

Causes of man-Elephant conflicts and its impact on livelihood in fringe villages of Moman Reserve Forest, Kamrup district, Assam, India

Meghna Das¹ and Gogoi Barnali²

Department of Geography, Cotton University, Guwahati 781 001, Assam, India.

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ABSTRACT

In India about 60 per cent of wild Asian Elephants are found. Elephants have a very significant and respected position in Indian societies since ancient periods. For the protection of this mammal the government of India has adopted the Indian Wildlife Protection Act (Schedule I and Part I), 1972. In spite of such protection and value of this animal in Indian culture, human- elephant conflict is found to be common in India and is increasing in recent times. Due to rapid growth of human population and subsequent reduction of natural habitat this problem has become more acute. Within a span of 10 years, 1991-1999 elephant habitat of over 3000 km² was lost from North-east India (Baskaran *et al.*, 2011). Moreover, there is an increase in the total elephant population of Assam from 5,246 to 5,719 in 2002 – 2017 (Government of Assam, 2017). The fringe areas of Moman Reserve forest, located at southern part of Kamrup district of Assam face the same problem. The main economic activity of these fringe villages is rice cultivation which is adversely affected during the harvesting season due to the herds of elephants coming in search of food. This has immense impact on the livelihood of the villagers. This study is an attempt to find the specific causes of the problem in the area and to search for a sustainable management approach to the problem. To assess the habitat loss satellite imageries of Landsat 2, Landsat 7 and Landsat 8 for the years 1977, 2000 and 2019 respectively are being processed in ERDAS Imagine software. Primary household survey using random sampling technique is being conducted in 50 households in Moman, Sijubari, Jarapara and Pakharapara to find the beginning, frequency and extent of damage of the conflict and its impact on their livelihood. Secondary data are also collected from different sources like government records, reports, websites, etc. There is loss of human life, public and private properties and huge crop loss every year in the study area.

Key words : Man- elephant conflict, Moman reserve forest, Livelihood.

Introduction

Man-Elephant conflict is one of the most arising problems in Assam from conservation perspective. Numerous attempts were made to resolve this problem but in vain, contrarily such events are in the rise in recent times. The reason behind this is manifold, main being the anthropogenic causes. Fragmenta-

tion of the habitats of these mammals is one of the major threats to these mammals and encourages such man-elephant conflicts as they need extensive areas for survival (Menon *et al.*, 2005). Degradation and deterioration of forest cover adds to it as these Pachyderms' home ranges in the wild from several hundred sq. kms. to 5,000 sq. kms. or more in size (wwf.org). In north India, female home ranges be-

tween 184–326 km² and male home ranges between 188–407 km² (iucnredlist.org/details/7140). In Assam there is also an increase of elephant population from 5246 in 2002 to 5719 in 2017 (Govt. of Assam, 2017). This increase in the population of these mammals adds to the conflict as there is shrinkage of habitat. Due to these conflicts about 876 people died since 2006 till November, 2017 in Assam (Govt. of Assam, 2017). These conflicts have impact on the livelihood of the people living in the fringe villages of the areas. In 2017 alone, 48 people died till November in Assam. Similar problems are also prevalent in the study area. Every year there is an increase in man-elephant conflict in the fringe villages of Moman Reserve Forest, Boko due to various reasons. The elephants of the study area fall

under the western population of south bank of the Brahmaputra (Menon *et al.*, 2005).

Study Area

The study area is located to the west of Guwahati city and in the southern part of Kamrup district of Assam near Boko town. It is located between the geographical coordinates : Longitude- 91°10'58.31"E to Moman, Sijubari, Jarapara and Pakharapara 91°13'57.77"E and Latitude- 25°54'59.85"N to 25°58'24.47"N. The four sampled villages Moman, Sijubari, Jarapara and Pakharapara are located to the west and north of Moman Reserve Forest. The Moman Reserve Forest falls in Bamunigaon Range of the Kamrup West division. Just adjacent to

