Mitigating Human Elephant Conflict Through Communication And Constructions Of Toilets With Tube-well- As Innovative Approach

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Abstract-- Human Elephant Conflict (HEC) is a major protection threat in the fringe villages of the Jaldapara National Park (JPNP) of West Bengal. JPNP is facing challenge from the highly populated fringe villages, existing in the elephant corridor. In between 2015-18 elephant mortality was 12 Nos. Human mortality, by elephant during the same period was 34 Nos. As per data, most of the elephant depredation occurred in the fringe villages of Madarihat and Jaldapara North Range. As per 'place of incidence' of human casualties, Chhekamari and Khairbari villages of Madarihat Range are in the most vulnerable list. Most of the human casualties occurred in the early morning (5:00 am to 06:00 am) and in the evening, when people are going outside for open defecation. On pilot basis Chhekamari and Khairbari villages of Madarihat Range were selected for the door to door household survey. The results of survey is that both the villages are tribal and minority populated, socioeconomic condition of the people are very poor, on an average 5 to 6 members are there in each household, source of drinking water is community well for most of the households, 50 Nos. household are devoid of any Toilet facilities and automatically the members of those households are going outside for Open Defecation (OD). Out of the total human mortality, 16 Nos. itself occur in the Madarihat area and out of this 16 death case, 6 was from the Chhekamari & Khairbari villages. For this reason, depending on available fund 20 Toilet with tubewell was built in the 20 neediest household of this 2 villages. All the communication made with the community people and behavioural changes also inflicted among the community people with their participation to assure the 100% usage of those toilets. Still now no death case reported, after the distributions of those toilets.

Key words - HPC, JPNP, OD, Communication, Toilets, Behavioural Changes, Mitigation

I. INTRODUCTION

Human Elephant Conflict is a negative interaction between 2 species, resulted in crop loss, property damage and also leads to ultimate loss of life of both Human and Elephant.

Conflict may be direct and indirect. Loss of property, crop and lives is the result of Direct Conflict. In indirect conflict peoples are living in fear from the Elephant, which restricted free movement and day to day activities of the people of forest fringe areas. Forest Department is mitigating the conflict through different means with the help of local Joint Forest Management Committees (JFMCs) in the Forest fringe villages in South Bengal in the adjacent forest fringe areas of Jhargram, Medimpur, Rupnarayan, Kharagpur a special team "Hulla Party" is there to drive the elephant from the village owards the Forest. But in recent time it is totally ban of the usage of 'spike & fire balls i.e. Hulla' by a recent supreme ourt order. In North Bengal concept of Hulla Party is not rere, but JFMC members were provided with crackers and search light from the Forest Department to drive the elephant to the Forests. So, at present Forest Department in both the Bengal solely depends on High Beam Search light and ckers to mitigate the elephant depredation problem. Apart from this direct action in the field forest department is also compensating the loss of crop, property, livestock and human life occurred from the Human Elephant Conflict as per the Order of the Government of West Bengal. A person who is affected by the attack of Elephant as specified in the Government order (No. 195-For/11M-95/2011 pt-I dated 30.01.2015), whose crop and/or house is damaged by wild animal and if any domestic animal is injured/died due to wild animal attack is eligible for claiming ex-gratia compensation¹. Ex-gratia for injuries and loss of human life is duly and promptly paid within 24 hours of the incidence happened. In present time vide G.O No. 1805-For/O/11M-95/2011 (Pt.I) Kolkata, 29th October, 2018 payment of compensation for the loss of life and property due to elephant depredation has been revised by the Government of West Bengal and the family of the deceased is getting Rs. 4.00 lakhs for loss of life subject to certification regarding cause of death from the appropriate authority². Ex-gratia payment for the loss of a limb or eye(s) is Rs. 59,100/- per person, when the disability is between 40% to 60% and when the disability is more than 60% that amount is increased to Rs. 2.00 lakhs per person, subject to certification by a doctor from a hospital or dispensary of Government, regarding extent and cause of disability². Ex-gratia payment regarding grievous injury requiring hospitalization is Rs. 12,700/- and Rs. 4,300/- per person requiring hospitalization for more than a week and less than a week respectively². So, this background information is clear enough to understand that Forest Department is adopting all sorts of strategy to prohibit and mitigate Human Elephant Conflict in the Forest Fringe

