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## COMMUNICATION

### INNOVATIVE WAY OF HUMAN-ELEPHANT COMPETITION MITIGATION

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## Innovative way of human-elephant competition mitigation

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**Abstract:** The negative interaction between humans and elephants is often referred to as conflict, however it is also seen as competition. Human-elephant competition (HEC) is a major protection threat in the fringe villages of the Jaldapara National Park (JPNP) of West Bengal, India. JPNP is facing challenges from the highly populated fringe villages, which exist in elephant corridors. Between 2015 and 2018 there were 12 elephant deaths. During the same period elephants caused 34 human deaths. As per data, most of the elephant interactions occurred in the fringe villages of Madarihat and Jaldapara North Range. Per reports of human deaths, Chekamari and Khairbari villages of Madarihat Range are in the most vulnerable list. Most of the human deaths occurred in the early morning (05.00–06.00 h) and in the evening, when people are going outside for open defecation (OD). On a pilot basis Chekamari and Khairbari villages of Madarihat Range were selected for a door to door household survey with the objective to develop an innovative strategy as a mitigation measure of HEC. The results of the survey show that both villages are tribal and minority population, the socio-economic condition of the people is very poor, on an average 5–6 members are in each household, the source of drinking water is a community well for most of the households, and 50 households are devoid of toilet facilities so automatically the members of those households go outside for OD. Out of the total human deaths, 16 occurred in the Madarihat area; out of these 16 cases, six were from the Chekamari and Khairbari villages. For this reason, between April 2019 to September 2019, with available funds 20 toilets with tube-well were built in the 20 neediest households of these two villages. Due to the communication with the community, behavioural changes were made and their participation for 100% usage of those toilets was assured. After the construction of the toilets until now, no human death cases have been reported.

**Keywords:** Behavioural changes, communication, mitigation, open defecation, toilets.

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## INTRODUCTION

The interaction between humans and elephants is often referred to as conflict, however, it is also seen as competition. Human-elephant competition (HEC) (Davidar 2018) is a negative interaction between the two species, resulting in crop loss, property damage, and can lead to the loss of life of both humans and elephants. Competition may be direct and indirect. Loss of property, crops, and lives is the result of direct competition. In indirect competition people live in fear of elephants, which restricts free movement and day to day activities of people in forest fringe areas. The forest department promotes coexistence through different means with the help of local joint forest protection committees (JFPCs) in the forest fringe villages. In southern Bengal, in the adjacent forest fringe areas of Jhargram, Medinipur, Rupnarayan, and Kharagpur a special team “Hulla Party” drives the elephants from the village towards the forest. But in recent times there has been a total ban of the usage of “spike and fire balls, i.e. Hulla” by a recent Supreme Court order. In northern Bengal the concept of Hulla Party does not exist, but JFPC members are provided with crackers and searchlights from the forest department to drive elephants to the forest. So, at present, the forest department in both northern and southern Bengal solely depend on high beam searchlights and crackers to mitigate the elephant depredation problem. Apart from this direct action in the field, the forest department also compensates the loss of crop, property, livestock, and human life which occur from HEC (Davidar 2018), per the order of the Government of West Bengal. A person who is affected by an elephant attack as specified in the government order (No. 195-For/11M-95/2011 pt-I dated 30.i.2015), whose crop and/or house is damaged by wild animals, and if any domestic animal is injured/died due to a wild animal attack, is eligible to claim ex-gratia compensation (West Bengal Forest Department 2015). Ex-gratia compensation for injuries and loss of human life is duly and promptly paid within 24 hours of the incident. In present times, the government order (No.1805-For/O/11M-95/2011 (Pt.I) Kolkata, 29 October 2018) regarding payment of compensation for the loss of life and property due to elephant depredation has been revised by the Government of West Bengal. The family of the deceased should receive four lakh rupees for loss of life subject to certification regarding the cause of death from the appropriate authority. Ex-gratia payment for the loss of a limb or eye(s) is INR 59,100 per person, when the disability is between 40–60%, and when the disability is more than 60% that amount

