

## Original Research

Indian sloth bear *Melursus ursinus* shaw- conflict with humans: a case study at Kadekolla village, Ballari district, Karnataka State

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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 men at Kadekolla cluster villages in Ballari district of Karnataka state. It was observed that there were no reports of man-bear conflict in this region till 1990 AD, however drastically increased in the last 15 years. Data was collected through interviews with the 46 of 47 victims living in six villages who survived serious injuries during 2000 to 2015. It was found that the local farmers of surrounding villages on the other side of bear habitat adopted modern horticultural practices to grow orchard plants. Attracted by the new delicious crop the bears began passing through the study area to reach the orchards about 4-7 KMs away from their dens. While returning from orchards in the morning hours, bears encounter people going to their farmlands, thus conflict occurs. 66 % of the bear attacks occurred in farmlands. 58 % of the victims of attack were in the age group of 31-50 years. Most of the attacks happened between 6 A.M and 4 P.M. 47 % of attacks were made by solitary bears and 40% of attacks by mother bear and cubs. 41 % of the victims received serious head injuries. 2 % of the victims succumb to the fatal injuries. 82% of the attacks occurred within 1 kilometer distance from the villages. 51 % 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. It is recommended to consolidate fragmented bear habitat, in order to support natural regeneration of flora in the forest, taking up soil and moisture conservation (S.M.C) activities in the bear habitat in order to reduce and avoid the above said conflict.

## Keywords:

Indian Sloth Bear, Kadekolla, Orchards, Sloth bear-man conflict, Change of crop pattern, Victims of Sloth bear attack.

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**INTRODUCTION**

The Indian Sloth Bear (*Melursus ursinus* Shaw), commonly known as 'karadi' in local language Kannada, is protected under Schedule-I of Indian Wildlife (Protection) Act, 1972 and listed as "Vulnerable" species by IUCN (Garshelis *et al.*, 2008). 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.

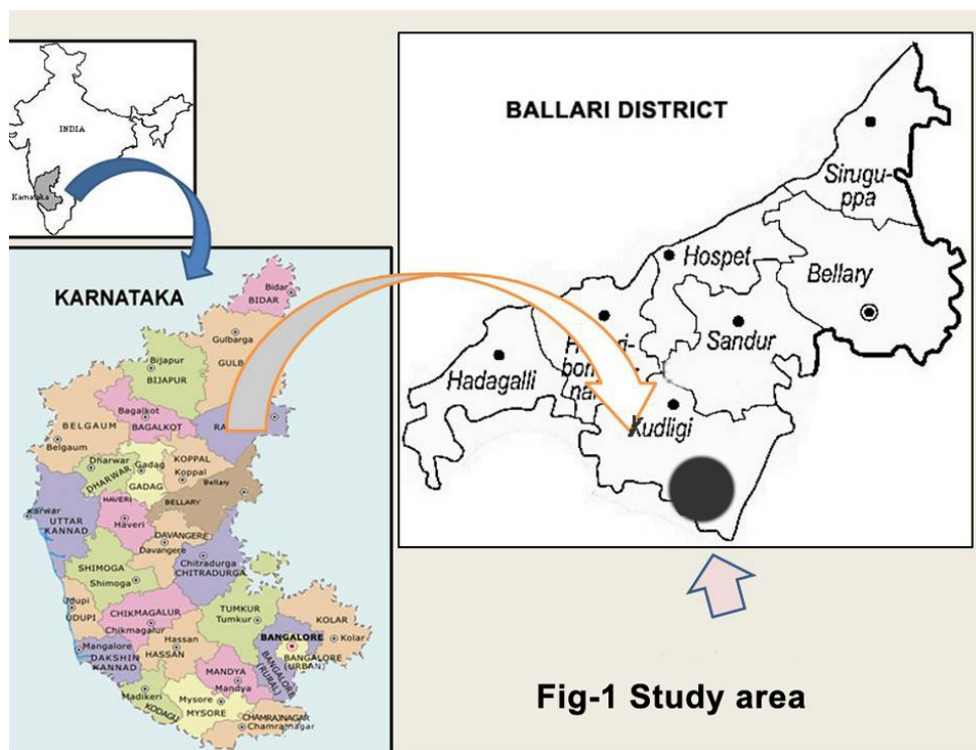
The major population of Indian Sloth Bear is found in the Central Indian states such as Madhya Pradesh, Chhattisgarh, Orissa, and North Maharashtra. However, Western Ghats hold a good population of sloth bears (Bargali, 2002). Apart from this, a considerable population of Indian sloth bears is found 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 (Anonymous, 2013; Samad *et al.*, 2012) Another subspecies of Sloth Bear *Melursus ursinus inornatus* is found in Sri Lanka (Pucheran, 1855).

