



Human-Elephant conflict in Tumkur district, Karnataka, India

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ABSTRACT

Human – wildlife conflict is a major obstacle in any kind of conservation in any part of the world today. Whenever we hear about Human-wildlife conflict we think of forest and human settlement around protected areas. In particular with Human-elephant conflicts are happening mostly in many of the National parks, protected areas or around dense forests. But when we observe carefully about these conflicts they are increasing in an alarming rate. These days, areas which are far away from the natural habitats of elephants are also being suffered as evident from number of incidents in the near past. Human-elephant conflict is not a new issue in Karnataka state (India) but the conflict was restricted to few parts of the state from time immemorable. But in the last decade this problem has spread across areas which experienced this problem never before for instance human-elephant conflict in Tumkur district, which is one amongst the dry and famine struck districts of Karnataka. In Karnataka there are 42 forest divisions among which 25 divisions are experiencing human-elephant conflict currently.

Keywords: Wildlife conflict, conservation, protected areas, habitat.

INTRODUCTION

Asian elephant [*Elephas maximus*] is one of the largest herbivorous, terrestrial mammals which is currently having the conservation status of 'endangered species' according to IUCN 2008 and considered as a keystone species (Swaminath and Gubbi, 2012). Asian elephant plays an important and crucial role in ecology as a long distance seed dispenser. In the state of Karnataka, Asian elephants are largely used as flagship animal with respect to wildlife conservation (Swaminath and, Gubbi, 2012). In comparison to the total population density of Asian elephants, India comprises 50% of elephants approximately (Sukumar and Lalitha, 2010) here are over 28000 elephants are living throughout the India (Verma et al., (2009) and in southern states of India Karnataka Kerala and Tamilnadu holds maximum densities of wild elephants which is around 10000 elephants (Verma et al (2009).

According to Elephant census 2010, Karnataka state with over an area of 14500 sq. kms area has 5700 (5300-62000) wild elephants which constitutes the one fifth of the total elephant population of India and the major densities of elephants can be seen concentrated in Southern parts of the state especially in and around the Mysore elephant reserve which is spread across over 6463 sq.km s area (A Report of Karnataka Elephant Task Force (2012).

Human-Elephant Conflict:

Human-elephant conflict can be defined as 'Any negative impacts which results from negative interaction between human and wild animals and these negative impacts affects the human's social, economic and cultural life and also affects the wildlife population and the environment (Manoj et al., 2013). According to IUCN world park congress 2003, human-wild animal conflict spikes in the circumstances where the requirements of wild animals overlap with the needs of human population affecting both the human and wild animals (Manoj et al., (2013). A series of direct or indirect negative interactions between human and wild animal consequences in human- wild animal conflict (Manoj et al., 2013). In India an average 400 human deaths are reported annually due to elephant attack and about 100 elephants lost their lives as a result of retaliation. Where as in Karnataka state an average of 25-30 people were killed annually in recent years (A Report of Karnataka Elephant Task Force (2012) by elephant attack and this

has become a major issue in conservation of elephant. The human-elephant conflict in Karnataka was common in and around the natural habitats of elephants but in recent years this problem is spreading even to areas which is having neither suitable habitat nor a traditional corridor for elephants. Human dominated landscapes like Tumkur District also experiencing the human-wild elephant conflict in a serious manner in recent years (A Report of Karnataka Elephant Task Force, 2012; Swaminath and Gubbi, 2012; Ravindranath *et al.*, 2014).

Study Area:

Tumkur district is located on eastern part of the Karnataka State [India], between $76^{\circ} 21' - 77^{\circ} 31' E$ latitude and $12^{\circ} 44' - 14^{\circ} 20' N$ longitude (Swaminath and Gubbi (2012). Areas of reserved forest in the district are approximately 800.76 km (Swaminath and Gubbi (2012). The average rain fall is 617.8 mm / year (Yathiraju, (2012).

The revenue district of Tumkur is having 10, 64,755 hectares of geographical region. 52-63% of land is used for cultivation only 10% of land under forest coverage, the remaining land is either barren or used for human activities (Yathiraju, 2012).