is increased to INR two lakh (INR 200,000) per person, subject to certification by a doctor from a government hospital or dispensary regarding the extent and cause of disability (West Bengal Forest Department 2018). Ex-gratia payments regarding grievous injury requiring hospitalization are between INR 12,700 and INR 4,300 per person when requiring hospitalization for more than a week and less than a week, respectively (West Bengal Forest Department 2018). So, this background information is clear enough to understand that the forest department is adopting all sorts of strategies to mitigate HEC in the forest fringe villages. No mitigation measures, however, are found to be 100% successful in avoiding competition between elephants and forest fringe villages. Where a JFPC exists as per the government norms, local people receive 40% of the revenue generated from eco-tourism activity and timber operation for community infrastructure development from the forest department. This provides a platform to the department to address elephant conservation and to tackle HEC. But the problem is massive in villages where no JFPCs exist and the forest department is unable to support community infrastructure work by providing JFPC share money and other benefits. This study mainly focused on assessing the problem and adopting other innovative strategies to mitigate and tackle HEC in the areas of non JFPC villages in elephant corridors, where the issue of elephant depredation is significant.

## MATERIALS AND METHODS

### Study Area

Jaldapara Wildlife Division of West Bengal, India (Figure 1) covers an area of 306.96km<sup>2</sup> with the national park area of 216.53km<sup>2</sup>. The Chekamari and Khairbari villages of Madarihat Range of Jaldapara Wildlife Division (Figure 2) lies between 26.700–26.718N & 89.243–89.264E. The study area is a non-forest elephant corridor in between the forest land of Dhumchi and Jaldapara (Figure 1, 2). The average normal annual rainfall of the area is about 293cm. The southwest monsoon starts from the middle of May and lasts until the end of September. The heaviest rainfall occurs during the month of June, July, and August. During the rainy season humidity is high. The approximate water table position of Madarihat Range and locality in summer is 2.80m (Conservator of Forest & Divisional Forest Officer 2012). People are working in agriculture mainly for subsistence; maize, paddy, potato are principal crops, which are also the preferred food crops for the elephants.



