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ELEPHANT-MAN CONFLICT IN SONITPUR, TINSUKIA AND GOALPARA DISTRICT OF ASSAM, INDIA: A REVIEW

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Review Article

ABSTRACT

Human-elephant conflict brings one of the major threats to human life. Since time immemorial, various regions of Assam have been facing the worst human-elephant conflict. Determining if, how and why this conflict has changed over time and finding suggestive measures to control this problem will be an important step towards stabilizing landscapes where human and elephants coexist. The review takes into account findings of various authors related to this area of study. The findings report the cause and effect, including the loss of property and life over time immemorial as a result of human-elephant conflict alone. This short review focuses on the significance of the threat faced by both the people and elephants of the region of Assam particularly in the districts of Sonitpur, Tinsukia and Goalpara, thereby highlighting some strategies for sustainable relation between man and elephant for their co-existence.

Keywords: Assam; co-existence; elephant; elephant-human conflict; sustainable living.

1. INTRODUCTION

Mega herbivores such as elephants (*Elephas maximus*) are species which need wide range of habitats and high nutrition [1]. There have been records of human-elephant conflict since 300 B.C. [2]. Several activities have led to the human-elephant conflict with the significant among them being human expansions, crop cultivation and encroachment of habitats.

Conflict arises when elephants comes out of their local habitat, destroy crops, damages houses and kills or injures people on their way. Often people counter attack against this damage causing death of these mega herbivores [2,3]. These frequent conflicts

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have caused damage and loss of lives to both parties [4].

According to the Elephant [5], the state of Karnataka has the highest number of elephants (6,049), followed by Assam (5,719). The elephants of the foothills of Himalaya are extremely endangered [6,7]. Choudhury, 2002 [8] stated that one of the last viable elephant populations can be found in the forests of Northeast, India. In the early 1990s, these human-elephant conflict led to death of few humans but the elephants were unharmed. Due to high level of encroachment, nearly 50% of the prime elephant habitat was lost and the region became the commonplace for the conflicts by 2002 [8]. According to Choudhury (2004) [9], more than 1,150 humans and 370 elephants have died as a result of human–elephant conflicts in North-East India between 1980 and 2003.

Assam has emerged as an important Centre for Asian Elephant Conservation [10,9]. In 1992, the Udalguri (previously Darrang) district of Assam faced the worst human-elephant conflict [11]. As such there is a strong need for the mitigation of human elephant conflict. This study combines social surveys conducted by various researchers since 20th century and highlights their specific important findings so as to focus on the major issues of human elephant conflict (HEC) in the various region of this state. Lastly the study highlights some strategies for sustainable relation between man and elephant for their co-existence.

2. DISCUSSION

"North-East India is one of the largest home ground for the Asian elephant having an estimated population of 9,200–11,000" [12] "with many of these elephants belonging to the state of Assam" [7,1]. "Sonitpur District, in the state of Assam in North-East India, has been referred to as a starting point where these conflicts first took place" [13]. Tinsukia district of Assam is one of the last strongholds of elephant in the state of Assam according to Sarma et al., 2021 [14]. These elephants are known to migrate from Tinsukia district to Myanmar passing through Changlang district of Arunachal Pradesh [15].

Choudhury, 2004 [9] reported that "human deaths from elephants increased in 1993 (32), 2001 (26), and 2002 (28) (Table 1) and in retaliation, over 30 elephants were poisoned from 2001 to 2002 in Sonitpur and adjacent areas. He further stated during his report that during the period between 1950 and 1998, the number of elephants living in the foothills of Barail range in Cachar, Assam was reduced from 100 to none. Elephants were extirpated from the area". Case studies of Choudhury, 2004 [9] indicated that "in just one week in August 1993, elephants killed more than 50 people near Burhachapori and Laokhowa wildlife sanctuaries in Assam. From 1980 to 2003, 1,010 people died in Assam from human–elephant conflicts. In 1997, in a single year, 68 people died from conflicts with elephants in Assam. Elephants have also died as a result of human–elephant conflicts, many of which were killed in retaliation by villagers in that area".