Tumkur forest Division has 10 forest ranges (Range gowda (2003), namely 1) Tumkur 2) Gubbi 3) Kunigal 4) Tiptur 5) Chikkanayakanahalli 6) Bukkapatna 7) Madhugiri 8) Sira 9) Koratagere 10) Pavagada.

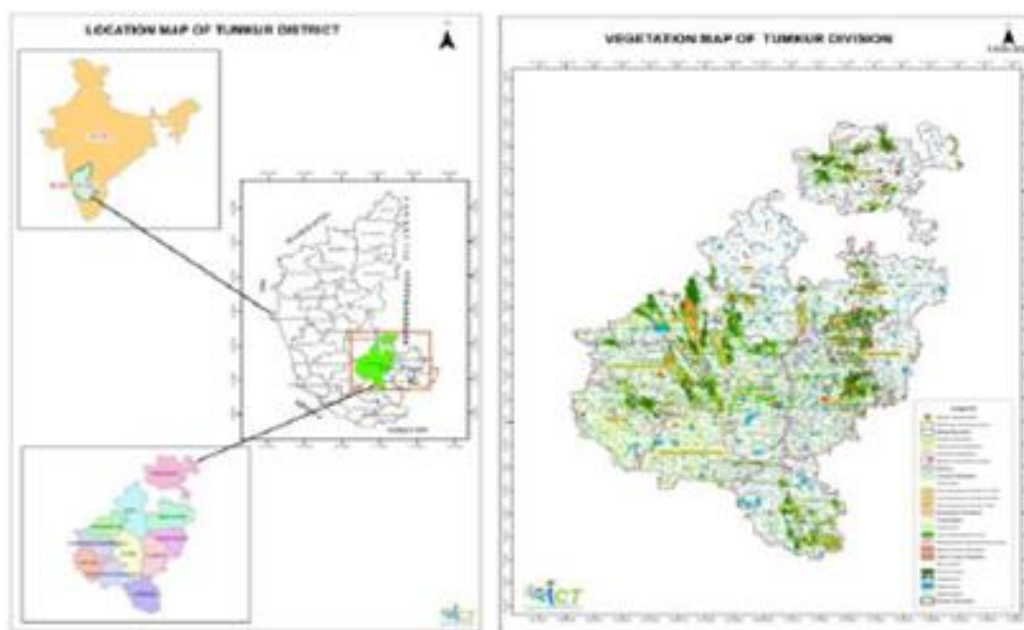


Fig.1: Map Showing the study area chosen (Tumkur District)

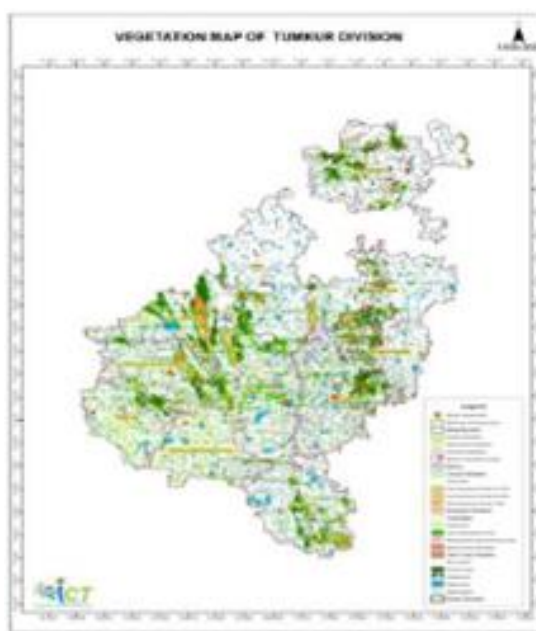


Fig. 2 Map Showing Vegetation of Tumkur District

Tumkur district is having 90465.94 hectares of forest area, which can be classified into following 4 types (Range gowda, 2003).

