



Sloth Bear *Melursus ursinus*- Human Conflict: A case study of unprotected bear habitat in Kudligi taluk, Ballari district, Karnataka

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Abstract

A field study was carried out to decipher the root cause of conflict between Indian Sloth Bear (*Melursus ursinus*) and human at Kadekolla cluster villages in Ballari district of Karnataka state. Data was collected through interviews with the 58 victims living in eight villages who survived serious injuries during 2001 to 2016. The study revealed that, the modern horticultural practices to grow orchard plants on the other side of bear habitat as reason for the attacks. While returning from orchards in the morning hours, bears encounter people going to their farmlands, thus conflict occurs. 58 % of the bear attacks occurred in farmlands and the victims of attack were in the age group of 31-50 years. 57 % of attacks were made by solitary bears and 33 % of attacks by mother bear and cubs. 41 % of the victims received serious head injuries 5 % of the victims succumb to the fatal injuries. 36% of the attacks occurred within 1 kilometer distance from the villages. 55 % of the victims felt that the change of crop pattern was the root cause of man-animal conflict in this area. It is also realized that the excessive human activities, deforestation and non-availability of water were the causes for the conflict.

Keywords: Indian sloth bear, kadekolla, orchards, sloth bear-human conflict, change of crop pattern, sloth bear attack

1. Introduction

The Indian Sloth Bear (*Melursus ursinus*) is protected under Schedule-I of Indian Wildlife (Protection) Act, 1972 and listed as “Vulnerable” species by IUCN ^[1]. It’s ideal habitat consists of scrub jungle in a rocky outcrops, boulders and caves. It uses the rocky caves for shelter wherever available. It is distributed throughout India from the foot hills of Himalaya to the southern tip of Deccan Plateau.

The major population of Indian Sloth Bear is found in the Central Indian states such as Madhya Pradesh, Chhattisgarh, Orissa, and North Maharashtra. However, Western Ghats hold a good population of sloth bears ^[2]. Apart from this, a considerable population of Indian sloth bears is found in the eastern plains of Central Karnataka where two sloth bear sanctuaries are established viz., Daroji Bear Sanctuary and Gudekote Bear Sanctuary in the Bellary district ^[3, 4]. Another subspecies of Sloth Bear *Melursus ursinus inornatus* is found in Sri Lanka ^[5].

Sloth bears are widely distributed across the tropical regions of India ^[6]. Whereas in the past until the early 18th century, sloth bears may have occurred in most non-arid, low-altitude

forests of India. Their population was high till 18th century, but began to decline drastically due to hunting, poaching and loss of habitat by 1950 ^[7, 8, 9, 10, 11].

The sloth bear is omnivorous ^[12]. However, food resources for bears have diminished because of extensive damage to its habitat ^[13] from timber and firewood harvesting ^[14, 15] and burning. Additionally, humans compete directly with bears by consuming the bears' food resources ^[16]. Consequently human-bear conflicts arise because bears enter crop fields and consume agricultural crops (e.g., sweet potatoes, potatoes, onions, and groundnuts).

2. Materials and Methods

2.1 Study Area

The present study aimed at understanding the dynamics of sloth bear-human conflicts in 30 sq km area around Kadekolla village. (N14^o45'06 and E 076^o28'54) This village is located about 26 km away from Kudligi taluk and about 20 km away from Gudekote bear sanctuary (Fig-1). There are about 10 villages around Kadekolla, among them in eight villages the man-bear conflict was severe. They are as follows:

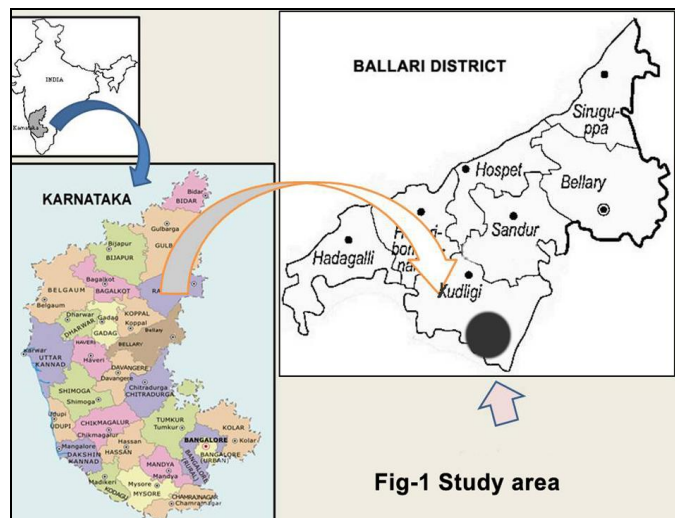


Fig 1

1. Kadekolla 1.5 km from the forest, 2. Bheema Samudra 2 km from the forest, 3. Makanadaku 4 kms from the forest, 4. Nela Bommanahalli 2.5 km from the forest, 5. Madlakanahalli 1.3 km from the forest, 6. Kradihalli 0.5 km from the forest, 7. Chikkajogihalli tanda 6 km from the forest and 8. Siddapura 8 km from the forest.

There is a scrub jungle in the eastern side of Kadekolla which is a degraded forest with rocky hills that provide shelter to the sloth bears and also has no perennial source of water. The forest is stretched to Narasimhagiri forest and Jarimale Reserve Forest, where a considerable number of bears are found.

2.2 Important flora

The forest type of this area belongs to Dry deciduous scrub and Southern thorn forests. Typical flora of this scrub jungle includes, *Acacia catechu* (Cutch), *Acacia leucophloea* (Bilijali), *Acacia nilotica* (Karijali), *Alangium salviifolium* (Ankole), *Albizia amara* (Tuggali/chuggali), *Anogeissus latifolia* (Dindiga), *Canthium parviflorum* (Kare hannu), *Capparis zeylanica* (Tottuluballi), *Carissa carandas* (Kavali), *Cassia fistula* (Kakke), *Ficus arnottiana* (Bettadarali), *Ficus benghalensis* (Ala), *Ficus racemosa* (Atti), *Givotia rottleriformis*, *Grewia damine* (Ulpi), *Grewia orbiculata* (Kari Jane), *Wrightia tinctoria* (Beppale), *Ziziphus jujuba* (bare), *Ziziphus oenopia*, *Ziziphus xylopyrus* (Godasi), *Rhus mysorensis* (Salabbe), *Erythroxylum monogynum* (Devadare), etc., most of these plants bear fruits in different seasons, throughout the year and are eaten by the bears. However, this forest area has been degraded due to uncontrolled grazing and browsing pressure by the local domestic cattle's and also firewood collection.

2.3 Climatic condition

The minimum rainfall is mainly confined to the period from June to November during the Southwest monsoon. The district average annual rainfall is 651 mm, 2 % more than the normal rainfall of 637 mm received during 2014. On an average, the district has 39 rainy days in a year. The general climate of the area is dry humidity with frequent droughts owing to scanty or no rainfall, resulting in low in water table and acute shortage

of water especially during summer months. In order to provide water a number of bore-wells have been drilled and the water is used for agriculture.

2.4 Sampling methods

Based on the primary data available i.e., from the local news papers reports about man-bear conflict in Kadekolla cluster villages were referred. For the collection of secondary data a questionnaire was prepared in both English and Kannada language and then authors visited the conflict prone villages especially the six villages once in a month from April 2015 to October 2015 to meet the victims of bear attack to find out the root cause of the problem by interacting with the community. In case of absence of victims, their close relatives or the friends were interviewed and data was recorded. A digital camera Canon 7 D with 18-55 mm lens was used to photograph the victims. GPS instrument by Garmin was used to record the longitude and latitude of the study area.

