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Short Communication

The impact of flood and poaching on the sustainability of one-horned rhino in Kaziranga National Park, Assam, India

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Abstract

Located in Golaghat district of Assam between the Brahmaputra on the north and Karbi hills on the south, Kaziranga National Park covers an area of 830 sq. km. This park famous for one- horned rhinoceros and habitat for a number of threatened species and migratory birds is facing twin major problems of flood and poaching every year which results to heavy loss of wildlife. Flood in Assam have been a common problem since early times. The plains of Assam have been inundated by the floods of the Brahmaputra and the Barak river systems in different periods. Heavy monsoonal rains and devastating landslides coupled with easy erodibility of rocks, steep slopes and high seismicity constitute the major natural causes of floods in Assam. The human induced factors such as deforestation in the hilly catchments of the Brahmaputra and the Barak are the important causes of flooding in the plains. Poachers kill the rhino for the horn which is in great demand in South- East Asia and Far East for medicinal value. Thus, this paper makes a humble attempt to study the implications of flood and poaching on the sustainability of the park.

Keywords: Flood, Brahmaputra river, deforestation, erosion, poaching, sustainability.

Introduction

Flood in Assam has been a common problem since early times. This flood affects agriculture, human life and properties, wildlife, etc. Kaziranga National Park (K.N.P.) is a UNESCO World Heritage Site. Among the national parks of Assam, this park is mostly affected by flood. This park is located in Bokakhat subdivision of Golaghat district striking the Brahmaputra to the north and Karbi Anglong in the south[1]. Broadly, the park is approximately 50 km long and 16 km wide. The shape of the park is roughly oval. It lies on the south bank of the river Brahmaputra. The park supports tall grasses and a few patches of deciduous forests also. The most important attraction of the park is its one- horned Asian rhinoceros. Besides it has wild buffalo, elephant, wild boar, Royal Bengal Tiger, leopard, swamp deer, barking deer, hog deer, sambur and many other animals including hillock gibbon and a few varieties of monkey. The park is also famous for pelican, hornbill, white throated brown hornbill, florican and several other species of swamp birds. Moreover, poaching of rhinos is also one of the major challenges to the park. The intensity of poaching has increased mainly due to escalation in high value of the rhino's horn consequent to imposing ban on its trade[2]. Besides, flood and poaching, this park suffers from erosion, habitat loss, human interference, etc.

Objectives of the study: i. To identify the causes of flood and poaching on Kaziranga National Park. ii. To assess the flood and poaching related casualities in the park. iii. To suggest safety measures to combat the problem of flood and poaching.

Methodology

The present study is confined to Kaziranga National Park. The data for the study have been collected from secondary sources such as books, journals, Directorate of K.N.P., Directorate of Economics and Statistics, Assam, Published news items, articles in newspapers, magazine, and Internet. Descriptive methodology is used for the analysis.

Results and discussion

Though flood helps in maintaining a balance in vegetation, there are many side effects of flood. Annual flood causes chaos and confusion in the park. It results in various problems including death of wildlife, shortage of fodder, malnutrition, highway accidents, accelerated erosion, etc. An increase in multi wave flood proves to be a threatening to the sustainability of the park and also its pride one-horned Asian rhinoceros.

Causes of Flood in Kaziranga National Park: Heavy Monsoonal rains: This is one of the important natural causes of flood in Assam. The runoff patterns of the Brahmaputra catchment in the Himalayas is primarily governed by the quantity and nature of distribution of precipitation. The Brahmaputra valley receives an average annual rainfall of 230 cm, while the Himalayan sector of its catchment enjoys annual

rainfall in the order of 500 cm. But, interestingly 60-70 percent of the annual rainfall generally occurs during the summer months of June to September. Since the rainfall normally starts from the month of April, the water holding capacity of the basins gets already lost before the beginning of monsoon rains. As soon as the monsoon starts, most of the rain water runs into the streams causing high stage in the Brahmaputra and their tributaries and thus results in unbelievable flash floods. The intensity of the rainfall in the catchment areas of the Brahmaputra and its tributaries is not equal and as a result, floods of different intensity occur in the park. During the rainy season, when the rainfall is evenly spread over the entire four months (from June to Sept.), floods are weak and may not cause much damage. Sometimes, there is cloud burst or very heavy rainfall during a short time. This results in discharge of large quantity of water in the rivers. Brahmaputra and its tributaries in the plains are not able to hold so much of water. This leads to floods and submergence of large area of forests nearby[3].