- 1) Southern Tropical Dry mixed Deciduous forest- Type 5A/c3
- 2) Southern Tropical Dry mixed Deciduous Scrub- Type 5A/d5
- 3) Southern Tropical Thorn forest- Type 5A/c1 and
- 4) Southern Thorn Scrub- Type 6A/ds1

Forests of Tumkur district are not suitable habitat for large mammals like elephants and this division is not a natural habitat for elephants and it is not having any connectivity corridors also Chellaiah et al. (2010), Swaminath and Gubbi (2012).

Movement of wild elephants in Tumkur district

The wild elephant which are causing human-elephant conflict in Tumkur district are basically the habitants of Bannerghatta National Park. Bannerghatta National Park is one of the smallest national park of India, which is having high density of elephant population and a significant protected area in the view of elephant conservation (Verma et al., 2009).

Elephant from Bannerghatta National Park have traditional path for ranging up to Savanadurga reserve forest of Ramanagara which is also a conflict affected area (Ravindranath et al. (2014) As Tumkur forest division is adjacent to Savanadurga forest, the conflict gradually extended to Tumkur range and to Gubbi, Chikkanayakanahalli, Tiptur range. Elephants, the habitants of Bannerghatta National Park start ranging to Savanadurga forest area then head towards Tumkur range via Adarangi reserve forest [Nelamangala range, Bangalore rural division] (Ravindranath et al., 2014). After taking the entry into Tumkur range they move to Gubbi range, Chikkanayakanahalli, Tiptur ranges, along the way causing huge crop lose, crop damage, asset loss and human injury and death.

Causes:

The major cause for the human-elephant conflict in the district is the intrusion of wild elephants into the Tumkur district from Bannerghatta National Park. The increasing human pressure due to human activities like extensive mining, stone quarrying, sand mining in and around the national park, collection of firewood, cattle grazing, fragmentation of protected area by construction

of roads. Weed infestation also pose a serious threat (Verma Vijay et al.,2009).

Due to this the degradation, fragmentation and disturbance is raising in and around the BNP (Anand et al., 2006; Gopalakrishna, 2012; A Report of Karnataka Elephant Task Force). Scarcity of fodder and water also one of the major issue (Gopalakrishna, 2012; Verma et al., 2009). The availability of water and palatable crops throughout the year in the Tumkur district attracts the elephants into the district. The failure in the proper maintenance of barriers around the Bannerghatta National park also a cause for the conflict (Gopalakrishna, 2012; Verma et al., (2009).

Another cause is lack of awareness of Elephant behaviour among public of Tumkur. As elephants are not a natural habitant of Tumkur district and most of the human death are caused when people tried to chase elephants. When elephants stray near croplands or plantations people will gather, cracks the crackers and make sounds which irritates the elephants. Stressed elephants cause more crop loss, human injury, human death due to trampling. In some cases of human death, the victims are sleeping near their staking to secure them during night and trampled accidentally. The Lack of coordination among forest officials of different forest divisions and lack of trained forest personals in mitigating human-elephant conflict was also important cause during initial years of the issue.

Adopted Method:

Collection of data:

Data of cases of Human-elephant conflict in Tumkur Division is collected from the Forest Department of Karnataka State. Data of Climate, rainfall, Land usage are collected from Statistics department of India Karnataka, Tumkur.

Data Analysis:

The data of Human Elephant Conflict during 2010-15 in Tumkur District is compiled in the form of spread sheets and data is analysed using analysing tool MS Excel

Maps:

The maps of Human-Elephant Conflict are generated using software Arc Map-10.

Human-Elephant conflict in Tumkur district

Table 1: Showing the details of number of villages affected by Human-Elephant conflict in Tumkur District during 2010-15

Sr. No.	Range	Total no. of. HEC affected villages in Tumkur District during 2010-15					Total
		2010-11	2011-12	2012-13	2013-14	2014-15	
1.	Tumkur	30	21	14	49	65	179
2	Gubbi	18	17	24	31	38	128
3	Kunigal	19	10	0	0	0	29
4	Tiptur	1	0	0	0	0	1
5	CNHalli	2	0	0	3	7	12
6	Bukkapatna	10	5	5	0	1	21
7	Madhugiri	0	0	0	0	0	0
8	Sira	2	2	0	2	0	6
9	Koratagere	0	0	0	0	0	0
10	Pavagada	0	0	0	0	0	0
		82	55	43	85	111	376