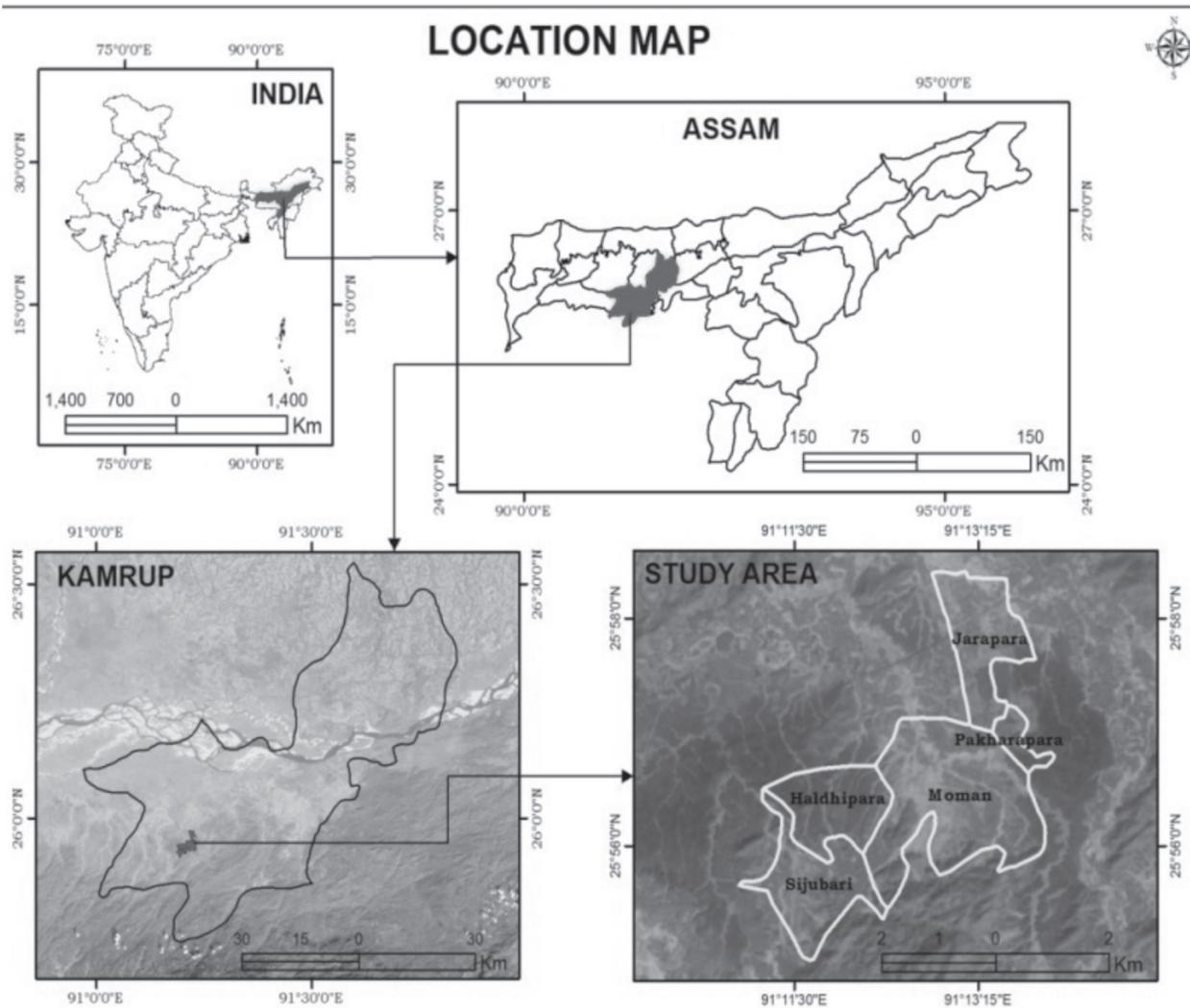


Fig. 1. Location map of the study area.

Moman Reserve Forest lies the Bogaikhas Reserve Forest, which is the largest reserve forest of this division and also the major habitat area of the elephants within this range. This reserve forest is connected to Rani Reserve Forest and further to the reserve forests of Meghalaya (in the Assam-Meghalaya border) where there lie a number of elephant corridors. These gigantic mammals come down to Assam from Meghalaya in search of food through these corridors in the reserve forests of Assam like Moman R. F. But due to lack of required food in the forest area they invade the agricultural fields which ultimately lead to man-elephant conflict in that area.

Objectives

The main objectives of this study are:

- To find out the causes of man-elephant conflict in the study area.
- To study the damages caused by such conflict in that area.
- To find the impact of conflict on livelihood of the people.

Data source and Methodology

The research work is based on both primary and secondary data. Primary data have been collected with the help of a pre-designed survey schedule. A total of 50 households have been randomly selected for the purpose from the fringe villages of Jarapara, Pakharapara, Sijubari and Moman. Apart from that a personal interview was also conducted with the forest officials of Boko forest office and Bamunigaon division forest office. The secondary data have been collected from these two offices, journals, newspapers, internet etc. The maps are collected from Google maps, satellite imageries and from Bamunigaon division forest office. The data gener-

ated are then analyzed by simple statistical techniques and the results are interpreted.