Findings of the physical survey works of [16] revealed that "7 people were victimised and 43 people were injured by wild elephant during the last 5 years in Goalpara district of Assam alone (Table 1). In addition to this large number of houses, plantation especially pineapple, banana, rubber, paddy and household properties were destroyed by elephant".

Saikia, 2015 [17] reported that "during 2003 to 2014, a total of 733 humans were killed by wild elephants in Assam (Table 1). On the other hand during 2001 to 2014, a total of 225 wild elephants were killed by poaching (32), poisoning (37), electrocution (107) and train hits (49)".

In a study conducted by Kar et al. [18] during January 2015 to December 2015, 84 human deaths and 30 elephant deaths were reported in Assam. A total of 735 houses, 16 shops and 7 schools were damaged due to human-elephant conflict. 1590 bighas of paddy fields were damaged and a total of 157 domestic animals also died due to the conflict. He further stated in his report that the top three districts of Assam affected by human-elephant conflict during the year 2015 was Sonitpur (24 human death and 8 elephant death) followed by Udalguri (21 human death and 6 elephant death) and Kamrup Metro (5 human death and 2 elephant death) (Table 1).

According to Bhattacharya et al. [19], "in between 2008 and 2014, four people died while another 7 people get injured due to human-elephant conflict in the area around Laokhowa wildlife sanctuary of Assam (Table 1). On the other hand, elephants had died too as a result of human-elephants conflict in the year 2012 because of taking pesticide from agricultural field" [19].

According to Bhuyan & Kar, 2018 [20], "the number of households damaged in Sonai-Rupai wildlife sanctuary in Sonitpur district of Assam was increased from 1 in 2003 to 57 in the very next year, moreover one elephant and one human was reported as dead in that same year (Table 1). The number further rose in the successive year when 164 houses were completely destroyed by elephants. An estimated 60% of the elephants in Sonitpur and adjoining districts have disappeared in the last 5 years, mostly from poisoning" [12].

Table 1. Recorded case of human casualty, injured, approximate nos. of houses damaged and land destroyed by wild elephant

Year	Casualty (Death)	Injured Nos.	Nos. House	Land (bigha)	Place	Reference
1999	1	13	50	-	Goalpara	[16]
2003	2	17	120	-	Goalpara	[16]
2008	2	14	50	-	Goalpara	[16]
2009	1	18	48	-	Goalpara	[16]
1997-2007	89	-	-	-	Sonitpur	Divisional Forest Officer, Sonitpur West Division, pers. comm., 2008
2003-2013	4	4	782	-	Sonai Rupai Wildlife sanctuary, Assam	[20]
1993	32	-	-	-	Sonitpur	[9]
2001	26	-	-	-	Sonitpur	[9]
2002	28	-	-	-	Sonitpur	[9]
2015	24	-	-	290	Sonitpur	[18]
2015	21	-	-	215	Udalguri	[18]
2015	5	-	-	386	Kamrup (M)	[18]
2008 - 2014	4	7	-	-	Laokhoa wildlife sanctuary, Assam	[19]
2003 - 2014	733	-	-	-	Assam	[17]

3. CAUSES FOR CONFLICT

3.1 Water Shortage

Kar et al. [18] stated that "there exist no permanent sources of water within most of elephants habitat. The run-off water from channels is very rapid and during winter seasons, these channels dry up and water gets retained only in small pockets of the habitat. As such, elephants often go to ponds in marshy lands and villages in search of water. As a result of this intervention, the human population of the particular area feels threatened and tries to drive away the elephants resulting in conflict between the two" [18].