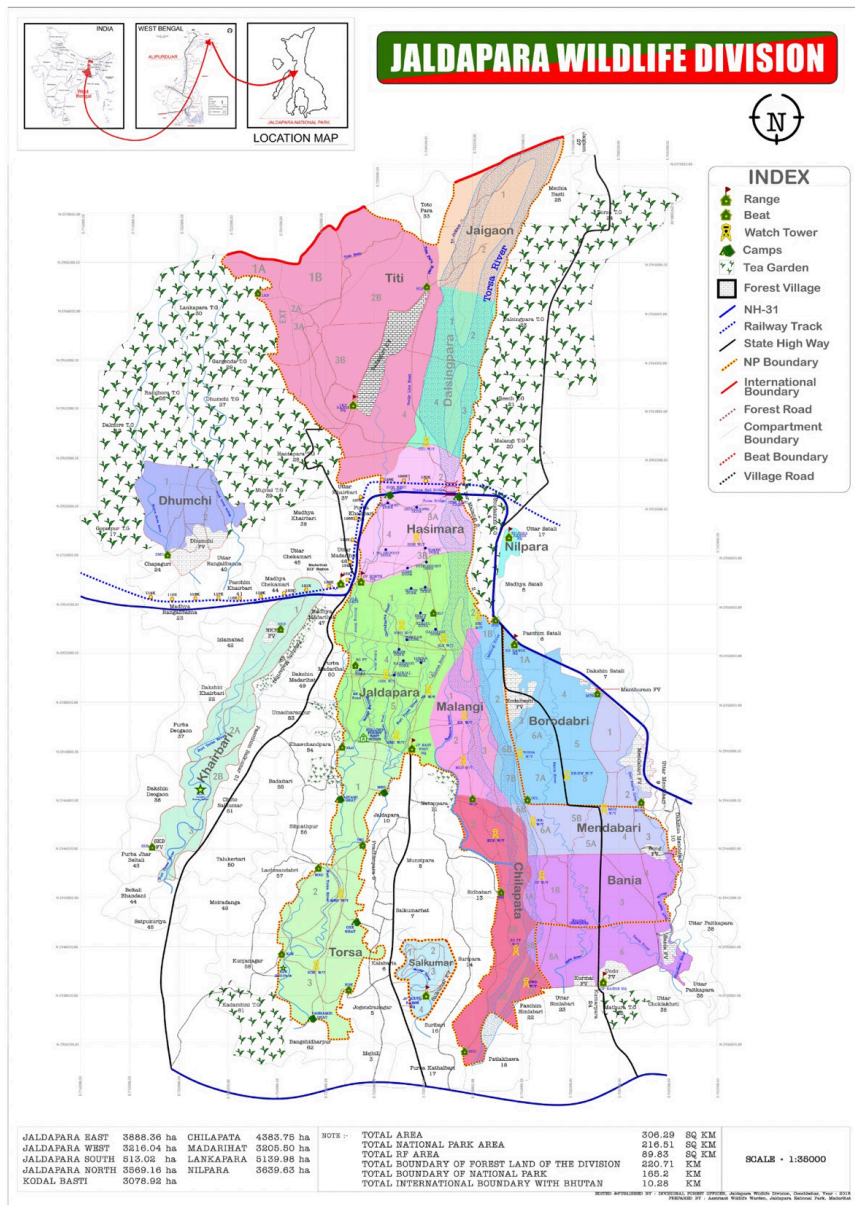


Figure 1. Jaldapara Wildlife Division.

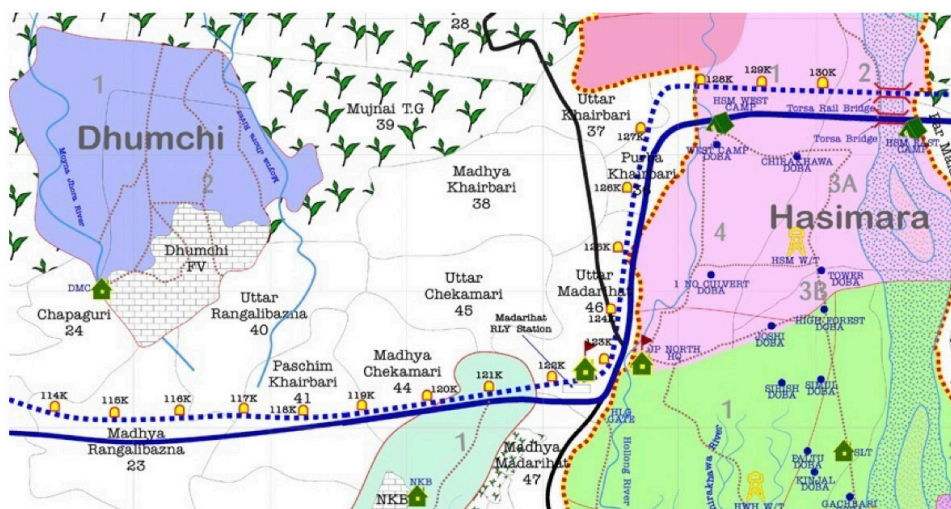


Figure 2. Chekamari and Khairbari villages.

## Data collection and analysis

To understand the background of human-elephant antagonism a preliminary study was conducted to collect primary data from Jaldapara Wildlife Division through a prepared questionnaire. Primary data analysis provided the estimated number of wild elephants in the Jaldapara Wildlife Division, season-wise maximum and minimum group size of elephants during crop raids, area of common habitat shared by elephants and humans, total number of elephants and human deaths during three years (2015–2018), details on age and gender of elephant and human death cases, causes of elephant and human deaths (Tables 1, 2), level of aggression of local people, methods used for driving away lone elephants/herds, total cases of crop-damage between 2015–2018, season of intensive crop damage, type of crop damage, total cases of property damages between 2015–2018, total compensation paid in cases of human-death, crop-damage and cases of property-damage between 2015–2018. The primary data analysis helped to identify the most vulnerable site of human and elephant deaths (Tables 1, 2). With this basic information field foresters of Madarihat Range, led by the author, went to the community platform of competition prone villages and through consecutive meetings by the author and field staff of Madarihat Range, awareness was created in the schools and other village institutions. The objective to mitigate HEC was communicated to the local people through audio-visual aids and door to door visits. These visits helped the local people to communicate their problem, livelihood, and socio-economic status. Based on the communication, the specific time of incidences of human death was assessed and this provided the incentive to adopt an innovative strategy to build toilets with tube-well on a priority basis to avoid the chance of HEC.

## RESULTS

Primary data from the Jaldapara Wildlife Division, West Bengal collected through the Questionnaire Method by the following questionnaire.

1. What is the name of the division?  
Jaldapara Wildlife Division, Coochbehar.
2. How many forest-ranges are there in the division?  
14.
3. How many elephants are there in the wild?  
100–130 (Last estimation)
4. What is the maximum group size of elephants

observed?

- a) 60 to 70 individuals in a herd during monsoon.
- b) The herd divides into maximum 25 to 35 individuals during rest of the year.

5. What is the minimum group size of elephants observed?

Minimum 2 to 3 adults in a small group during crop raids.