Source: Forest Department of Karnataka

Table 2: Showing the details of number of cases of Crop loss due to Human-Elephant conflict in Tumkur District

Sr. No.	Range	Total no. of. Cases (HEC Crop loss) in Tumkur division during 2010-15					Total
		2010-11	2011-12	2012-13	2013-14	2014-15	
1.	Tumkur	68	61	65	305	877	1376
2	Gubbi	181	56	136	101	160	634
3	Kunigal	20	10	0	0	0	30
4	Tiptur	1	0	0	0	0	1
5	CNHalli	9	0	0	5	18	32
6	Bukkapatna	23	18	5	0	1	47
7	Madhugiri	0	0	0	0	0	0
8	Sira	4	6	0	6	0	16
9	Koratagere	0	0	0	0	0	0
10	Pavagada	0	0	0	0	0	0
		306	151	206	417	1056	2136

Source: Forest Department of Karnataka

Table 3: Showing the details of Compensation amount paid towards cases of Crop loss due to Human-Elephant Conflict in Tumkur District

Sr. No.	Range	Compensation amount paid towards Crop loss by wild Elephant in Tumkur division during 2010-15					Total
		2010-11	2011-12	2012-13	2013-14	2014-15	
1.	Tumkur	32150	515480	314240	9714544	4874166	15450580
2	Gubbi	722005	124500	781570	360895	982413	2971383
3	Kunigal	55380	32490	0	0	0	87870
4	Tiptur	6200	0	0	0	0	6200
5	CNHalli	22680	0	0	38150	73400	134230
6	Bukkapatna	82660	27530	21300	0	2000	133490
7	Madhugiri	0	0	0	0	0	0
8	Sira	15700	14400	0	12500	0	42600
9	Koratagere	0	0	0	0	0	0
10	Pavagada	0	0	0	0	0	0
		936775	714400	1117110	1012608	5931979	18826353

Source: Forest Department of Karnataka

Table 4: Showing the details of Numbrere of Human death due to Human- Elephant conflict in Tumkur District

Sr. No.	Range	Total no. of Human death cases occurred in Tumkur District during 2010-15					Total
		2010-11	2011-12	2012-13	2013-14	2014-15	
1.	Tumkur	1	0	1	1	1	4
2	Gubbi	1	0	0	2	1	4
3	Kunigal	0	0	0	0	0	0
4	Tiptur	1	0	0	0	0	1
5	CNHalli	0	0	0	1	0	1
6	Bukkapatna	0	0	0	0	0	0
7	Madhugiri	0	0	0	0	0	0
8	Sira	0	0	0	0	0	0
9	Koratagere	0	0	0	0	0	0
10	Pavagada	0	0	0	0	0	0
		3	0	1	4	2	10

Source: Forest Department of Karnataka

Table 5: Showing the details of Compensation amount paid towards Human death due to Human-Elephant Conflict in Tumkur District

Sr. No.	Range	Compensation amount paid towards Human death due to Human- Elephant Conflict in Tumkur division during 2010-15					Total
		2010-11	2011-12	2012-13	2013-14	2014-15	
1.	Tumkur	200000	0	500000	500000	500000	1700000
2	Gubbi	150000	0	0	1000000	500000	1650000
3	Kunigal	0	0	0	0	0	0
4	Tiptur	200000	0	0	0	0	200000
5	CNHalli	0	0	0	500000	0	500000
6	Bukkapatna	0	0	0	0	0	0
7	Madhugiri	0	0	0	0	0	0
8	Sira	0	0	0	0	0	0
9	Koratagere	0	0	0	0	0	0
10	Pavagada	0	0	0	0	0	0
		550000	0	500000	2000000	1000000	4050000

Source: Forest Department of Karnataka

The study of data can be summarised as follows:

There are 82 villages which were affected by human elephant conflict in the year 2010 and their number has increased to 111 villages at the end of year 2015 (Fig 5), it is evident that there is an increase in human elephant conflict in Tumkur District. There are 225 cases of crop loss by elephants in the year 2010 and the number has escalated to 997 during the year 2015 (Fig 6). There is increasing trend of crop loss cases with each year in a substantial manner. Among 10 ranges of Tumkur district 7 ranges are experiencing the human-elephant conflict during the study period and 3 ranges have no human-elephant conflict issue completely (Fig 8) and out of 7 human-elephant conflicts affected ranges Tumkur and Gubbi ranges highly affected with 1376 and 634 cases of crop loss cases respectively. Bukkapatna range (47 crop loss cases), Chikkanayakanahalli range

(32 crop loss cases) and Kunigal range (30 crop loss cases) are moderately affected by human-elephant conflict. Sira range having the human-elephant conflict with 16 crop loss cases. Tiptur range also experienced this problem occasionally whereas Madhugiri, Koratagere and Pavagada ranges never experienced the human-elephant conflict the study Period (Fig 7). Compensation amount of Rupees 18826253 was given towards cases of crop loss which were reported during the period of 2010-2015 (Fig 9). There were 10 human death incidences occurred during 2010-14 (Fig 10), among which 4 deaths occurred during 2013-14. As compensation amount rupees 4050000 was given to the families of the victims (Fig 11). Out of 10 human death cases 4 deaths was reported from Tumkur range, 4 deaths reported from Gubbi range, 1 death from Tiptur and 1 death from Chikkanayakanahalli range (Fig 12).