3.2 In Search of Food

Kar et al. [18] reported that in "some pockets of Assam, people from nearby tea-garden areas make and consume home-made country liquor, which these elephants are very fond of. Thus, in search of this liquor, elephants frequently visit tea garden areas and damage the houses. Moreover elephant habitats near the tea gardens are highly degraded due to continuous illegal felling and encroachment by the local people especially by the labourers of adjoining tea gardens" [18]. During the study it was further observed that incidences of man elephant conflict gradually increase from the second quarter of the year and reach a peak in the third and fourth quarter as these quarters correspond with the cropping (paddy) season. Moreover, forest areas become dry in this period due to winter season.

During one of the study by Bhuyan & Kar, 2018 [20] conducted in "Sonai-Rupai wildlife sanctuary in Sonitpur district of Assam, they reported that due to decrease in fodder in the forest, the elephants come out in search of food to the nearby villages. In order to defend their houses, the villagers counter attack the elephants and causalities occur in the area. They further stated that one of the primary reasons for the elephant attack in the house, apart from searching for food, is the smell of home-made liquor. Most of the fringe villages are dominated by tribal people who prepare liquor in their home itself" [20].

3.3 Loss of Elephant Corridor

Haphazard and illegal developmental and industrial growth around the elephant corridors is creating disturbances in the movement of elephants between landscapes. In Assam, encroachment of forests lands is increasing in unproportionate manner [21,22].

Talukdar & Kalita, 2014 [16], during their study in Goalpara district of Assam, reported that the ancient elephant corridor had been infiltrated by development activities which have resulted in a land–resources competition between man and elephants which ultimately led into human–elephant conflict.

According to Sarma et al., 2021 [14], blockage of traditional elephant corridors (viz. Bogapani, Golai and Katha) by various developmental activities and rise in tea cultivation in the area has contributed to the rise in human elephant conflicts in the region of Tinsukia district of Assam. Due to blockage of traditional routes of elephant, four new corridors in Tinsukia district were reported to be created in due course of time. Human-elephant conflict takes place on a regular basis along these four new corridors viz., Bogapani, Upper Dihingeast - west, Takuaoni Kakojan and Koth – Burhidihing [14].

3.4 Loss of Forest Cover

In one of the study conducted by Chartier et al., 2011 [23], "report indicate that conflict between human-elephant increased dramatically in the early 1980s in Sonitpur district of Assam, with 85% of those surveyed indicating that conflict began after 1980. The major reason behind this conflict was attributed due to significant dropping of forest below 30–40% (Table 2) (Table 3)".

Talukdar & Kalita, [16] reported "in their study that due to massive destruction of forest cover in the district of Goalpara, Assam, habitat of the elephants have been disturbed by anthropogenic interference which has cost them with food and shelter insecurity. This has resulted in the movement of the elephant from the hills to human habitat leading to human-elephant conflict. During their study they also reported that rate of degradation in forest cover of Borjhar Forst area in Goalpara district of Assam will be further degraded over 4622 hectares by the end of this decade which is 2.54% of total Geographical area (Table 3)".

Bhattacharya et al. [19] reported that "78% of the people surveyed stated that large scale habitat destruction (deforestation and excessive cattle grazing) was responsible for a higher human-elephant conflict in the areas around Laokhoa wildlife sanctuary of Assam".

As per report of Bhuyan & Kar, 2018 [20], "Sonitpur district records the highest degree of forest degradation and encroachment in the entire state of Assam. This has given rise to high incidence of human-animal conflict in some parts of the district like Behali reserve forest and Gohpur reserve forest, but it has taken a severe turn in the Sonai– Rupai wildlife sanctuary" [20] (Table 3).