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Villages. But no mitigation measures are found full proof to give 100% result to avoid the conflict of the forest fringe villages. Where Joint Forest Management Committee (JFMC) is there as per the Government norms, local peoples is getting benefits and Community Infrastructure usufructuary Development Fund from the Forest Department and it is giving a platform to the Department towards Elephant Conservation and to tackle HEC. But problem is massive in those villages, where no JFMCs are there and Forest Department is unable to perform community infrastructure work, to give JFMC share money and other usufructuary benefits. So, this study mainly focused to find out the problem and to adopt other fruitful innovative strategy to mitigate and tackle HEC problem in the areas of Non JFMC villages lying in Elephant Corridor, where problem of Elephant Depredation is massive.

II. MATERIALS & METHODOLOGY

To know the essential background of the conflict and to conduct preliminary study primary data collected from the Jaldapara Wildlife Division through a prepared form of Questionnaire. Primary data analysis helped to know the estimated number of Elephant of the Jaldapara Wildlife Division in the wild, season wise maximum and minimum group size of the elephant during crop raids, area of the common habitat shared by the elephant and human, total number of Elephant and human mortality during past years i.e. 2015-18, Details on age and sex of Elephant and hum mortality cases, causes of Elephant and human mortality, level of aggression of local people, methods used for driving a lone elephants/herds of elephants, total cases of crop-dama. ed between 2015-2018, season of intensive crop damage, type crop damage, total cases of property damages between 201 2018; total compensation paid in cases of human-mortality, crop-damage and in cases of property-damage in between 2015-2018. Finally, Primary data analysis helped to identify the intensive zone of Human Elephant Conflict. Then from the stratified data, actual "place of incidence" of Human and Elephant mortality was identified. With all this basic information went to the community platform of conflict prone villages and through consecutive meeting, awareness in the Schools and other institution of the villages, through miking and door to door visit communication made with the local people with the objective to mitigate HEC. Door to door survey helped the local people to communicate their problem to us. Door to door communication also helped to know the livelihood and socio-economic status of the households. So, it's a both way communication. Based on the communication specific time of the incidence of human mortality was assessed and that's gave clue to adopt innovative strategy to build Toilet with Tube-well on priority basis to avoid the chance of Human Elephant Conflict.

III. RESULTS

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

- 1. Name of the division: Jaldapara Wildlife Division, Coochbehar
- 2. Total number of forest-ranges in your division: 14 Nos.
- 3. Estimated numbers of elephants in your division: 100 to 130 (Last estimation)
- 4. Maximum group size of elephants observed:
 - \checkmark 60 to 70 numbers in a herd during monsoon.
 - ✓ The herd divides into maximum 25 to 35 numbers during rest of the year.
- 5. Minimum group size of elephants observed. Minimum 2 to 3 adults in a small group during crop raids.
- 6. Total area (in km^2) covered by forests in your division: 306.5 Km².
- 7. Total number of elephant mortality (in past three years 2015, 2018). 12 Nos.
- 8. Details on age and sex of elephant mortality cases (for example: How many females or males? How many adults/subadults/juveniles/calves?): Data Available in Table-1
 - GPS locations of where these cases happened, if available: Not Available
- 10. Causes of elephant mortality:
 - Electrocution-04Nos.
 - b. Cardiorespiratory failure- 03Nos.
 - c. Rail Accident- 01No.
 - d. Infighting- 02Nos.
 - e. Natural Death- 02 Nos.

