNP (the neighboring territorial forests) has resulted in a higher human-elephant conflict. 12 % felt that it was due to a behavioral change of the elephant. Interestingly, about 16% of the people felt that destruction of the BNP along with a behavioral change of the elephant had resulted in high human-elephant conflict (Table 1).

**Table 1: Cause of human-elephant conflict (Opinion of villagers)**

SL No	Cause of Human-elephant conflict	Degree of conflict (%) Change
1	Destruction of the BNP	58.14
2	Habitat loss	2.33
3	Shortage of elephant food	4.65
4	Behavioral change	11.63
5	Combination of 1 & 3	16.28
6	Combination of 1 & 4	2.33
7	Combination of 2 & 3	2.33
8	Combination of 3 & 4	2.33

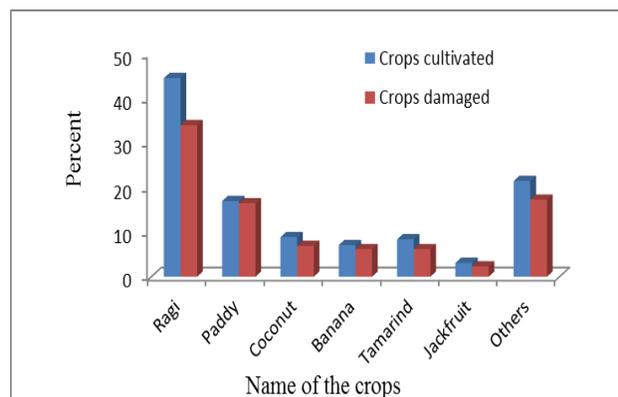
### 4. Crops cultivated and damaged

A total of 23 crops were found to be cultivated in the survey villages during the study period. Among the crops cultivated, Ragi (*Eleusine coracana*) dominated (44.6%) followed by the cultivation of Paddy (*Oryza sativa*) (17%), Coconut (*Cocos nucifera*) (8.9%) and Banana (*Musa paradisiaca*)

(7.11%). It is interesting to note that the crops cultivated in these villages were found to match information on crop type extracted from the compensation claim records for the study area. People's opinion on reasons for elephant visits to these villages were found to be primarily for water and crops (65.0%), exclusively for crop (33.0%)



and for liquor (6.0%), which was reported from only one village. The crop damage data collected showed that Ragi (34%) was raided the most among all the cultivated crops (Fig. 2), which was followed by Paddy (16.5%), Coconut (6.9%), Banana (6.2%), Tamarind (6.2%) and Jackfruit (3.1%).



**Fig. 2: Relationship between percentages of crops cultivated and damaged by the elephants.**

### 5. People's perceptions of elephants

Over 60% of respondents said that they thought that elephants were dangerous (Table 2). When they were asked to elaborate on this, it became clear that most people considered elephants capable of injuring and even killing humans on occasions. Many people expressed that elephants were aggressive and unpredictable in their behavior. However, amongst some of the men interviewed, and particularly the older men, it was reported that elephants were only dangerous to people when the animals, or their young, were being threatened in some way. Men were more frightened of wild

elephants than women. This difference was probably due to the fact that men were the primary gatherers of resources and frequently encountered crop raiding wild elephants, which negatively influenced their anxiousness (Røskoft *et al.*, 2003).

### 6. Should elephants be conserved?

Nearly 65% of respondents were in favour of elephants being protected in BNP (Table 2). From numerous discussions and casual conversations with men and women during this survey, and throughout previous field trips, it was apparent that the concept of 'conservation' to local people included the notion of 'protection', where 'protection' was not just protection of wildlife from people's activities but also the protection of people from the action of wildlife. Of the 16 people who said they were not in favour of conserving elephants in BNP, by far the most commonly cited reasons were that elephants were liable to cause crop damage and were very dangerous to humans. People who rely on agriculture for their sole income and are at risk of experiencing crop damages by elephant are more likely to be negative attitudes towards elephant (Dickman, 2010). Level of crop damage can influence local attitudes toward conservation (De Boer and Baquete, 1998; Naughton-Treves, 1998; Okello, 2005). The majority of people not in favour of conserving elephants were women. Our study found a significant increase over time in households reporting crop damages by elephants. As such, any plans to conserve elephants must consider the people who share the same living space, as increases in conflict can lead to local opposition of conservation efforts (Taylor, 1999).