Results and Discussion

Background of the surveyed villages

According to 2011 census the surveyed villages have a total population of 5222 persons residing in 1161 households. About 79.87% of that population belongs to Scheduled Tribe category (2011). Out of that 50 households which has a population of 210 persons have been surveyed which represent about 4.3% households of the surveyed villages. Out of it 52% are males and 48% are females. The total literacy of the surveyed population is 83.74%, out of which male literacy is 55.88% and female literacy is 44.12%. From the surveyed data it is found that about 88% (i.e. 44 households) of the population are farmers and they are primarily dependent on agriculture, followed by job holders 10% (i.e. 5 households) and business makers 2% (i.e. 1 household). The surveyed households occupy a total of 115.63 acres (0.47 sq. km.) of land. Out of which homestead comprises of 38.44 acres (0.16 sq. km.), farmland 54.06 acres (0.22 sq. km.) and plantation 3.13 acres (0.01 sq. km.). In addition to this they use about 20 acres (0.08 sq. km.) of land in the forest for plantation. Moreover they collect firewood and some minor products from the forest. It has been found from the survey that not a single household in Sijubari has LPG; they solely depend on fire wood collected from the forest.

Causes of Man-Elephant conflict

A) Degradation of forest

A significant decrease in forest cover within the

Table 1. Changes in forest cover of Moman and Bogaikhas Reserve Forest (1977, 2000 and 2019).

Moman Reserve Forest And Bogaikhas Reserve Forest	1977	2000	2019
Forest Area (in sq. km.)	238.11	211.5	190.02
Non-forest Area (in sq.km.)	13.76	40.37	61.85
Total (in sq. km.)	251.87	251.87	251.87

Table 2. Changes in forest cover of Moman Reserve Forest (1977, 2000 and 2019).

Moman Reserve Forest	1977	2000	2019
Forest area (in sq. km.)	30.89	26.01	23.29
Non-forest area (in sq. km.)	4.13	9.01	11.73
Total (in sq. km.)	35.02	35.02	35.02

Moman and Bogaikhas Reserve Forest is found after processing of the satellite imageries of Landsat 2, Landsat 7 and Landsat 8 for the years 1977, 2000 and 2019 respectively in ERDAS software. The total forest area of both the forests is 251.87 sq. kms., out of which Bogaikhas has 216.85 sq. kms. and Moman has 35.02 sq. kms. In the years 1977, 2000 and 2019 the forest cover of both the Reserve Forests were 238.11 sq. kms., 211.5 sq. kms. and 190.02 sq. kms. respectively (Table 1). The percent of change in forest areas of both the Reserve Forests are -10.16 from 2000 to 2019 and is -11.18 from 1977 to 2000. This indicates that there is tremendous shrinkage of -20.20 percent of forest cover in both the forest within a span of 42 years from 1977- 2019 (Fig. 2). Similarly,

the percent of change in forest cover of only Moman Reserve Forest is -10.46 from 2000 to 2019 and -15.80 from 1977 to 2000 (Table 2). This indicates that there is tremendous shrinkage of -24.60 percent of forest cover of Moman Reserve Forest within a span of 42 years from 1977- 2019 (Fig. 2).

B) Illegal felling of trees

According to the villagers the man-elephant conflict in the study area had its beginning in 1982-1983 when illegal felling was in rise due to loophole in the management. Active illegal trade of woods was prevalent widely in which the locals were also involved and thus started shortage of food and habitat for these species. At that time the conflict was not