Sloth bears are widely distributed across the tropical regions of India (Yoganand *et al.*, 2005). Whereas in the past until the early 18<sup>th</sup> century, sloth bears may have occurred in most non-arid, low-altitude forests of India. Their population was high till 18<sup>th</sup> century, but began to decline drastically due to hunting, poaching and loss of habitat by 1950. (Gilbert, 1897; Dunbar, 1923; Prater, 1948; Phythian, 1950; Krishnan, 1972).

**Study area**

The present study aimed at understanding the dynamics of sloth bear-human conflicts in 30 sq km area around Kadekolla village. (N14°45'06 and E 076°28'54) This village is located about 26 km away from Kudligi- the taluk head quarters and about 2.5 km away from the nearest forest. Gudekote bear sanctuary is situated about 20 km away from here (Figure 1).. There are about 10 villages around Kadekolla in which man-bear conflict was severe in six villages. They are as follows:

- |                  |                         |
|------------------|-------------------------|
| 1.Kadekolla      | 1.5 kms from the forest |
| 2.Bheema Samudra | 2 kms from the forest   |
| 3.Makanadaku     | 4 kms from the forest   |



**Fig-1 Study area**



Pujari Ningappa-who lost his left eye in bear attack

Ashoka – a 16 years old boy lost his scalp in bear attack

Ravishankar-last his left eye in bear attack. Now he has a dummy glass eye

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

**Figure 2: Examples of persons survived on bearing sloth bear attack**

- |                     |                         |
|---------------------|-------------------------|
| 4.Nela Bommanahalli | 2.5 kms from the forest |
| 5.Madlakanahalli    | 1.3 kms from the forest |
| Kradihalli          | 0.5 kms from the forest |
| --                  | --                      |

There is a scrub jungle in the eastern side of Kadekolla and all the above villages. This is a degraded forest with rocky hills that provide shelter to the sloth bears in caves. This forest is contiguous to Narasimhagiri forest and Jarimale Reserve Forest where a considerable number of bears are found. The forest in the study area is degraded and has no perennial source of water.

#### **Importance of the flora.**

The forests of this area belong to Dry deciduous scrub (5DS1) and Southern thorn forests (6A/DS1) according to Champion and Seth classification. Typical plants of this scrub jungle include, *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* (Tottiluballi), *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 oenoplia*, *Ziziphus xylopyrus* (Godasi), *Rhus mysorensis* (Salabbe),

*Erythroxylum monogynum* (Devadare), etc. The above plants bear fruits in different seasons, throughout the year and most of them are eaten by the bears. But this forest area is degraded due to uncontrolled grazing and browsing by the local domestic cattle herds and firewood collection by local villagers.

#### **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.

#### **MATERIALS AND METHODS:**

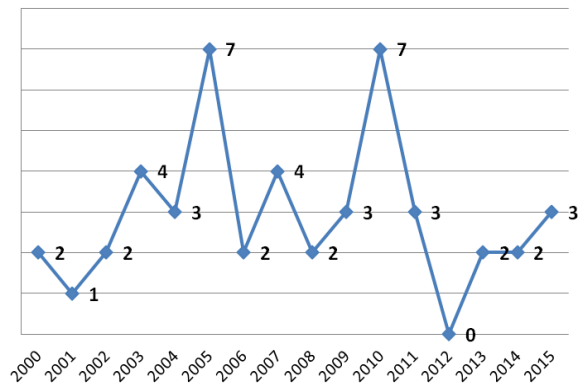
The news of man-bear conflict in Kadekolla cluster villages has been reported in the local news papers more often. Therefore, the authors visited the conflict prone villages to find out the root cause of the problem by interacting with the community, which revealed that the bear attacks are more in six villages listed above. A questionnaire was prepared in both

English and Kannada language and visited the six villages once in a month from April 2015 to October 2015 to meet the victims of bear attack. 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.

