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Research Article

A PERSPECTIVE ON DEATH OF ONE-HORNED RHINOCEROS (RHINOCEROS UNICORNIS) IN DUARS REGION OF WEST BENGAL, INDIA

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ABSTRACT

The Duars of West Bengal is the home to the second highest population of the One-Horned-Rhinoceros (*Rhinoceros unicornis*) in the country after the Kaziranga National Park in Assam. In Duars the Garumara National Park and Jaldapara National Park are the two important geographical places for one-horned-Rhinoceros. The Rhinoceros's number has increased in Duars. It has been raised from 8 in 1978 to 49 in 2015 in the Garumara National Park and from 72 in 1964 to 204 in 2015 in the Jaldapara National Park. At the number of male Rhinoceros have increased in Jaldapara and in Garumara National park of the Duars in recent years and therefore this has become a regular affair over the past few years' male Rhinoceros engaged in an interspecies fight for female Rhinoceros. The smuggling of horn of the One Horned Rhinoceros has happened in a number of times in Duars of North Bengal in the recent past. The total population of Rhinoceros has been increased in Duars at one hand, death of Rhinoceros due to interspecies fight for female and poaching activities on the other hand. It gives a mixed conservative success of the foresters of Duars for One-Horned-Rhinoceros.

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INTRODUCTION

The word 'Rhinoceros' is derived from the Greek word meaning 'nose-horned'. The one-horned Rhinoceros (*Rhinoceros unicornis*) are the second largest terrestrial animal in Duars next to elephant. These large herbivores are shapers of their landscape and environment. By continuously browsing shrubs and small trees, they keep them short and accessible to a whole range of small leaf-eaters. Each consumes almost 40kg of vegetation a day.

It inhabits two types of forest, 1. Dense mixed forest and lower hill slopes of Terai and Duars and 2. Tall grassland and mixed forest. It is occasionally seen outside the forest area, raiding crop field in the fringe village at night. The Rhinoceros are solitary creatures and tend to avoid one another, coming together only for breeding. Females don't move too far from their place of stay. The males are slightly more nomadic. Both sexes mark their territories with feces, urine and soil scrapes. It has been seen in group in Jaldapara and Garumara National Park, which is an indication of lack of space which lead to fight for dominance among Rhinoceros, a competition for available space.

Objectives of the study

The objectives of the study include the following:

- To find out the year-wise changing scenario of Rhinoceros in Duars.
- To identify the causes of death of Rhinoceros
- To trace the illegal hunting areas of Rhinoceros
- To highlight the preventive measures for Rhinoceros death and poaching.

Study area

The Duars lying in the Himalayan foothills has great natural beauty and is home to some of West Bengal's most varied flora and fauna. Gorumara National Park and Jaldapara National Park are located in the Duars region of Jalpaiguri and Alipurduar district in West Bengal. This forest area famous for its natural population of the Great Indian one horned Rhinoceros. Garumara National park is located in the district of Jalpaiguri in the flood plain of Jaldhaka and Murti River. It is situated between 88°50' to 88° 60' E longitude and 26°44' to 26°75' N latitudes. Jaldapara National Park has been placed on the wildlife map of India because of the presence of the Great Indian one horned Rhinoceros. The sanctuary is located in the

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floodplains of the river Torsa and other small rivers, which created large tract of grassland sustaining a small population of one horned Rhinoceros. It lies in the district of Alipurduar, West Bengal, which is situated between the latitudes of 25°58' to 27°45'N and longitudes of 89°08' to 89°55'E.