11 Total cases of human mortality (in past three years 2015-2018): 34 Nos.

12 Details on age and sex of human mortality cases (for example: How many females or males? How many of them were old/young?): Year wise Detail Data available in Table-2, 3, 4 & 5

Year	Ma	ile	Female		
	Old Age	Young	Old age	Young	
2015-16	02	02	01	-	
2016-17	-	09	-	02	
2017-18	08	01	01	03	
2018-19	03	02	-	-	

- 13GPS locations of where these cases happened, if available: Not Available
- 14Time of Elephant Depredation in the villages: In the evening and night.
- 15Cause of human mortality: Injury, through direct interaction with Elephant.
- 16Time of injury or direct interaction with the elephant: In the early morning and in the evening and night.
- 17Level of aggression of local people (high/ moderate or low): Moderate
- 18Methods used for driving away lone elephants/herds of elephants: Elephant driving by using high beam search light and crackers.
- 19Total cases of crop-damaged 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

20In which seasons (months), more crops were damaged? Any specific timing or months of raiding observed? Throughout the year.

- 21What crops were damaged most? Maize, Paddy, Potato et
- 22Total cases of property damages between 2013

Year	Property damaged Area(Nos.)
2015-16	619
2016-17	308
2017-18	193
2018-19	827

23Total compensation paid in cases of human-mortality (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-5nos.cases)
	+11,70,000.00(Old cases-11nos.cases)

24Total compensation paid in cases of crop-damage (2015-2018):

Year	Compensation paid (IN Rs.)
2015-16	265000.00
2016-17	1541506.00
2017-18	605000.00
2018-19	3840870.00
25Total compensation (2015-2018):	n paid in cases of property-damage
Year	Compensation paid (IN Rs.)
2015-16	40800.00

2016-17	880355.00
2017-18	638200.00
2018-19	3605950.00



Fig. 1 Toilet and Tube-well with beneficiary



Fig. 2 Tube-Well with beneficiary



Fig. 3 Inflicting behavioural changes through communication and awareness among the community people

Results of Primary Data Analysis

Analysis of questionnaire data gave some interesting results along with few interesting facts. From the preliminary data available in Table 2, 3, 4 & 5 it is came to know that most of the human mortality ocurred in the fringe villages of the Madarihat PS and Range, which is having adjacent boundary with the Jaldapara National Park. From the data of "Place of incidence" of Human Mortality of Table 2, 3, 4, & 5 we came to know that Chhekamari and Khairbari villages of Mdarihat is in the hit zone of conflict. From the questionnaire data No. 12, it is came to know that deceased was old and young in the most of the Human Mortality cases. This fact is at par with the detail data of Age and Sex of deceased recorded in Table-2. 3. 4, & 5. From the questionnaire data No. 21, it is come to know that elephant conducted raid in the crop season of Maize, Paddy and Potato. In North Bengal farmers go for Maize summer, then Paddy in the Monsoon and then Potato in the winter. In this way local farmers are attracting the raid of Elephant throughout the year. So, the collected data of questionnaire No. 20 and 21 is at par with each other. signifies the purity of the data. From the questionnaire data No. 14 it is come to know that elephant depredation in the villages occurred in the evening and night. Questionnaire data No. 15 help to know that direct injury is the cause of human mortality. Time of injury or direct interaction with the elephant occurred in the early morning and in the evening and night in all of the cases (Questionnaire data No. 16). So, it is clear that as elephant depredation occurred in the evening and night, human mortality also occurred at that time. But the fact of human mortality in the early morning is not clearer from the available data. But at the second phase of filed study through door to door communication, we have got the answer of incidence of human mortality by elephant through injury at the early morning

Result of Door to Door Communication

We have understood through preliminary data analysis, that Chhekamari and Khairbari Villages of Mdarihat Range and PS is in the hit zone of conflict. For that reason second phase of field study conducted in that area through Door to Door communication. It is resulted in the fact that 50 Nos. Household were devoid of any Toilet facilities in this 2 villages and the members of those houses going outside for open defecation in the early morning and in the evening. On an average 5-6 members are there in each and every household of those villages. So, approximately 250- 300 Nos. peoples are going outside for Open Defecation, with the fear of direct conflict with the Elephant and other wild animal at that specific time. As per the objective of our study we are searching for innovative strategy to mitigate conflict in the villages of Non JFMC areas and interestingly this 2 village's viz. Chhekamari and Khairbari is also having no JFMCs. So, it signifies that we are in the right track of our study as per our objective of study. Mid-aged adult male and female were to some extent more cautious to avoid interaction with the Elephant at that specific time, but young and old aged people by nature is less concern with the interaction and automatically lost their life with the direct conflict at the time of open defecation in the outside. The community people and the people of the deceased family confirmed the fact that, almost in all of the 34 cases of Human mortality occurred, when deceased went for Open Defecation in the outside.