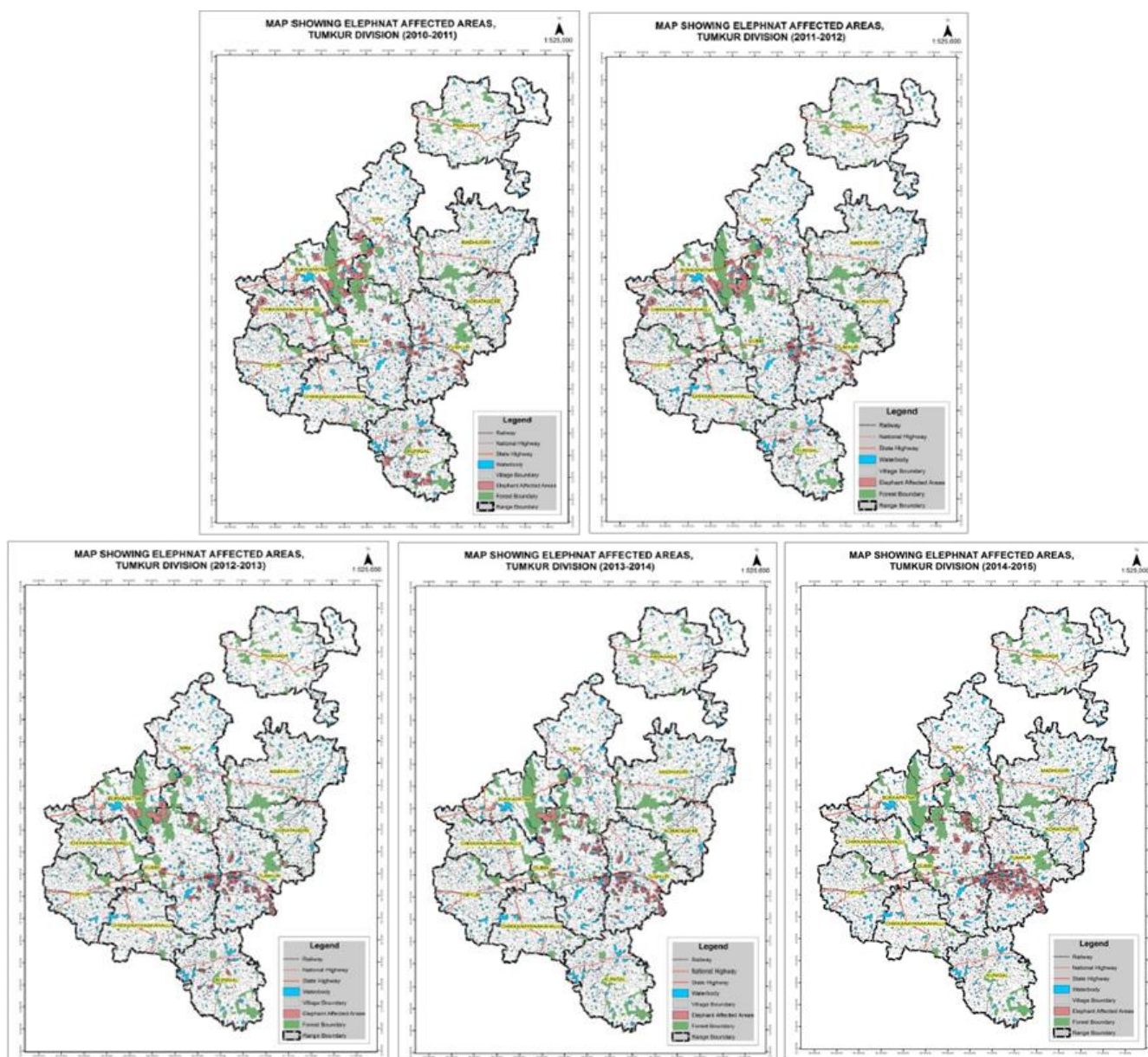


Figure 3-7: Maps showing Human-Elephant conflict in Tumkur District during 2010-14.

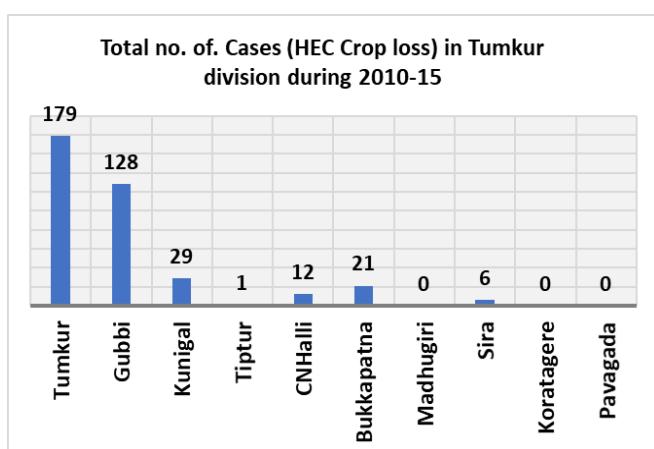


Fig. 8: Showing total no. of. Cases (HEC Crop loss) in Tumkur division during 2010-15

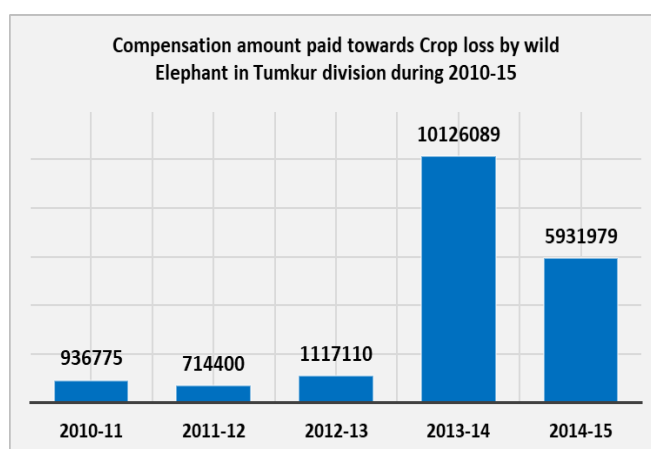


Fig. 9 : Showing Compensation amount paid towards Crop loss by wild Elephant in Tumkur division during 2010-15