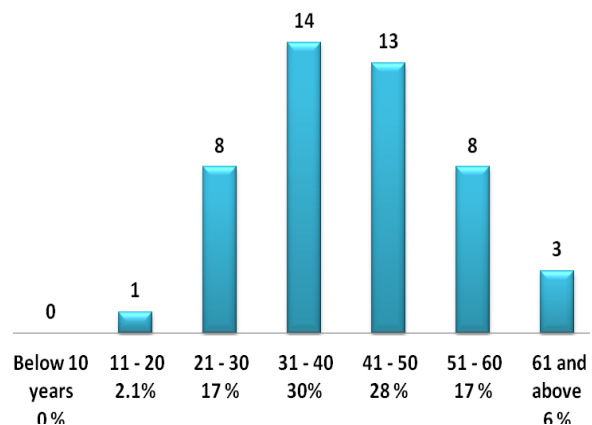
**RESULTS**

**Conflict details**

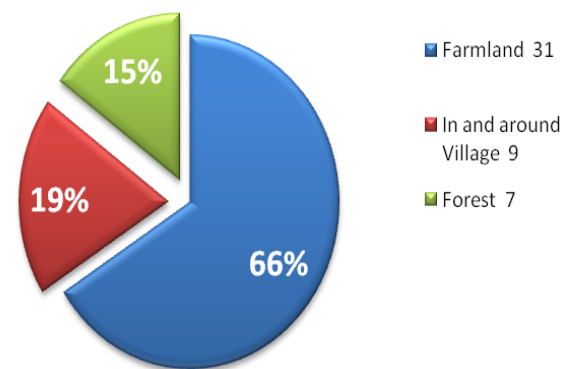
It has been observed that man-bear conflict prevailed in Kadekolla cluster villages for more than 15 years. Earlier to 1990 AD, there were no cases of bear attacks. The bears were living in the forest and using its resources like wild fruits, termites, ants, honey, dung beetles and water for their sustenance. But from 2000 AD onwards some local farmers began cultivating fruit crops in M.B. Ayyanahalli, Chikkajogihalli and Banavikallu which are about 5 to 7 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 4-7 km away and started resting in the mulberry farms itself. When the farmers came for watering the farm or to