Discussions

Based on the interpretation of the results and availability of AMPA (Compensatory Afforestation Fund Management Planning Authority) Fund on priority basis 20 Toilets with Tube-well were constructed to 20 neediest household of those illages who are unable to construct toilet due to poor socionomic condition. After construction, Toilets were handed over to those beneficiaries and behavioural changes also inflicted among the people of those households to assure 100% Toilet usage and in this way chance of direct interaction with the elephant reduced to the members of those household. All the Toilets with tube-well, then tagged with the GPS location and beneficiary list kept to the Madarihat Range Office and with the Jaldapara Wildlife Division. After seeing the success of the pilot project CAMPA authority sanctioned fund for those remaining 30 Nos. Household devoid of Toilet facilities. Construction is going on and very soon we will be able to officially distribute those toilets and to make the Chhekamari and Khairbari open defecation free. In the meantime those people are using community toilets and the toilets of the relatives. Till date no Human mortality reported from those areas where Toilets were constructed and usage was assured among the community people, with the community participation.

IV. CONCLUSION

So, in this way by Constructing Toilets with tube-well as an innovative strategy a big scientific problem of Human Elephant Conflict and Elephant Conservation was addressed through the door to door communication with the community people and with community participation. First time any Protected Area adopted this sort of innovative strategy to mitigate Human Elephant Conflict and as added advantage the issue of Open Defecation is also addressed. So, it's a win-win situation for the community people. Saha, S. K.

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VI. REFERENCES

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TABLE 1

ELEPHANT MORTALITY CASES

Date	Age & Sex	Place	Cause of Mortality	
4.6.15	Wildelephant, Female, 4Yrs.	Tulsipara Das Ghar Village, P.S. Birpara	Electrocution	Accidental
24.8.15	Wild elephant, Female, 30Yrs.	Tulsipara Bara Line, P.S. Birpara	Electrocution	Accidental
8.9.15	Elephant, Male	Satali Nakadala Village area	Electrocution	Accidental
10.09.15	Elephant, Adult, Female	BD-8 Compt.	Cardio respiratory failure	Natural
21.10.15	Elephant, Female, 15 Yrs.	JP-5 Compt.	Cardio respiratory failure	Natural
24.11.15	Wild elephant, Tuster	Railway truck near Haripur, Madarihat	Railway accident	Accidental
5.03.16	Elephant, Adult, Male	BD-4 Compt.	Cardio respiratory failure	Natural
08.06.2016	Elephant, 4Yrs, Male	BN-4	Cardio respiratory failure as a consequence of left eye with vision lost and not been able to stand on its leg in swampy area.	Natural
02.11.2016	Wild elephant, Tusker	Gopalpur T.G.	By electrocute	Accidental
14.12.2016	Elephant, 25 Yrs, Male	BN-4	Infighting	Natural
16.06.2017	Wild elephant calf, 2Yrs., Male	Titi-4 Compartment near Torsa river bed.	Natural death	Natural
01/03/2018	Elephent, Male, 40Yrs.	BD-3(a) Compt. KB Beat	In fighting	Natural



TABLE-2

HUMAN CASUALTIES BY ELEPHANT (2015-16)

Name of the person died with details (age, sex, address etc.)	Date	By which species	Place of incidence	Compensation Paid (in Rs.) (during 2016-17)	
1. Suklal Nayek, Male, Vill+P.O. Jaldapara, Dist. Alipurduar	09.5.2015	Wild elephant	Jaldapara Village near Forest Boundary.	Rs.2,50,000.00	
 Saila Lama, Female,98Yrs, Uttar Rangalibazna, P.S. Madarihat, Dist. Alipurduar. 	15.6.2015	Wild elephant	House Premises	Rs.2,50,000.00	
 Kuchu Munda, Male, 56Yrs, Madhya Chakamari, P.S. Madarihat, Dist. Alipurduar. 	15.6.2015	Wild elephant	House Promises	Rs.2,50,000.00	
 Manilal Munda, Male, 55Yrs, Purba Khairbari, P.S. Madarihat, Dist. Alipurduar. 	08.10.2015	Wild elephant	House Premises	Part payment Rs. 20,000.00	
 Nabal Kishore Roy, Male, 40Yrs, Uttar Khairbari, P.S. Madarihat, Dist. Alipurduar. 	13.02.2016	Wild elephant	House Premises	Part payment Rs. 20,000.00	
	Ĩ		TOTAL Rs.	7,90,000.00	