6. What is the total area (in km<sup>2</sup>) of the Division?  
306.96km<sup>2</sup>.

7. How many elephants died in past three years from 2015 to 2018?

12

8. Is any data available regarding the age and gender of elephant death cases? (For example: How many females or males? How many adults/sub adults/juveniles/calves?) Data Available in Table 1

9. Are GPS locations available where these cases happened?

Not Available

10. What were the causes of elephant death?

- a) Electrocution- 4
- b) Cardiorespiratory failure- 3.
- c) Rail Accident- 1
- d) Infighting- 2
- e) Natural Death- 2

11. How many cases of human deaths by wild elephant attack occurred in past three years from 2015 to 2018?

34

12. Is any data available regarding the age and gender of human death cases? (For example: How many females or males? How many of them were old/young?)

Year wise Detail Data available in Table 2

Year	Male		Female	
	Old Age	Young	Old age	Young
2015–16	2	2	1	-
2016–17	-	9	-	2
2017–18	8	1	1	3
2018–19	3	2	-	-

13. Is GPS locations available of where these cases happened?

Not Available

14. Generally what is time of elephant depredation in the villages?

In the evening and night for raiding in the crop fields.

15. What were the causes of human deaths?

Injury through direct interaction with elephants.

16. Generally what was the time of injury or direct interaction with elephants?

In most of the cases in the early morning when elephant herds returned back to the forest from the villages, and in a few cases in the evening at the time of elephant depredation during crop raiding.

17. What was the level of aggression of local people (high, moderate or low)?

Moderate

18. What are the methods used for driving away lone elephants/herds of elephants from the villages?

Elephant driving by using high beam searchlights and crackers.

19. How much crop area damaged in between 2015–2018?

Year	Crop damaged Area (in ha)
2015–16	100.84
2016–17	166.39
2017–18	49.31
2018–19	293.15

19. Which seasons (months), more crops was damaged? Is any specific timing or months of raiding observed?

Throughout the year.

20. What crops were damaged most?

Maize, paddy, potato.

22. How many hut damages between 2015–2018?

Year	Huts damaged (number)
2015–16	619
2016–17	308
2017–18	193
2018–19	827

23. How much compensation paid in cases of human death (2015–2018)?

Year	Compensation paid (IN Rs.)
2015–16	7,90,000.00
2016–17	18,00,000.00
2017–18	13,92,500.00
2018–19	8,25,000.00 (Current year-5 cases) +11,70,000.00 (Old cases-11 cases)

24. How much compensation paid in cases of crop damage (2015–2018)?

Year	Compensation paid (IN Rs.)
2015–16	2,65,000.00
2016–17	15,41,506.00
2017–18	6,05,000.00
2018–19	38,40,870.00

25. How much compensation paid in cases of hut damage (2015–2018)?

Year	Compensation paid (Rs.)
2015–16	40,800.00
2016–17	8,80,355.00
2017–18	6,38,200.00
2018–19	36,05,950.00

## RESULTS OF PRIMARY DATA ANALYSIS

From the preliminary data available in Table 2 it is known that most human deaths occurred in the fringe villages of the Madarihat Police Station (Madarihat PS) and Range, which shares a boundary with Jaldapara National Park. The data of the site of human deaths of Table 2 shows that Chekamari and Khairbari villages of Madarihat are very vulnerable. The questionnaire data shows that deceased included both old and young. The questionnaire shows that elephants raid mainly in the crop season of maize, paddy, and potato. In northern Bengal, farmers grow maize in summer, then paddy in the monsoon, then potato in the winter. As a result, local farmers are attracting elephant raids throughout the year. The questionnaire data shows that elephant depredation in the villages occurred in the evening and night mainly during raiding in the crop fields, and cause of human death is direct Injury or interaction with elephants. But as a follow up door to door communication, it appeared that in most cases the time of injury or direct interaction with elephants occurred early in the morning when elephant herds returned to the forest from the villages, and in a few cases in the evening at the time of elephant depredation during crop raiding.

Through preliminary data analysis, we understand that Chekamari and Khairbari villages of Madarihat Range and PS are vulnerable areas (Table 2) and, for that reason, a second phase of field study was conducted by the author and his field foresters of Madarihat Range in that area through door to door communication. Door to door communication was made by onsite visits and discussion with every household for the purpose of assessing the primary reason of HEC, to know the reason for open defecation (OD), to get the data of availability of toilets in those households, to know the education status of the family members of those households, and, most importantly to communicate the mitigation measures of HEC. The main result of this communication was learning the fact that 50 households were devoid of toilet facilities in these two villages, and the members of those households were going outside for OD in the early morning and in the evening. On an

Table 1. List of elephant deaths.