3. Results

It has been found that man-bear conflict prevailed in Kadekolla cluster villages for more than 15 years. Earlier to 1990 AD, there were no cases of bear attacks. The bears were living in the forest and using its resources like wild fruits, termites, ants, honey, dung beetles and water for their sustenance. But from 2000 AD onwards some local farmers began cultivating fruit crops in M.B. Ayanahalli, Siddapura, Chikkajogihalli and Banavikallu which are about 5 to 8 km away from the forest. A few landlords of these area started modern agriculture by drilling bore wells and began cultivation of cash crops like Mulberry (*Morus indica*) for silk worm rearing. When these plants attain fruits, the bears of Kadekolla forest gradually attracted towards them, started roaming in search of food and water in summer. It seemed that the sweet and sour fruits made the bears to get addicted to them. The bears started roaming out from their rocky abode in the early evening, crossing Kadekolla and all other affected villages listed above located on the way to reach the mulberry plantation by the night (Table-1). They were feeding upon mulberry fruits, termites, ants and other fruits if available, and drinking water from the farmlands before leaving for the rocky dens in the early morning hours. Sometimes bears were reluctant to go back to their caves about 4-8 km away and started resting in the mulberry farms itself. When the farmers came for watering the farm or to harvest the mulberry leaves, the relaxing bear would get frightened by approaching humans. If it is in safe distance it would run away but when it is in closure vicinity, it would attack the approaching person. This formed the initial stage of bear-man conflict. Later on orchards of pomegranate, guava and papaya were established in and around Chikkajogihalli, Siddapura, M.B. Ayanahalli, Banavikallu villages and paved a way for more severe conflict incidents (Fig-1 and 2).

While going to and from their dens to their feeding areas, they need to cross the affected villages and come across the people resulting in conflicts. Most of the conflicts occur during the day while the bears return from the orchards to the rocky dens. Some conflicts occur during the mid-day if bears relax in the bushes and plantations. Sometimes, when the villagers found the bears sheltering in their farmlands, they chased the bears

towards the forest. Hundreds of villagers armed with cudgels and weapons chased the bear for 2-6 km. Shocked by their sudden attack, the frightened bears galloped to save their life. In this course, when the bears found someone else in front of them, they mauled, bit or scratched them before running away (Fig-2).

3.1 Analysis of the problem

For the past 15 years the people of Kadekolla cluster villages were living in the fear of sloth bears. There were more than 100 instances of Man-bear interactions/ close encounters reported. However using the questionnaire, the 46 of 47 victims, who got serious injuries, were interviewed to understand the nature of bear attacks and further details. Some of them lost their eyes, (Fig 2: a, c) limbs and scalp (Fig 2: b, d) etc., in bear attack (Fig-2).

3.2 Year wise frequency of (Number) bear attacks

From the study it was revealed that of the total bear attacks about 17 % occurred in 2016. While about 12 % of the attacks occurred during 2005 and 2010. About 7% of attacks happened in 2003, 2007, and 2015. However, no serious bear attacks occurred during 2012. The study also revealed that, there was a gradual decline in the rate of bear attacks from 2012 onwards, but suddenly it has been increase in 2016 (Fig. 3).

3.3 Age group of victims of bear attack

The Figure 4 revealed the average of age groups i.e., from 11 to 61years as the victims of bear attack. Of this, about 30% victims were fall under the age group of 31-50 years, followed by the 28% in the age group of 41-50 years respectively. However, the victims under both 21-30 and 51-60years of the age group showed equal i.e. 17% each. About 6% of the victims fall under the age group of 61 years and above, followed by the 2.1% in the 11-20years and however no records of victims under the below 10years age groups.

3.4 Site of (Place) of attack and activities of victims of bear attack

The study also revealed that, of the site wise bear attacks about 58% occurred in the farmland, 21% attacks in and around villages, 12 % in the forests and 9% attacks on the people going on the way to farmland respectively (Fig-5). The study also revealed that, about 60 % of bear attacks occurred, when the victims were busy in agriculture activities, 15 % while grazing cattle in the forest, 12% while the victims were standing in front of their home in villages, 11 % while collecting the firewood in and on the boundary of the forest area, 4 % while the villagers were going to their daily chore and 4% while chasing the bear/ bears to outskirts of the villages or farmlands (Fig-6).