TABLE-3

HUMAN CASUALTIES BY ELEPHANT (2016-17)

Name of the person died with details (age, sex, address etc.)	Date	By which species	Place of incidence	Compensation Paid (in Rs.) (during 2016-17)
6. Bande Oraon, Age-42 Yrs, Vill- Sidhabari, P.S. Alipurduar.	26.05.2016	Wild Elephant	Village area	Rs. 2,50,000.00
7. Zakir Hossein, Male, 40Yrs, Paschim Salkumar, P.S. Madarihat	17.06.2016	Wild Elephant	Khairbari Forest	Inside Forest area
8. Suniram Kujur, Male, 45Yrs, Ballalguri, Totopara, Dist- Alipurduar	29.06.2016	Wild Elephant	Kalikhola	Rs. 2,50,000.00
9. Jayanti Oraon, Female, 6Yrs, Gopalpur T.G, P.S. Madarihat	17.07.2016	Wild Elephant	Own House	Rs. 2,50,000.00
10. Iswar Oraon, Male, 27Yrs, Chapaguri, Madarihat	16.08.2016	Wild Elephant	Own House	Rs. 2,50,000.00
 Ramesh Kharia, Male, 25 Yrs, Umacharanpur, P.O. Chhoto Salkumar, Dist-Alipurduar 	03.09.2016	Captive Elephant		Rs. 1,87,500.00
12. Balaram Roy, Male, 35 Yrs, Paschim Khairbari, Madarihat	18.10.2016	Wild Elephant	Own House	Rs. 1,75,000.00
 Jetha Chhetri, S/O Late Mon Bahadur Chhetri, Vill- Ranbahadur Basti, P.O. Dalsingpara, Dist- Alipurduar. 	20.10.2016	Wild Elephant	Ranbahadur Basti	Rs.1,87,500/- (75% payment)
 Saharai Kerketta, 46Yrs, Male, Vill- Madhya Satali, P.O.Satali Mandalpara, P.S. Jaigaon, Dist- Alipurduar. 	18.12.2016	Wild Elephant	Satali Mandalpara	Rs.2,50,000.00
15. Ashik Kheria, Male, 23 Trs	20.02.2017	Captive Elephant		-
 Suchitra Das, W/O Kali Kr Das, 40Yrs, Female, Vill- Mairadanga, P.S. Falakata, Dist-Alipurduar. 	18.03.2017	Wild Elephant	Mairadanga	Inside Forest area
			TOTAL Rs.	18,00,000.00

TABLE-4

HUMAN CASUALTIES BY ELEPHANT (2017-18)