Brahmaputra and other rivers: The entire area of Kaziranga National Park which is situated in the flood plains of the Brahmaputra River has been formed by silt deposition that is carried out by different river systems flowing through it. There are two situations of Brahmaputra river causing flood: i. Brahmaputra river below the flood level: In this situation, the park remains free from the problem of flood as the runoff from the river having its origin in the Karbi Anglong Hills is quickly drained out into the Brahmaputra river. ii. Brahmaputra river rises above the flood level: As a result of the 1950 earthquake, the river bed of Brahmaputra river has been raised and subsequently by gradual silt deposition, the runoff from the catchment areas during the monsoon cannot be held in the existing water ways or channels of this river[4]. In this situation, the park faces flood as the excess water of the river enters from the western side through the tributaries- Dipholu and Mora Dipholu. Kaziranga is very rich in water bodies, locally called as beels. Some of the beels are Daphlang, Borbeel, Bahubeel, Koladuar, etc. This beels covers about 5.96 percent of the total park area. There are 92 perennial water bodies and more than 250 seasonal water bodies which have been formed by silt depositions. This water bodies are situated along the northern part of the park. As such this part remains unstable and faces the severe problem of bank erosion. Moreover, due to the problem of erosion, the area of this park is shrinking.

Deforestation: It is also one of the causes of flood in the park. Due to human activities, deforestation is increasing in upper catchment areas of Brahmaputra river. The shifting cultivation practiced in Karbi Anglong has substantially reduced forest cover. As a result, enormous sediments are generated and continually getting deposited on the river bed of the Brahmaputra river.

Effects of flood in Kaziranga National Park: Flood in the park plays both positive and negative role. The positive effects are maintaining ecological balance, soil formation, improving soil fertility and breeding of fishes. Whereas, the negative effects of flood includes -

Loss of Wildlife: There is a huge loss of wildlife in the park due to flood along with poaching. The Table below gives a picture of death of rhino due to flood and poaching.

Table-1: Death of Rhino due to Flood and Poaching in Kaziranga National Park, since 1980.

Year	Loss of rhino due to		Total	Year	Loss of rhino due to		Total	Year	Loss of rhino due to		Total
	F	P			F	P			F	P	
1980	13	11	24	1993	03	40	43	2006	04	06	10
1981	03	24	27	1994	02	27	29	2007	05	16	21
1982	01	25	26	1995	05	41	46	2008	06	06	12
1983	NA	37	37	1996	02	40	42	2009	08	06	14
1984	01	28	29	1997	01	29	30	2010	02	05	07
1985	01	44	45	1998	39	28	67	2011	04	05	09
1986	01	45	46	1999	31	06	37	2012	28	11	39
1987	03	23	26	2000	10	04	14	2013	03	27	30
1988	38	24	62	2001	01	08	09	2014	02	35	37
1989	01	44	45	2002	06	04	10	2015	03	17	20
1990	01	35	36	2003	03	03	06	2016	21	18	39
1991	06	23	29	2004	01	04	05	2017 (upto 02-11-2017)	31	5	36
1992	NA	49	49	2005	03	09	12	Total	262	812	1074

F- Flood, P- Poaching. Source: www.kaziranganationalpark.in

Table-2: Flood related Casualities in Kaziranga National Park.