3.5 Time of attack

From the study it has been found that, the maximum bear attacks occurred during the day hours, i.e. from 6 AM to 6 PM and minimum thereafter i.e. (7 PM to 8 PM). About 43% of bear's attacks were occurred between 6-7AM and 7-8AM. This was the ideal time, when the bears returning from their "feeding grounds" to the rocky forest for shelter. The villagers

also go to the farm land early morning to protect their crop. Hence the probability of encounters was more in the morning hours. This trend continues even till 8-12 PM with 7 % of attacks and 5% of attacks occurred between 4 PM and 7 PM when the bears come out of their dens and go for foraging (Fig-7). From this, it has been cleared that the bears do not attack during the night as their chances of escape is easy rather than encounter.

3.6 Months of attacks

From the study, the month wise bear-human conflict was found to be maximum in the month of July with 28 %, followed by the February with 19 % and April with 6% of bear attacks respectively. This maximum of bear attacks in July was due to the region got good rain and insects like, termites, ants and dung beetle flourish in the farmlands which was ready for sowing (Fig. 8).

3.7 Number of bears involved in the attack

Of the total bear attacks, the maximum bear attacks, i.e. 57% (n=33) were made by the solitary bears, 33 % (n=19) by the mother with cubs and 10% (n=6) by two bears of which one mother and the other was a grown up cub (Fig. 9).

3.8 Type of injuries received

Among all the victims of bear attacks 41% (n=23) with head injuries. 36% (n=18) with injuries on the legs, 15% (n=7) with eye injury and lost their eyes, 5% (n=3) with fatal injuries lead to the death and 4% (n=2) with injuries on their back respectively (Fig. 10).

3.9 Reasons for attack and Vulnerable villages of bear attack

About 55% (n=32) of respondents opined that the change in crop pattern was the main reason for bears attack. Bears lured by the horticulture crops like Papaya, Guava, Sapota, Pomegranate etc., which has been cultivated in last 20 years in and around Hosahalli and Chikkajogihalli. And about 26 % (n=15) victims opined that the loss of habitat by cutting trees, excess grazing, sand mining, quarrying, and encroachment were the reasons for the conflict. Whereas, the 12% (n=7) opined that, bears attacks due to the non availability of food and water, followed by the 5% (n=3) with increased human activities in the forest for various reasons, and 2% (n=1) opined that because the bears like to suck the human blood respectively (Fig. 11). From the study, it was revealed that, Kadekolla is the most vulnerable with highest bear attacks i.e. 34% (with n=20 victims), followed by both Karadihalli and Bheemasamudra with 19% each (n=11 each), Makanadaku with 9 % (n=5), both Madlakanahalli and Siddapura with 5% each (n=3 each), and least in Nelabommanahalli with 2% (n=1) of of all the villages of bear attacks (Fig. 12).

4. Discussion

Probably, Sloth bears consider humans as their potential predators and react through their roaring and attacking, which is similar to those evoked in presence of tigers and leopards [17]. Indian sloth bears are crepuscular and nocturnal animals [9]. They rest the entire day and go out in search of food by evening and return to their dens by early morning. During the

midday, they rest in the caves if available otherwise under the thick bushes and crops [10].

Similarly, the bears in the present study area rest in the bushes around the villages or in the grown up crop. The reason for this behavior was that, they fed on the orchards of Siddapura, Hosahalli, Chikkajogihalli till morning and started returning to their caves for a distance of 5-8 km away. By that time it would become morning and so much of human activities began in the transit path around villages. Hence the bears found it easy to rest in the dense bushes or crops in the outskirts of the villages. When people went on their routine in the narrow lanes or inside the crop for watering, weeding and harvesting- bears that were relaxing in their respective places got irritated or frightened by the sudden interruption and attacked the 'intruder' before running towards the forest. In rare cases the bears attacked in the night when the farmers go for watering the crops in the darkness. Some instances while returning to their dens, they pass through the conflict villages and sometimes encountered the humans and attacked.