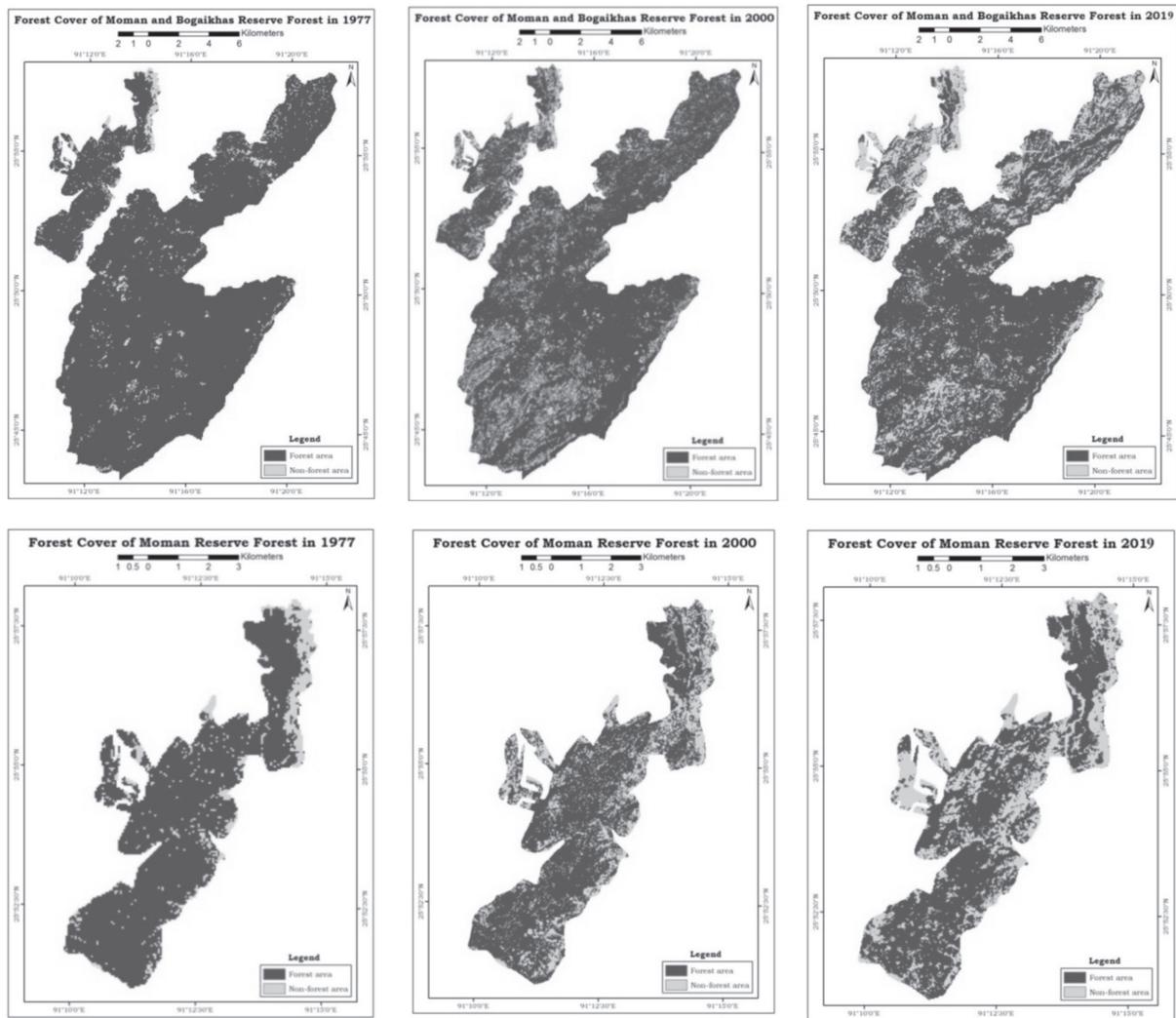


Fig. 2. Maps showing changes in forest cover of Bogaikhas and Moman Reserve Forest of 1977, 2000 and 2019 years respectively.

so severe but gradually the elephants became more and more aggressive and new areas were started being affected by them. Through time the invading size of their herds too increased from 3 to about 40 at present. The major causes behind the man-elephant conflict in the study area is the deterioration and reduction of quality as well as quantity of forest cover due to illegal felling and plantation by the locals, increase in elephant population and lack of food and habitat. Moreover this forest lies in the elephant corridor. The villagers were asked to rank the most prominent causes of forest destruction and about 82% of the households consider illegal felling as the main cause, followed by firewood collection (14%), loophole in Management (4%), land grabbing (0%) and natural calamity (0%). Moreover, from the primary survey it became clear that not only the quantity of trees in the forest area decreased but also the quality of it deteriorated through time. About 38% of the surveyed households practice plantation in about 20 acres (0.08 sq. km.) of land in the forest. This indicates that the surveyed households practice plantation of betel nut and orange in about 0.08 sq. km. area within the Reserve forest which ultimately leads to the man-elephant conflict.