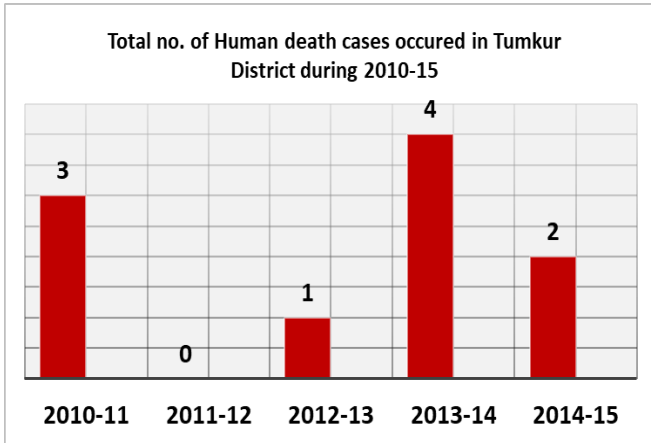


Fig. 10: Showing total no. of Human death cases occurred in Tumkur District during 2010-15

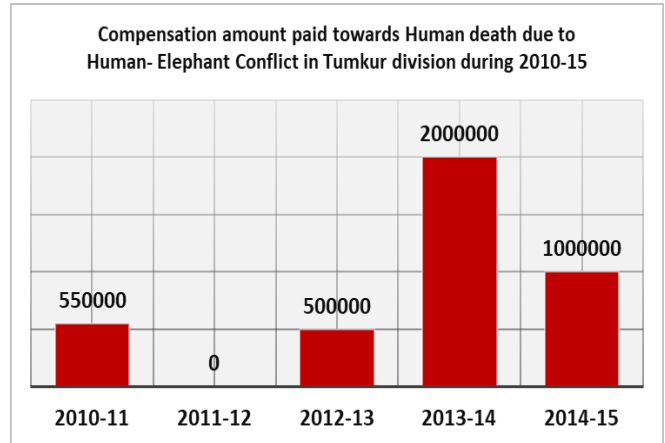


Fig. 11: Showing Compensation amount paid towards Human death due to Human- Elephant Conflict in Tumkur division during 2010-15

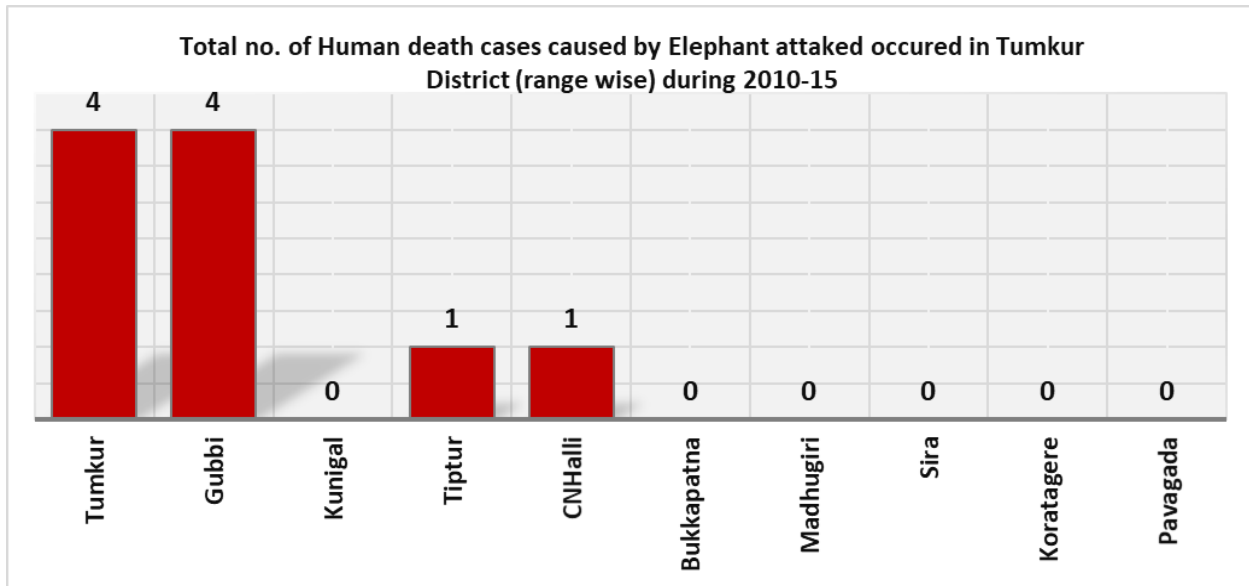


Fig. 12. Showing total no. of cases of Human death (range wise) caused by Elephant attacked occurred in Tumkur District during 2010-15

DISCUSSION

The issue of human-wild elephant conflict in Tumkur district or forest division began in the year 1997 with the entry of a single male elephant from Savanadurga forest area of Ramanagara forest division. Which has been connected to Bannerghatta National Park and there are 20-30 elephants have been reported in division -ETF.