The data on period of attack revealed that it was maximum in the month of July followed by February and comparatively less in the rest of the months. It was observed that bears maul or bite the scalp and head, (Fig 2; b, d) which is a characteristic feature of bear attack. All attacks by the bears are not intentional and the bears attack human out of the fear and to escape from them. In one and half decade of bear's disturbances 3 victims succumb to the fatal injuries and 55

victims received serious injuries, who were hospitalized for months and most of them suffering from one or the other kind of disabilities.

The study revealed that, the sloth bears of this region used the villages as a corridor to reach the orchards on the other side of the bear habitat. And in this process they encounter the people and man-animal interactions occur. This observation also falls in line with earlier studies [7, 8, 18, 19, 20].

Lack of sufficient water and food sources in the forest and availability of fruits and water in the modern agricultural areas, attracted the bears to expand their feeding areas. Though the villagers of Kadekolla cluster have not seen the bears before two decades, began seeing them due to the new horticultural practices. The passages that bears pass through the villages to reach the orchards served as "induced corridors" for Sloth bears.

As the proverb rightly says 'prevention is better than cure', the villagers were trying to avoid any instance of bear attack. 23% of the respondents prefer to avoid going out alone in the night. Another 23% of the respondents prefer to use torch lights in the night while going outside. It is observed that there is a fear psychosis prevailing in all the six villages under study. Everyone in these villages seems to be suffering from *bear phobia* as they see the badly injured victims of bear attack every day. Hence there is a need of immediate intervention by the line departments to save the villagers as well as the Indian sloth bears from suffering.