According to the forest officials of Kamrup West Divisional Forest Office, Bamunigaon and Boko Forest Office the main cause of man-elephant conflict in Moman fringe areas is illegal poaching in the Meghalaya Forest areas. The major habitat of the elephants is primarily in the forest areas of Meghalaya. The elephants are killed by guns and due to which they are afraid to stay there and descend to the forest areas of Assam. In addition to that there is also mass forest destruction in the Meghalaya area which leads to lack of food and habitat for the elephants and so they come to Assam

in search of food and water. Thus, this leads to the conflict in the surveyed area.

Impact

In the fringe villages of Moman Reserve forest the people practice different livelihood activities. However, rice cultivation is the main livelihood activity as 94% of the surveyed households are engaged with it. In addition to that there are other livelihoods activities like wage labour (32%), service (10%), shop keeping (2%), poultry (72%), animal husbandry (70%), plantation (34%), vegetable selling (14%) and fuel wood selling (4%). Again out of the total households 88% (44) is fully dependent on agriculture as their primary livelihood source. But due to the increasing elephant attack on matured crops annually, their primary livelihood source is tremendously affected. This has compelled and led the households to follow other alternative livelihood activities. From the survey it is found that about 50% of the surveyed households are compelled to follow wage earning (32%), vegetable selling (14%) and fuel wood selling (4%) as their alternative livelihood sources as rice cultivation can no longer fulfill the family requirements. Apart from that, temporary migration (6%) to Guwahati and Kerela has started as a strategy to provide livelihood sustainability to the family affected by elephant attack. This shows the adversity and impact of man-elephant conflict on livelihood in the study area as the villagers are compelled to diversify their livelihood and adopt different strategies for survival.

From the survey it is found that there is an annual loss that worth about Rs.3, 34,000 of the surveyed households which include crop, plantation and property loss. In the surveyed area 76% house-

Table 3. Livelihood activities among the surveyed households.

Livelihood activities	Number of households	Percentage of Households (%)	Total households
Rice cultivation	47	94	50
Wage earner	16	32	50
Service	5	10	50
Shopkeeper	1	2	50
Poultry	36	72	50
Animal Husbandry	35	70	50
Plantation	17	34	50
Vegetable seller	7	14	50
Fuel wood seller	2	4	50

holds are affected by this conflict every year and loss matured crops of rice and different plantation. Moreover in the year 2014, one elephant killed one person and injured another person of the same family in the Moman area. Similarly, in the same year another woman from Haldhipara was injured by an elephant. Out of the 4 villages (i.e. Sijubari, Pakharapara, Jarapara and Moman) where the primary survey was conducted, the most adversely affected village is Sijubari. The population of this village has land areas at the boundary of the forest. So the crops that they cultivate are totally consumed by the mammals and for this reason about 90% households of this village have either stopped cultivating or decreased the area of cultivation.

Conclusion

The study area is under continuous elephant attack since the 1980s but it was not so adverse during those days. It is in the recent decade that the adversity of such attacks is in rise. The Elephant herd size that visits in the study area ranges from 3 to 40 elephants at present. Though these mammals visit the study area all the year round but the conflict arises mostly during the crop harvesting season i.e. between October and December which may continue till January. The harvesting time is the most crucial time for the locals as 88% of the surveyed households have agriculture as their primary source of livelihood. To handle such attacks and protect their crops the villagers have adopted certain measures themselves. They make 'Chang ghor' (raised platforms) near the fields and guard their crops the whole night as the elephants mostly visit it during the night time. They try to dispel the elephants with the help of fire, crackers and making a lot of noise to deviate their paths. But in some fields which are located just adjacent to the reserve forest the animals invade the crops during day time also. This is still prevalent in that area. Apart from it, the government too has taken certain measures to protect and conserve the forest from illegal felling. There is a positive step taken by the forest department i.e. in-

roduction of social forestry in the study area during 2000-2002. In this method the responsibility of protecting the forest was given to the locals. If anyone cuts down a tree he/she will have to pay a fine of Rs.500 and no one is allowed to cut big trees. These measures taken by both villagers and government have helped to a certain level in controlling the situation. But to overcome more, several other steps can be taken by the government like increasing awareness among the locals regarding causes of the conflict, creating and providing such livelihood options to forest fringe dwellers that are not related to forests, census of elephants may be required to protect and provide the necessary habitat, restriction on invasion of forest and restoration of the forest cover in degraded areas. This study is specific to fringe areas of Moman reserve forest, but there are many areas in Assam with man-animal conflicts. Several studies have been done in other areas. But irony is that despite these studies number of such events is increasing every year.

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