Year	Site	Age (in years)	Gender	Assigned cause	Remarks
2015	Tulsipara Das Ghar Village, P.S. Birpara	4	Female	Electrocution	Accidental
	Tulsipara Bara Line, P.S. Birpara	30	Female	Electrocution	Accidental
	Satali Nakadala Village area	-	Male	Electrocution	Accidental
	BD-8 Compartment of Jaldapara National Park	Adult	Female	Cardio failure respiratory	Natural
	JP-5 Compartment of Jaldapara National Park	15	Female	Cardio failure respiratory	Natural
	Railway track near Haripur, Madarihat, Alipurduar District	-	Male Tusker	Railway accident	Accidental
2016	BD-4 Compartment of Jaldapara National Park	Adult	Male	Cardio failure respiratory	Natural
	BN-4 Compartment of Jaldapara National Park	4	Male	Cardio failure respiratory	Natural
	Gopalpur Tea Garden	-	Male Tusker	Electrocution	Accidental
	BN-4 Compartment of Jaldapara National Park	25	Male	Infighting	Natural
2017	Titi-4 Compartment of Jaldapara National Park, near Torsa river bed.	2	Male Calf	-	Natural Death
2018	BD-3(a) Compartment of Kodalbasti Range, Jaldapara	40	Male	In fighting	Natural

average, 5–6 members live in each household of those villages. So, approximately 250–300 people were going outside for OD, with the fear of direct competition with elephants and other wild animals at that specific time. As per the objective of our study, we were searching for an innovative strategy to mitigate competition in the villages of non JFPC areas. Interestingly, these two villages, Chekamari and Khairbari, do not have JFPCs. Middle-aged adult men and women were, to some extent, more cautious to avoid interaction with elephants at that specific time. Young and older people by nature are less concerned with the interactions and some lost their life with the direct competition at the time of OD outside. The community and the relatives of the deceased confirmed the fact that almost all of the cases of human deaths by wild elephant attack occurred when the deceased went for OD outside.

## DISCUSSION

Based on the interpretation of the survey and communication results, and the availability of CAMPA (Compensatory Afforestation Fund Management Planning Authority), 20 toilets with tube-well were constructed on a priority basis for the 20 neediest households of those villages. These households are unable to construct a toilet due to poor socio-economic condition. After construction, the toilets were handed

over to those beneficiaries and behavioural changes were made to assure 100% usage of toilets through consecutive household visits, meetings, and seminars. Villagers also adopted the good practice of toilet usage instead of OD, and as a result direct confrontation with elephants was avoided. No human death has occurred to date in that area. All the toilets with tube-well were tagged with their GPS location and a beneficiary list is kept in the Madarihat Range Office and with the Jaldapara Wildlife Division. After seeing the success of the pilot project, the CAMPA authority sanctioned funds for those remaining 30 households devoid of toilet facilities. Construction is ongoing and very soon we will be able to officially distribute those toilets to make the Chekamari and Khairbari villages OD free. In the meantime, people are using community toilets and the toilets of relatives. To date no human deaths have been reported from those areas where toilets were constructed and usage was assured among the people through community participation.

## CONCLUSION

By constructing toilets with tube-well as an innovative strategy a big problem of human-elephant competition and elephant conservation was addressed through door to door communication and with community participation. For the first time a protected area has



Table 2. List of human deaths.