Animals	1998	2002	2012	2013	2014
Hog deer	478	10	615	04	18
Wild boar	14	05	45	01	08
Buffalo	20	03	10	00	02
Samber	10	01	26	00	00
Swamp Deer	08	01	12	02	01
Python	00	01	00	00	00
Elephant	05	00	02	03	01
Porcupine	09	00	06	00	08
Hog Badger	05	00	03	00	00
Barking Deer	00	00	01	00	00

Source: Report of the Rhino Task Force- 2015, Government of India.

Between June and September, 1998, as many as 39 rhinos were drowned in the park while more than a thousand hog deer lost their lives. In 2012 over 540 animals including 13 rhinos have perished in the park due to flood.

Since, January 2016, the loss of rhinos both due to natural causes and floods in Kaziranga is 88. These loss have reduced the rhino population in the park from 2290 in the beginning of the year 2016 to 2191 as on October 2016. A total of 212 animals died of drowning. As many as 334 animals have died at the park in two successive waves of floods in Assam in this year. The causalities includes 22 rhinos, 1 tiger, several elephants and buffaloes and over 250 various species of deer.

Migration of animals including the one- horned rhino from the park to highlands: At the onset of monsoon season (June-September), the animals including the one- horned rhino, in order to escape from flood, move away from the low- lying areas to higher reaches of Karbi Anglong hills outside the southern border of the park.

During such migration period, the helpless animals, invariably, becomes vulnerable not only to the poacher but also to the villagers living near the park. Moreover, during their migration to the park also becomes risky as in doing so they have to cross the NH- 37 where heavy vehicles ply round the clock. While the animals come physically drained and panic- stricken on the highway NH- 37, they confront vehicular traffic there. Some of the animals get severely injured in road accidents and even after rescue and treatment they succumb to the injuries.

Table-3: Figures from Kaziranga on mortality of animals on NH- 37 between Amguri and Panbari corridors.

Year	Mortality of animals	Percentage (%)
2010	24	19.3
2011	10	8.1
2012	38	30.6
2013	26	21.1
2014	07	5.6
2015	NA	-
2016	06	4.8
2017 (upto July)	13	10.5
Total	124	100

Source: Report of Kaziranga Management.

Shortage of fodder and malnutrition: During flood, the grazing animals in the park severely suffer from shortage of fodder as all the grasslands remain submerged under water. As a result these animals suffer from malnutrition.

Soil erosion: Soil erosion is a serious problem in the park during summer flood. Erosion is primarily attributed to the instability of the river in this region.

Damage to Infrastructure and disruption in Communication: The floods generally cause considerable damage to the infrastructure of the Kaziranga National Park. This year a number of wooden bridges and anti- poaching camps have been severely damaged.

Rhino poaching: The pride of K.N.P. one- horned rhino, is an IUCN Red Listed species whose density is about 5.59 per square kilometer in the park. The 2013 rhino census in the park counted 2,329 rhinos which increased to 2,401 in 2015. Besides this success in conservation, the rhinos in the park continue to be vulnerable to the poachers. Poaching is a major threat to the Great Indian one- horned rhino as per the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). In Kaziranga, although 45 rhinos were poached between the years 1965 and 1968, greater poaching started in 1980 when 11 rhinoceroses were poached during that one year. Thereafter, until 1993, the minimum number of rhinoceroses poached annually was never lower than 23, and reached a high of 49 animals in 1992[5].

Causes of Poaching in Kaziranga National Park: Illegal Trade of Rhino's Horn: Poachers kill the rhino for the horn which is in great demand in South- East Asia and Far East for

medicinal value. There is a huge loss of rhino population because of poaching in the park. As per the Vietnamese, the horn of the rhino provided remedies for fever and liver problems and most importantly it cures cancer diseases[6]. Besides, its horn other parts of rhino like nails and skin have a high value in Asian Traditional medicinal market.

Topography of the park: According to Satyendra Singh, field director of K.N.P., the topography of the park is to some extent responsible for poaching. The northern and eastern side of the park is delineated by the Brahmaputra river and to the south is the Karbi Anglong hills. Such physical setting enables the poacher's easy entry to the park.