**Figure 3. Bear attacks from 2000 to 2015**



**Figure 4. Age group of Victims**



**Figure 5. Place of bear attack**

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

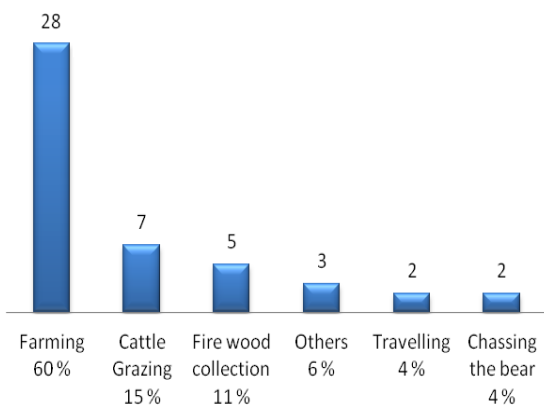


Figure 6. Activity of the victims of Bear attack

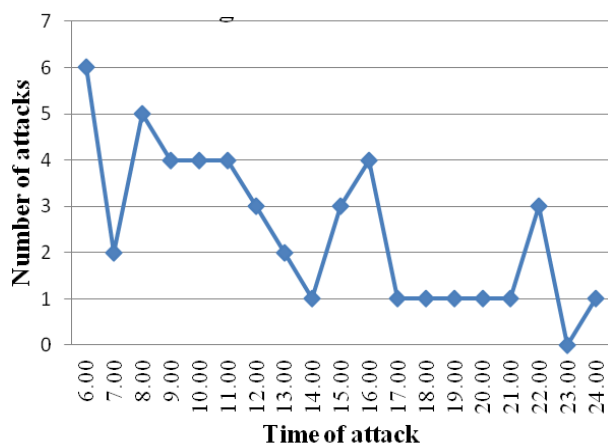


Figure 7. Time of attack

formed the initial stage of bear-man conflict. Later on orchards of pomegranate, guava and papaya were established in and around Chikkajogihalli, M.B. Ayyanahalli, Banavikallu villages and paved a way for more severe conflict incidents (Figure 1 and 2).

While going to and fro 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 scratch them before running away (Figure 2).

**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, (Figure 2: a, c) limbs and scalp (Figure 2: b, d) etc., in bear attack (Figure 2).

**Number of bear attacks in Kadekolla cluster villages:**

Among the bear attacks about 15 % occurred in 2010 and 2011. About 8.5 % of the attacks happened in 2003 and 2007. About 6% of attack happened in 2004, 2009, 2011 and 2015. Interestingly no serious bear attacks occurred during 2012. There was a gradual decline in the rate of bear attacks on men from 2012 onwards (Figure 3).

**Age group of victims of bear attack**

Bears do not differentiate the age and gender of humans, however under the threat situations they attacked the people of all age groups and gender from 11 to 61years (Figure 4). 58 % of victims were in the age group of 31-50 years. The people of this age are matured, responsible and hard working in the fields, where they come across the bears and got attacked. In their most productive age they become invalid and unproductive due to the grave attacks. Some of the victims in this category had chased the bears from the farmlands and were attacked by the bears. 17 % of the victims belong to 21-30. 17% of the victims were in the age group of 51-60. About 7 % of the victims fall under the age group of 11-20 and 61 above.