Year	Site	Age (in years)	Gender	Possible Cause	Compensation Paid (IN Rupees)
2015–16	Jaldapara Village near forest boundary, Alipurduar	-	Male	Attacked by wild elephant	2,50,000.00
	Near house premises, Uttar Rangalibazna, Madarihat, Alipurduar.	98	Female	Attacked by wild elephant	2,50,000.00
	Near house premises, Madhya Chekamari, Madarihat, Alipurduar.	56	Male	Attacked by wild elephant	2,50,000.00
	Near house premises, Purba Khairbari, Madarihat, Alipurduar.	55	Male	Attacked by wild elephant	Part payment 20,000.00
	Near house premises, Uttar Khairbari, Madarihat, Alipurduar.	40	Male	Attacked by wild elephant	Part payment 20,000.00
2016–17	Sidhabari Village area, Alipurduar	42	-	Attacked by wild elephant	2,50,000.00
	Inside Khairbari Forest, Paschim Salkumar, Madarihat	40	Male	Attacked by wild elephant	Not eligible for compensation in forest land
	Kalikhola, Ballalguri, Totopara, Alipurduar	45	Male	Attacked by wild elephant	2,50,000.00
	Near house premises, Gopalpur Tea Garden, Madarihat	6	Female	Attacked by wild elephant	2,50,000.00
	Near house premises, Chapaguri, Madarihat	27	Male	Attacked by wild elephant	2,50,000.00
	In national park (on duty), Alipurduar	25	Male	Attacked by captive elephant	1,87,500.00
	Near house premises, Paschim Khairbari, Madarihat	35	Male	Attacked by wild elephant	1,75,000.00
	Ranbahadur Basti, village, Dalsingpara, Alipurduar	-	-	Attacked by wild elephant	1,87,500.00 (75% payment)
	Satali Mandalpara, Madhya Satali Village, Jaigaon, Alipurduar	46	Male	Attacked by wild elephant	2,50,000.00
	Inside Jaldapara National Park (on duty)	23	Male	Attacked by captive elephant	-
	Moiradanga (inside forest), Mairadanga Village, Falakata, Alipurduar	40	Female	Attacked by wild elephant	-
2017–18	Totopara Road, Hollapara village, Ballalguri, Totopara, Madarihat, Alipurduar	59	Male	Attacked by wild elephant	1,87,500.00
	Inside Jaldapara National Park in JP-1 Compartment, NWC Beat, Madarihat, Alipurduar	45	Female	Attacked by wild elephant	-
	Inside National Park in JP-1 Compartment, NWC Beat, Madarihat, Alipurduar	44	Female	Attacked by wild elephant	Not eligible to get compensation inside the national park
	Inside the Forest land of BD-3 Compartment, Kodalbasti Beat under Kodalbasti Range, Jaldapara National Park, Alipurduar	65	Male	Attacked by wild elephant	Not eligible to get compensation inside forest land.
	Madhya Madarihat, Madhya Khairbari village, Madarihat, Alipurduar	68	Male	Attacked by wild elephant	80,000.00
	Purba Khairbari, Torsa Tea Garden, Dalsingpara, Alipurduar	45	Female	Attacked by wild elephant	1,25,000.00
	In Jaldapara National Park (On duty), Madarihat, Alipurduar	47	Male	Attacked by captive elephant	2,50,000.00
	River side of Bhangri river, Garganda Tea Garden, Madarihat, Alipurduar	-	Female	Attacked by wild elephant	1,25,000.00
	In Jaldapara National Park (On duty), Falakata, Alipurduar	-	Male	Attacked by captive elephant	1,25,000.00
	Purba Deogaon, Falakata, Alipurduar	29	Male	Attacked by wild elephant	1,25,000.00
	Subhasini Nadi Line, Hasimara Outpost, Alipurduar	52	Male	Attacked by wild elephant	1,25,000.00
	Ramjhora Tea Garden, Birpara, Alipurduar	66	Male	Attacked by wild elephant	1,25,000.00
	StaliMandal Para, P.S. : Jaigaon, Alipurduar	54	Male	Attacked by wild elephant	1,25,000.00
2018–19	Lankapara, Madarihat,	-	-	Attacked by wild elephant	2,50,000.00
	Near House premises, Madarihat Range, Uttar Chakamari, Madarihat, Alipurduar	-	-	Attacked by wild elephant	1,25,000.00
	Near House premises, Paschim Madarihat Village, Madarihat, Alipurduar			Attacked by wild elephant	1,25,000.00
	Near house premises, Mujnai Tea Garden, Madarihat, Alipurduar	-	-	Attacked by wild elephant	1,25,000.00
	Near house premises, Chilapata Range, Uttar Mendabari, Kalchini, Alipurduar	-	-	Attacked by wild elephant	2,00,000.00



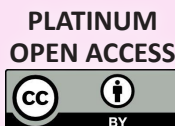


Image 1. Beneficiaries with toilets & tube-wells at Chhekamari and Khairbari villages, Madarihat, Alipurduar District, West Bengal. © Divisional Forest Officer, Jaldapara Wildlife Division.

adopted this sort of innovative strategy to mitigate human-elephant competition by promoting coexistence; as an added advantage the issue of open defecation is also addressed. So this project is a win-win situation for both the community people and the forest department towards elephant conservation.

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