a) Pujari Ningappa- who lost his left eye in bear attack



b) Ashoka-a 16 years old boy lost his scalp in bear attack



c) Ravishankar- lost his left eye in bear attack. Now he has a dummy glass eye



d) Madiwala Kadadeshi-received serious injuries on head and back in bear attack

Fig-2: Persons survived on bearing sloth bear attack

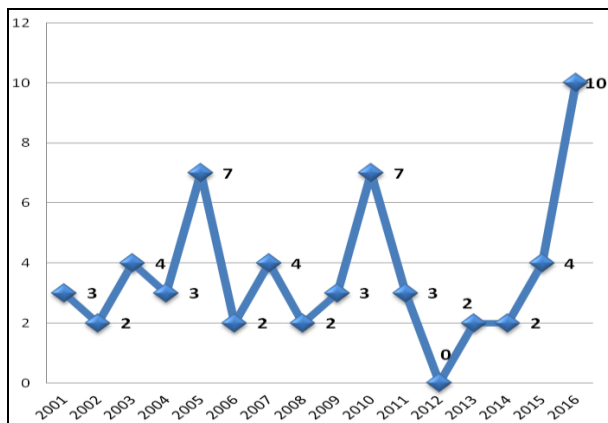


Fig 3: Bear attacks from 2001 to 2016

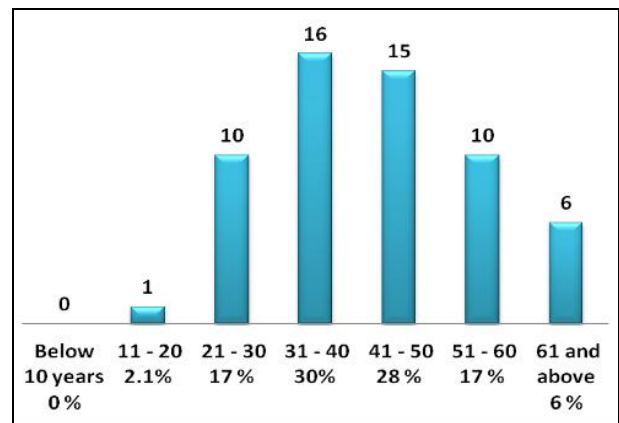


Fig 4: Age group of Victims

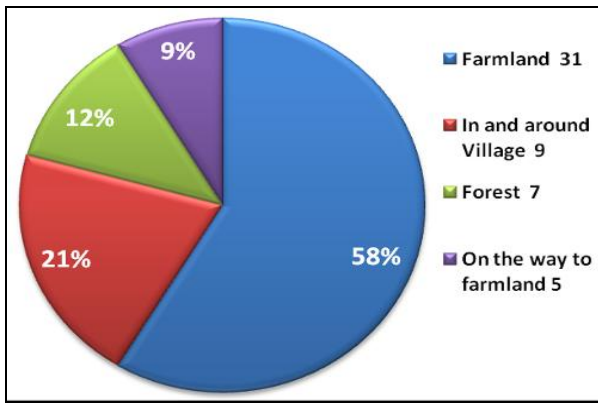


Fig 5: Place of bear attack

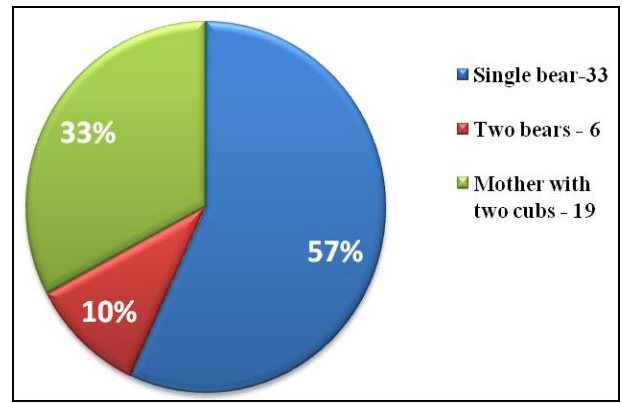


Fig 9: No. of Bears involved in attack

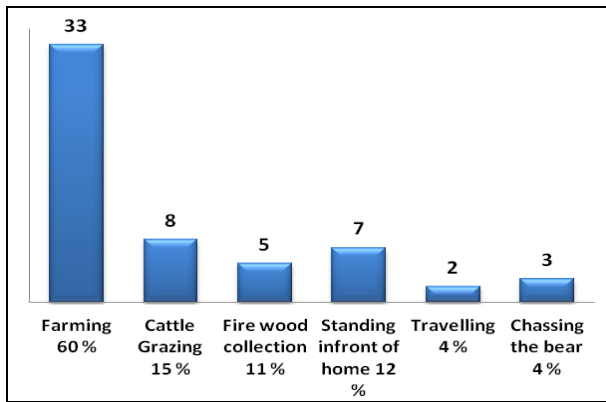


Fig 6: Activity of the victims of bear attack

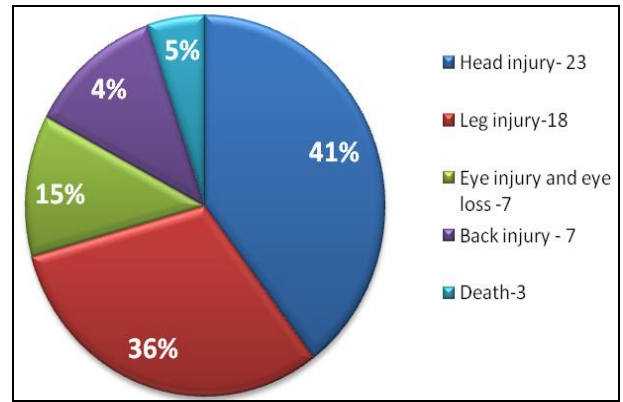


Fig 10: Type of Injury

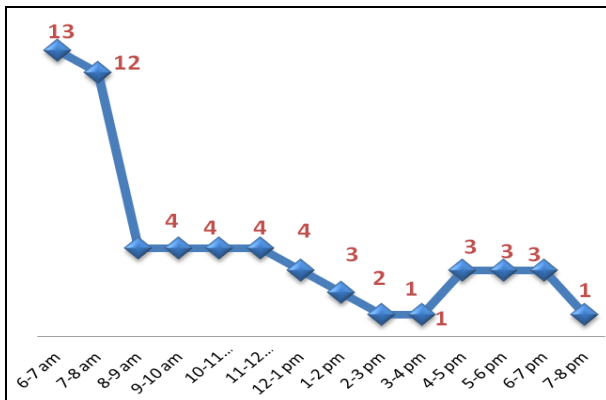


Fig 7: Time of attack

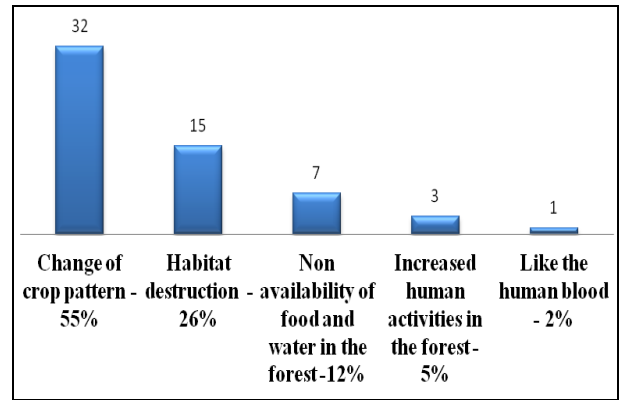


Fig 11: Reasons for Bear attack

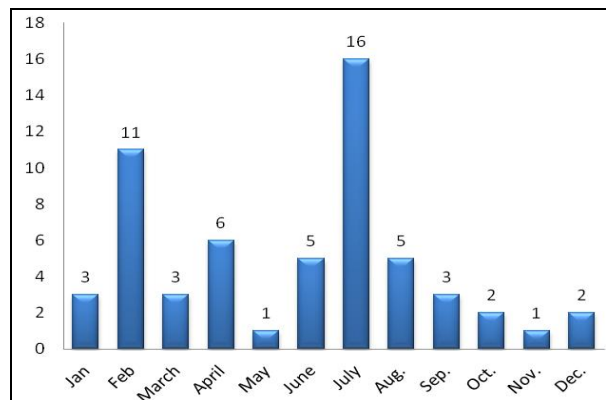