Later the elephants started intruding and causing small quantities of crop damage occasionally till the year 2000. There after every year, during the months of December and January the frequency of visits has increased gradually to a predictable extent. During 2010

the issue of human-elephant conflict emerged in a significant manner causing huge amount of crop destruction, crop loss, human injury and mainly human deaths. From 2010 every year there was a significant increase in the frequency of conflict and the areas under the conflict was also increased to a large extent. Now, out of 10 forest ranges, 6 six ranges are affected by wild elephant conflict. The number of elephants is also increased indeed 10-08-12 elephants is also increased indeed to 8-12 elephants in single herd or two herds. These herds composed male, female adults, sub adults, juvenile adults also. Though during initial years, the level of conflict was less with every passing year the issue become a more serious problem.

Initially these elephants were visiting just the agricultural fields of rural parts of Tumkur taluk. Now we can see the intrusion of elephants into urban areas of Tumkur city, Gubbi town or near proximity of National and state highways, thus creating panic among public. During the year 2014 they travelled up to forest of Chikkanayanakanahalli range, Tiptur range causing several human deaths, huge amount of crop destruction, asset lose, etc. Year 2014 experienced the peak of human elephant conflict in the district like never before.

Proposed Measures to be undertaken:

The root cause is in the Bannerghatta National Park, the degradation; fragmentation of protected area due to various reasons should be controlled.

Barriers around the BNP should be restored and constructed newly where ever they need current situation maintenance of barriers should be proper.

Creating awareness among public of Tumkur district with effective educative programs regarding the behaviour of wild elephants is an effective tool in mitigating of human death by elephant conflict.

Formation of Elephant task force, conducting proper training among forest personals, co-ordination among officials of different forest divisions, public should be maintained.

The procedures for claiming compensation for crop loss, asset loss, human injury or death should be simplified and quickly completed.

Observation and Inferences:

Through our study it is known that these wild elephants prefer to range in Gubbi range in most of the cases. Because Gubbi range more number of manmade water bodies- tanks and these water bodies get channel water supply from Hemavathi irrigation channel project. These tanks are having water almost throughout the year. As a result, farmers around the tanks activate verities of crops like, paddy, ragi, maize, Banana plantation, Mango plantations, Areca plantation, vegetable, flowers etc.

Conflict elephants which are experiencing scarcity of food and water in their natural habitat due to various reasons get attracted to this easily available, nutrient rich, palatable food. Hence, they since to reach and spend prolonged time in and near proximity of tanks in Gubbi range. These tanks also provide ideal shelter for

elephants during day time, when they are resting the crop depredation is observed mostly during night time. During night, these elephants set movement march for forage before sunrise again they reach water bodies and take shelter during day time. Even, the straying of elephants into human settlements like Tumkur city, Gubbi town has been observed during nights only. It is known that the straying of wild elephants into the Tumkur Division during initial years was occasional, later the visits were observed only during December – January months. But during recent past there is no seasonal visits or regular visits has been observed as such. They are visiting the Tumkur Division throughout two years.

The straying pattern, crop depredation pattern, frequency of straying into the district are very irregular and non-predictable. But we can predict their movement path to some extent. The elephant movement path starts from Bannerghatta national park and goes through Bidadi, Kanakapura and Madadi in Ramanagaram district, Shivagange in Bangalore rural district, Devarakere, Davarahosahalli, Olakallu, Guler, Mallasandra, Gubbi, Nittur, Chikkanayanakanahalli, Tiptur and Turuvekere in Tumkur district.

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