Table 2. Records showing percentage of forest cover

Year	% of forest cover	Place	Reference
1973	43	Sonitpur, Assam	[23]
1988	37	Sonitpur, Assam	[23]
2007	16	Sonitpur, Assam	[23]

Table 3. Records showing percentage of degraded forest

Year	% of degraded forest	Place	Reference
1989	5.48	Goalpara, Assam	[16]
1993	2.73	Goalpara, Assam	[16]
2003	5.2	Goalpara, Assam	[16]
1973	9	Assam	[23]
2007	30	Assam	[23]
1988-2014	>40	Sonai Rupai Wildlife sanctuary, Assam	[20]

3.5 Suggestions for Resolving Conflict

Elephants can be kept at bay by adopting some strategies which may result in lesser conflict between the two. Farmers may use smoke, bonfires, torch-lights etc. to scare and chase the elephants away [24,25]. Loudspeakers is also a short-term solution for crop raiding elephants [26].

Choudhury, 2004 [9] emphasized on legal protection of elephant migration corridors and also on regulation of shifting cultivation. According to Choudhury, 2004 [9], "new protected areas need to be created. With only about 25% of the habitat of elephants within protected areas, there is an urgent need to create more protected areas" [9]. By declaring a part of land as protected area, it does offer a vital legal step toward conservation and reducing conflicts. Further according to him, the existing protected areas should also be enlarged and fragmentation of protected areas should be discouraged.

Chartier et al. [23] listed "three important strategies viz. maintenance of remaining forest areas, reforestation, and the creation of habitat corridors that could help prevent further expansion of conflict".

Rajkumar et al. [27] suggested "a very fruitful measure to minimise human-elephant conflict by using remote elephant tracking method in areas facing such conflicts. This measure involves the use of some sensor that generates an alarm by detecting the seismic waves that are generated by the movement of elephants. This alarm can make the people as well as forest department know about the arrival of elephants".

Kar et al. [18] listed some suggestions that "may be adopted for reducing elephant human conflict. Suggestions included creation of buffer zone between the natural habitat and settlement area by planting unpalatable crops like Chilly, Citrus, Tobacco, Lantana, Citronella, Jatropha etc. and developing a permanent fresh water ecosystem within the habitat of elephants, so that sufficient drinking water is available for them" [18].

Bhattacharya et al. [19] reported that "hundred percent of the respondent living around the area of Laokhowa wildlife sanctuary of Assam stated that the electric fence might be the right solution for the human-elephant conflict mitigation".

Bhuyan and Kar, 2018 [20] suggested that "in order to prevent the elephants from coming out of the sanctuary, there is a need to increase the food for elephants and other wildlife inside the forest". Bhuyan & Kar, 2018 [20] listed "one interesting measure to keep the elephants at bay in the fringe areas of Sonai-Rupai Wildlife Sanctuary in Assam. The measure was adopted by the North-East Frontier Railway (NFR) in 2017 which was that they had downloaded the sound of honeybees from the internet and later on played these sound through micro-phone (electronic buzzer) in the elephant sensitive zones of Assam. This measure thereby helped to keep the elephants away from railway tracks and hence reduce their death through potential train accidents. They further stated that in the year 2006, the forest department constructed electric fencing in and around some selected elephant corridors to stop the elephants from coming out of the forest which resulted in decrease of the conflict".

As suggested by Sarma et al. [14], remote sensing data on temporal scale should be analyzed to monitor the corridors regularly. Regulation is of prime importance in the expansion of tea gardens to provide ecological connectivity of the species from different habitats [14].

4. CONCLUSION

Man-elephant conflict brings one of the major threats to human life. The death or injury of human beings due to elephant also has a high social cost. This also threatens the conservation of elephant world-wide. There is a need for better understanding and awareness about the nature and complexity of factors contributing to human-elephant conflict including water shortage, in search of food, loss of elephant corridor and loss of forest cover. These mega herbivores are listed under the Schedule I of the Indian Wildlife Protection Act, 1972) [28], which is the highest level of protection accorded to any species in the country [29]. The elephant is also listed as an "endangered" species by the IUCN, 2002 [30,9]. As such protection and conservation of these mega herbivores should be given significance such that they do not face any threat in the near future.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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