Name of the person died with details (age, sex, address etc.)	Date	By which species	Place of incidence	Compensation Paid (in Rs.) (during 2017-18)
Hanu Kharia, 59Yrs, Male , S/O Late Khanu Kharia, Vill : Hollapara, Ballalguri, P.O. Totopara, P.S. Madarihat, Dist. Alipurduar,	09.04.2017	Wild elephant	Totopara Road	1,87,500.00
Bindu Sarkar,45Yrs., Female, Vill+P.O. Madarihat, Dist. Alipurduar	22.04.2017	Wild elephant	JP-1 Compartment, NWC Beat	In side National Park.
Kajali Das, 44Yrs., Female, Vill+P.O. Madarihat, Dist. Alipurduar.	22.04.2017	Wild elephant	JP-1 Compartment, NWC Beat	In side National Park.
Akal Rabba, 65Yrs, Male, S/O Late K. Rabba, Vill : Kodalbasti Forest Village, P.O. Satali, P.S. Jaigaon, Dist. Alipurduar.	01.05.2017	Wild elephant	BD-3 Compartment, Kodalbasti Beat under Kodalbasti Range.	In side Forest
Joynarayan Sharma, 68Yrs., Male, S/O Late Ramsundar Sharma, Vill+ P.O. Madhya Khairbari, P.S. Madarihat, Dist. Alipurduar.	17.05.2017	Wild elephant	Madhya Madarihat	80,000.00
Debi Sharma,45Yrs, Female, W/O Sri Arun Sharma, Vill : Bhulan Chowpati, Torsa Tea Garden, P.O. Dalsingpara, Dist. Alipurduar	01.08.2017	Wild elephant	Purba Khairbari	1,25,000.00
Akhil Karjee, 47Yrs., Male, Vill : Nutanpara, P.O. Jaldapara, Dsit. Alipurduar	13.09.2017	Captive elephant	Jaldapara	2,50,000.00
Susena Minj, Female, W/O Pascal Oraon, Vill : Garganda Tea Garden, P.S. Madarihat, Dist. Alipurduar.	17.09.2017	Wild elephant	River side of Bhangri river	1,25,000.00
Juliyas Kharia, Male, S/O Sukra Kharia, Vill+ P.O. Khawchandpara, P.S. Falakata, Dist. Alipurduar.	10.11.2017	Captive elephant	Jaldapara	1,25,000.00
Mafidul Haque, 29Yrs., Male, S/O Ramjan Ali, Vill : Purbo Deogaon, P.O. Deogaon, P.S. Falakata, Dist. Alipurduar.	22.11.2017	Wild elephant	Purba Deogaon	1,25,000.00
Gandur Oraon, 52Yrs., Male, S/O Late Jharia Oraon, Vill : Permalangi 2 No. Basti, P.O. Hasimara, P.S. Hasimara Out Post, Dist. Alipurduar.	27.11.2017	Wild elephant	Subhasini Nadi Line	1,25,000.00
Akalu Goyala, 66Yrs. Male, S/O Late Budhram Goyala, Vill : Ramjhora Tea Garden, P.O. Ramjhora, P.S. Birpara, Dist. Alipurduar.	17.12.2017	Wild elephant	Ramjhora Tea Garden	1,25,000.00
Doma Nagashiya, 54Yrs., Male S/O: Late Bipata Nagashiya, Satali Mandal Para, P.S. : Jaigaon, Alipurduar	02.01.2018	Elephant	Stali Mandal Para, P.S. : Jaigaon, Alipurduar	1,25,000.00
			TOTAL Rs.	13,92,500.00

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Sl. No.	Name & address of deceased person	Deceased by attack of which animal	Date of death	Range	Place of incidence	(Compensatio n) (In Rs.)
1.	Markush Ekka(Oraon) S/o Soma Ekka, (Oraon),Dakshin Ballalguri,PS-Madarihat,Dist- Alipurduar.	Wild Elephant	25.5.2018	Lankapara	Lankapara	250000.00
2.	Jangi Bir Bahadur Chhettri of Uttar Chakamari, P.O. & P.S. Madarihat, Dist. Alipurduar	Wild Elephant	09.06.2018	Madarihat	House Premisses	125000.00
3.	Chuni Oraon, S/O Ratiram Oraon, Vill : Paschim Madarihat, P.O. Madhya Madarihat, P.S. Madarihat, Dist. Alipurduar	Wild Elephant	14.09.2018	Madarihat	House Premisses	125000.00
4.	Sibram Munda, S/O Late Narayan Munda, Vill : Mujnai Tea Garden, P.O. Mujnai Tea Garden, Dist. Alipurduar	Wild Elephant	05.10.2018	Madarihat	House Premisses	125000.00
5.	Jharhi Oraon, Vill : Dakshin Mendabari, P.O. Uttar Mendabari, P.S. Kalchini, Dist. Alipurduar	Wild elephant	10.03.2019	Chilapata	House Premisses	200000.00

TABLE-5 HUMAN CASUALTIES BY ELEPHANT (2018-19, TILL THE STUDY)

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TOTAL Rs. 8,25,000.00