Poor socio-economic condition of the villagers: The villagers residing near the park are mostly poor and this intensifies the problem of poaching. Poachers coming from nearby states of Assam like Nagaland and Manipur usually come in groups (6-7) and as they are unaware of the park landscape, they approach the local communities to guide them through the difficult terrain. In this way, the poor villagers make quick and easy money for helping the poachers[7].

Involvement of Insurgent groups: North- East India is home to a variety of insurgent groups such as NLCT (Arunachal Pradesh), ULFA, NDFB, KLNLF, UPDS, DHD, KLO (Assam), UNLF, PLA, PREPAK, KCP, KRA (Manipur), NSCN-IM, NSCN-K (Nagaland), NLFT, ATTF (Tripura), HNLC, ANVC, GNLA (Meghalaya) and HPC-D (Mizoram)[8]. As mentioned in M. Basu's article "Kaziranga, India's rhino paradise, has a poaching problem that's proving to combat hard" the terrorist groups who with the help of their agents and local people kill the rhino and exchange animal parts including rhino horns with international arms vendors in order to purchase sophisticated weapons.

Flood aids poaching: As mentioned in V. Menon's Traffic Network Report, the incident of flood in the park also aids poaching. The one- horned rhinoceroses in K.N.P. are typically taken by poachers as they cross the NH- 37 to seek refuge in the Karbi Anglong hills and Burapahar hills, when the rest of the park is under water.

Preventive measures: Construct Highlands: Though there are a number of highlands in the park yet they are not enough to provide shelter to the entire population during floods and some of the highlands are old and need to be renovated. As floods are a recurring feature and their severity increases due to climatic change, the government authority should make more highlands for shelter of the wildlife.

Drivers to drive slow: Highway drivers need to drive slow if they see animals in the NH- 37. This will help to reduce the loss of animals due to accidents at NH- 37.

Local people's participation: Though there are a number of anti- poaching activities adopted both inside and outside the park, yet there is no control of poaching. So, the people from the surrounding villages should come forward and stand against poaching as the villages are part of the ecological continuum of the Kaziranga landscape. Thus, local people's participation is one of the necessities for fulfilling every step for the well being of the national park.

Provide adequate fund: The government must provide adequate fund for regular repair of the infrastructure damaged due to flood and also provide the forest staff of the K.N.P. the basic medical cover.

Government Initiative: The government officials must spread awareness of the importance and significance of the park in the environment, among the local communities residing near the park and also try to build a more intensive and extensive intelligence with the surrounding villagers in order to combat poaching.

Demystify the myth about rhino's horn having medicinal properties: As long as the myth of rhino's horn having medicinal properties will exist, the demand for the horn and poaching of rhino will continue. So, there is an urgent need to prove that myth wrong. To achieve this effective awareness should be created against the use of rhino horn, nails or flesh, by exposing the futility of such usage.

Multi-State Action: As the north- eastern states of India namely Arunachal Pradesh, Nagaland, Manipur and Mizoram share borders with Assam as well as with Myanmar where rhino horns are being sold, so there is an urgent need for a concerted multi- state action to control poaching.

Rhino DNA Indexing System (RhODIS): This project aims to improve the plight of the rhinos. It was initiated by the Veterinary Genetics Laboratory, University of Pretoria. This system was first used in 2010 when a Vietnamese citizen was convicted of poaching rhino horn in his baggage and was sentenced for 10 years imprisonment[9].This technology if adopted by the state government can go a long way in combating poaching. With the aid of this system, an individual rhino's unique DNA profile is being compiled in a ready- to-reference data base.

Harsh Punishment to the poachers: As poaching is a crime so the punishment for the poachers must also be harsh. In some countries due to lenient punishment for poachers, the problem of poaching has been increased.

Conclusion

Thus, it can be concluded from the study that both flood and poaching are the two major threats for the rich biodiversity of K.N.P. Recent floods ant the rapid rate of poaching are a warning for all of us to take urgent steps to address to this two problems in a holistic way. The loss of animals particularly the

one- horned rhino of which the park is famous for should be minimized in order to maintain the sustainability of the park.

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