**Table 2: Frequency of responses given to questions about perceptions of elephant's and whether they should be conserved within BNP.**

Question	Type of response	Frequency of responses	
		Men (n = 70)	Women (n = 20)
1. Do you think elephants are dangerous?	Yes	53	11
	No	5	2
	Only when disturbed	8	1
	Unsure	4	6
2. Should elephants be conserved in BNP?	Yes	48	8
	No	9	10
	Unsure	13	2

### 7. Deterrent Measures Used

Human-elephant conflict is a very complex problem that may vary enormously from one area to the next (Hoare, 2001). Every field site has specific characteristics and it is unlikely that any single method will work in all situations (Osborn and Parker, 2003). A variety of methods are being used in and around BNP (Table. 3). Traditional measures used by people were by far the most common such as firecrackers, drumming and making various kinds of sounds. The mention of EPTs and solar fencing refers to barriers erected by the Forest Department, which were present only in a few villages near reserved forests in the east. From the questionnaire survey analysis we found that none of the active drive method is fully effective if use singly, but a combined effort is quite effective. Use of combinations of methods was also suggested by Hoare (2001) since reliance on one or two individual methods is particularly vulnerable to failure. Effectiveness levels of various deterrent measures are evaluated (Table 4). Most of the interviewees felt that the traditional methods were not very effective. Opinion was equally divided between somewhat effective, slightly effective and ineffective. However traditional methods must have some level of effectiveness otherwise people would not continue using them.

**Table 3: Deterrent Measures Used by Local People**

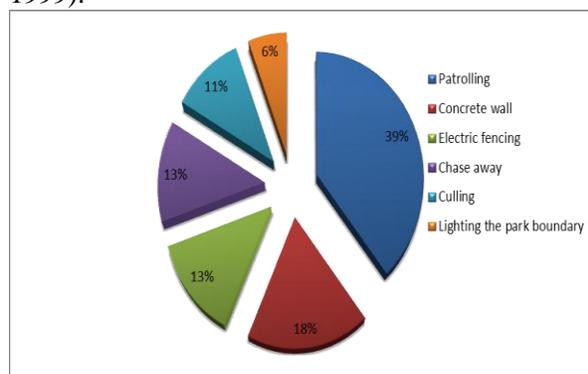
Deterrent Measures	Number of Respondents
Fire Crackers	21
Making Sound, Drum, Trumpet	15
Throwing Fire, Making fire	29
Barbed Wire	19
Other	6

**Table 4: Effectiveness of traditional measures**

Effectiveness	Number of Respondents
Very Effective	15
Somewhat effective	18
Slightly effective	34
Not effective	23

### 8. Suggested remedies

During questionnaire survey when the villagers asked to recommend some possible effective measures which can be applied towards reducing human-elephant conflict, majority of them suggested regular patrolling (39 %) by the forest department officials and special joint patrolling (with villagers) during the paddy harvesting time. Next to patrolling majority of the respondents recommended a concrete wall (18 %) construction along the park boundary, so that no animal including elephant can come out of the park, followed by electric fencing (13 %), chase away (13 %), culling (11 %) and lighting the park boundary area during night time (6 %) (Fig. 3). Some of the respondents suggested for electric fencing. But, the materials, installation and maintenance costs make this method impractical for large-scale applications in poorer developing countries despite its technical effectiveness (Taylor, 1999).



**Fig 3: Methods for reducing elephant depredation suggested by villagers during field survey in BNP**

### Conclusion

All the communities surveyed were involved in crop cultivation. The source of income was from agriculture and only a small proportion of villagers depended on salary based jobs. The land owning is about 1-5 acres. Some farmers feel elephants come for water. They also feel decrease of forest cover and habitat destruction as being the causes of conflict. Among 14 different mitigation methods recommended, about 15 per cent of the villagers suggested killing of elephants. Rubble wall and establishing electric fence around the villages are some of the suggestions given by the farmers.



Farmers also suggest building permanent fool-proof physical barriers along the sensitive elephant entry points. Farmers expect the authorities to conduct regular meetings to share information about elephants and conflict mitigation measures. They also feel this can be achieved by conducting meetings at local level or through the television. Even though killing of elephants is met with low level of acceptance among the farmers interviewed, such a view does figure among the overall farming

community. Hence, this may require a high level of commitment from the conservation community to mitigate conflict.

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