**Place of attack and activities of victims of bear attack**

Most of the villagers are farmers and cultivating

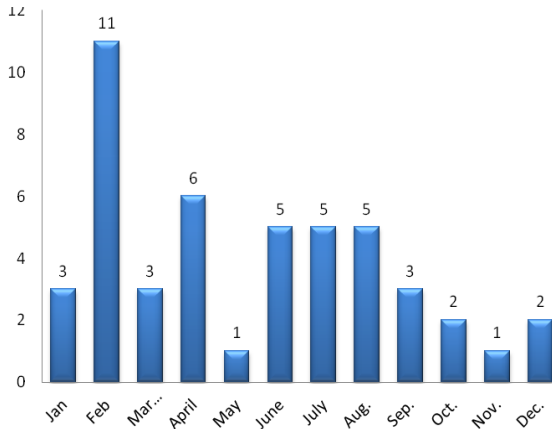


Figure 8. Month of attack

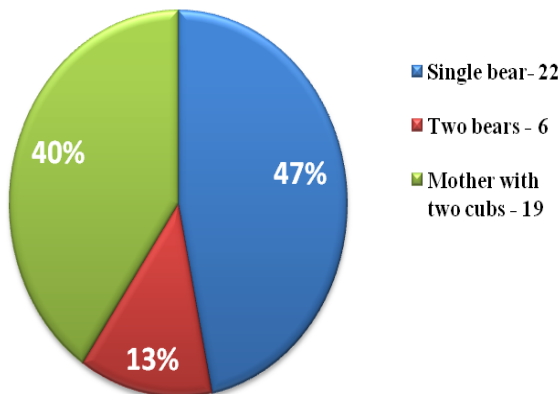


Figure 9. No. of Bears involved in attack

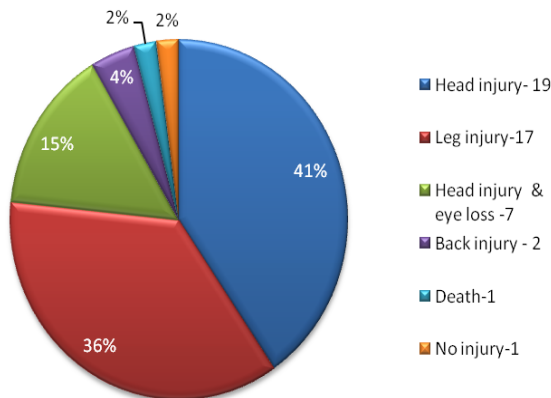


Figure 10. Type of Injury

the crops on rain fed and irrigation systems. These bears go in search of food and water towards western part of the Kadekolla forest towards Hosahalli, C.J. Halli, M.B. Ayyanahalli etc.,. It became a routine for them to pass through the bushes of the villages on the way to

orchards. About 66% of attacks occurred in the farmland, 19% of the attack happened in and around villages and 15% of the attack occurred in the forests are observed in the present study (Figure 5).

About 60 % of bear attacks happened when the victims were busy in agriculture activities. About 15 % of bear attacks happened while grazing cattle in the forest and while they were quenching their thirst from the stream in the forest. Another 11 % attacks occurred while collecting the firewood in and on the boundary of the forest area. About 4 % of attacks taken place while the villagers were chasing the bear/ bears to outskirts of the villages or farmlands. Another 4 % attacks occurred on the victims while they were going on the road to attend some work or while returning from farmland to home. This obviously indicates that the bear attacks were more in the farmlands (Figure 6).

**Time of attack**

Most of the bear attacks occurred during the day only from 6 to 8 AM and 4 to 6 PM. This is a clear indication of bears do not attack during the night as their chances of escape is easy rather than encounter, yet most of the attacks (about 13%) occurred around 6 AM, 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 AM also 11 % of attacks happened in and around 8 AM (Figure 7).

**Months of attacks**

About 23 % of the bear attacks occurred in the months of February, 13% in April and 11 % in June, July and August. The reason was that in February, most of the crop was harvested to which bears ride and eat. More over, all the farmers go to their farmlands to harvest the crops during this period and in this process the bears attacked them. In the months of March, April, May and June, non availability of water in the forest, forced the

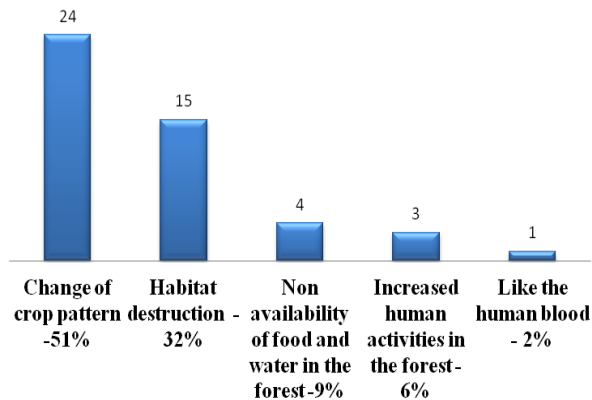


Figure 11. Reasons for Bear attack

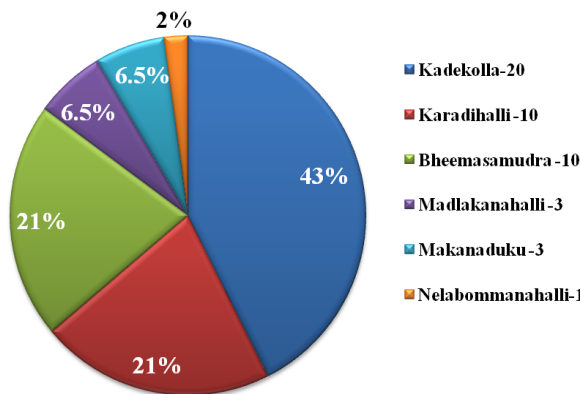


Figure 12. Vulnerable villages of bear attack

bears to roam around the villages and agriculture lands that use tube wells for watering their crops (Figure 8).

**Number of bears involved in the attack**

Among the total attacks, 47%- were happened by solitary bear and 40 % of attacks made by the mother with cubs. Whereas 13% of the attacks were by two bears of which one mother and the other was a grown up cub. Therefore, 53% of the attacks were made by mother with cubs (Figure 9).