Fig 8: Month of attack

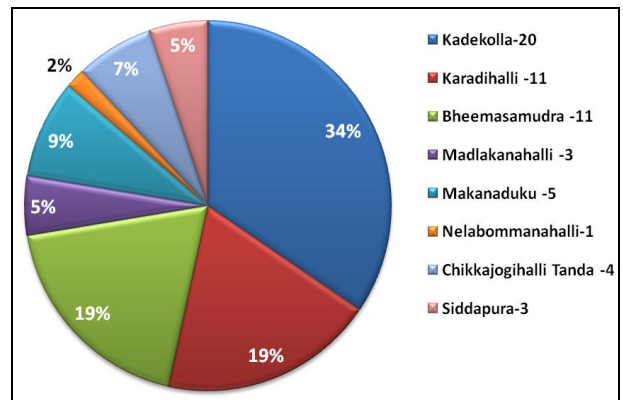


Fig 12: Village-wise victims of bear attack

Recommendations

Following actions may be taken up immediately to mitigate man-bear conflict in the disturbed study area:

1. Regeneration of natural forest should be allowed by preventing of human activities like wood cutting, grazing, quarrying, sand mining, encroachment, forest fires etc.
2. Overgrowth of bushes and weeds like *Lantana camara*, *Prosopis juliflora* should be cleared in and around villages and along the path to the farmlands to prevent bears from hiding in these bushes.
3. By organizing a series of continuous awareness programs for the local villagers through mass media and school curricula is needed.
4. Provide electricity for irrigation between 9 AM and 4 PM so that the farmers keep away from the bear's movement.

5. Acknowledgements

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6. References

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