**Type of injuries received:**

Among all the victims of bear attacks 41% received head injuries. 36% of them received injuries on the legs. 15% of the victims received both head injury and lost their eyes. 4% of the victims received injuries on

their back and 2% of fatal injuries lead to the death of the victim. (Figure 10)

**Reasons for attack**

About 51 % of respondents felt that the change in cropping pattern was the main reason for bears attack. About 32 % victims felt that the loss of habitat by cutting trees, excess grazing, sand mining, quarrying, encroachment etc. was the reason for the conflict. The other reasons were- non availability of food and water (9 %), increased human activities for various reasons (6%) (Figure 11)

**Vulnerable villages of bear attack**

Kadekolla is the most vulnerable of all the villages with 43% (20 victims) of victims of bear attack. Karadihalli and Bheema samudra have the second highest number of bear attacks with 21% each (10 victims each). Villages Madlakanahalli and Makanadaku have 6.5 % of victims of bear attack (3 each) and Nelabommanahalli has 2% of bear attacks with one victim (Figure 12)

**DISCUSSION**

Probably, sloth bears consider humans as their potential predators and react through their roaring and attacking, which is similar to those evoked in the presence of tigers and leopards (Yoganand *et al.*, 2013). They possess long claws, high strength and aggressive behavior which make them to disfigure humans during the combat (Sterndale, 1884). A total of 137 attacks (resulting in 11 deaths) occurred between April 1998 and December 2000 in the North Bilaspur Forest Division of Chhattisgarh. The majority of attacks were perpetrated by single bears, and occurred in kitchen gardens, crop fields, and in adjoining forests during the monsoon season (Bargali *et al.*, 2005).

Indian sloth bears are crepuscular and nocturnal animals (Prater, 1948). 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. (Phythian, 1950). The reason for the bears resting in the bushes or crops in Kadekolla cluster villages were that, they fed on the orchards till morning and started returning to their caves for a distance of 5-7 km away. By that time it would become morning and so much of human activities began in the transit 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 cutting- bears that were relaxing in their respective places got irritated or frightened 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.

Data on the period of attack revealed that it was maximum in the month of February followed by June to August and it was minimum in the rest of the months. It was observed that bears maul or bite the scalp and head, (Figure 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 fear and to escape from them. In a decade of bear's disturbances, no loss of life is occurred. The victims who received serious injuries were hospitalized for months and most of them became disables.

Similar to the above, the study revealed that, the sloth bears of this region used the villages as a corridor to reach the orchards. In this process, they encounter the people and man-animal interactions occur. This observation also falls in line with earlier studies. (Gilbert, 1897; Dunbar, 1923; Akhtar *et al.*, 2004)

The main reason for man-bear conflict in Kadekolla cluster villages was the change of crop pattern in last one and half decades. More number of orchards of papaya, pomegranate, guava, sapota and mango came

up adjacent to the study area during the past 15 years. Such changes in the cropping pattern influenced the feeding behaviour of the wild bears and resulted in the wildlife conflicts. (Krishnan, 1972)

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, they began seeing them due to the new horticultural practices. The passages that bears pass through the villages served as "*induced corridors*".

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. About 12 % of the victims prefer to avoid going to the forest so as to prevent any instances of bear attacks.

About 76% of the respondents opined that the population of bears are increasing day by day which is the root cause of the problem. 18% of the victims feel that the population of bears are stable in the study area. Whereas only 6% of the respondents feel that they are not sure about the population of bears. None of the respondents felt that the population of bears are decreasing. When asked about the nature and behavior of sloth bears, all the victims told that the bears are ferocious and attack humans whenever they encounter.

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.



## 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. Natural regeneration of the forest should be supported by dibbling the seeds of local forest plants and other endemic fruit plants.
3. Soil and Moisture Conservation (SMC) activities should be taken up to create a viable ecosystem.
4. 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.
5. Creation of continuous awareness programs among the local villagers through mass media and school curricula is needed.

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