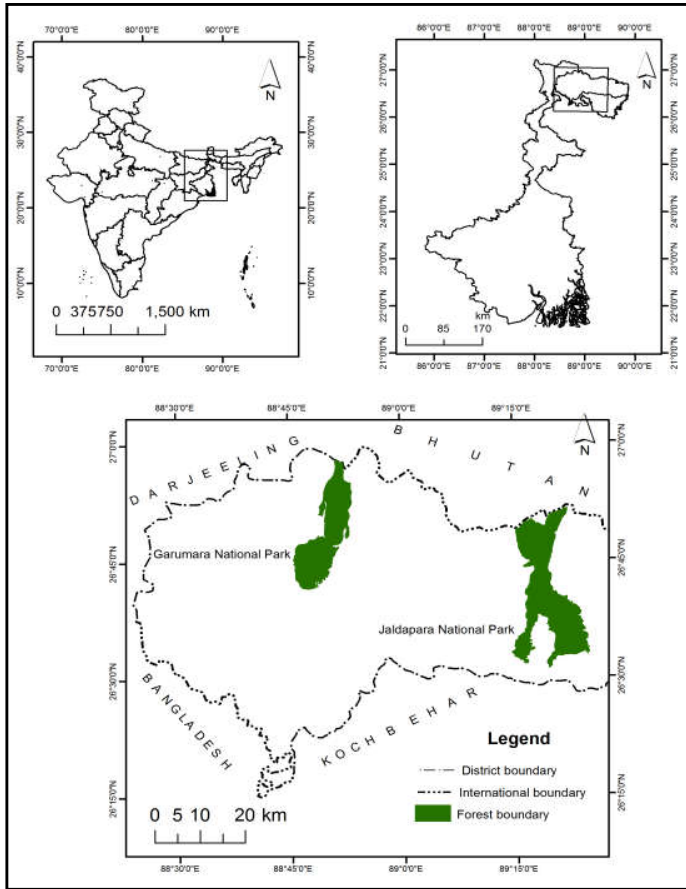


Figure 1 Study Area

MATERIALS AND METHODOLOGY

Data on Rhinoceros population, grassland coverage, death due to poaching, interspecies fight and male-female ratio have been collected from different sources like the forest department record, news paper. Thereafter, these data are analysed and interpreted through various statistical techniques.

RESULT AND DISCUSSION

According to Fig. 2 the slope of regression line shows that the correlation between Rhinoceros census year and number of Rhinoceros is positive ($r = 0.4960$ for Jaldapara and $r = 0.8408$ for Garumara) which suggest that the number of one-horn Rhinoceros has been increased in Jaldapara and Garumara reserve forest with time, but the ratio of female Rhinoceros as opposed to the male Rhinoceros has not improved which results in increase of the death of male Rhinoceros while contending for female Rhinoceros. There are 49 Rhinoceros in Garumara and about 204 in Jaldapara according to 2015 Rhinoceros census. But it also mentioned that, Rhinoceros census has not been conducted in all the respective year in both the national park.

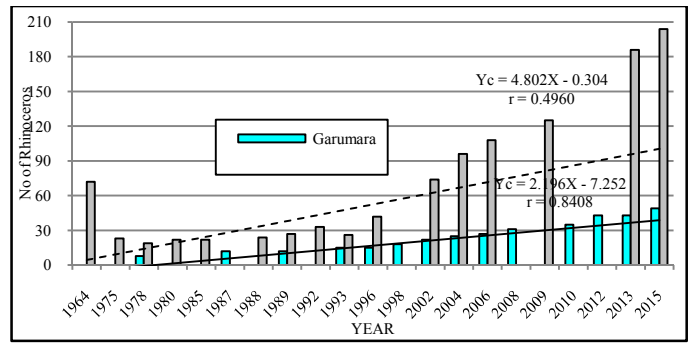


Figure 2 Population dynamics of Rhinoceros in Garumara National Park and Jaldapara National Park

Source: Computed by authors from State Report on West Bengal Forest, 1990-91 to 2015-16

The rate of growth of the Rhinoceros population in Garumara national park is higher than the Jaldapara national park. The number of Rhinoceros was 43 in 2013 and it's become 49 in 2015 at Garumara where as in Jaldapara the number of Rhinoceros was 186 in 2013 and it's become 204 in 2015.

According to government report 1953-54 there were 56 Rhinoceros in Jaldapara and in 1954-55 Barabisha and Balapara region 3 Rhinoceros were there. According to government forest reports 1997 Rhinoceros existed before 1968 in the southern part of Buxa Tiger Reserve's Valka and Panbari region. But now Rhinoceros are mostly found in Jaldapara and Garumara national park in Duars region.

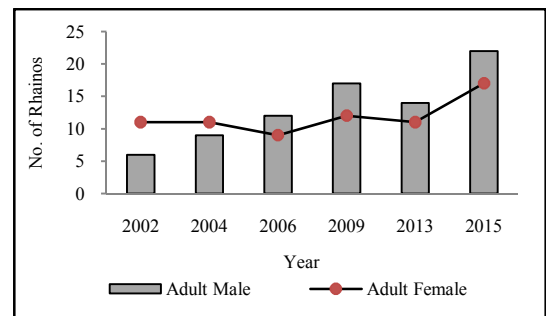


Figure 3 Male-female distribution in Garumara National Park

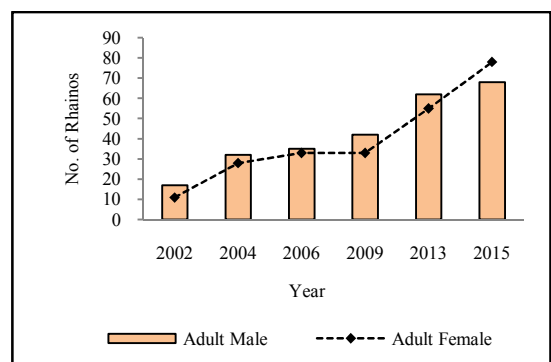


Figure 4 Male-female distribution in Jaldapara National Park

According to 2015 one-horn Rhinoceros census, there are 204 Rhinoceros in Jaldapara National Park, an increase of 20 compared to last year, but matter of a concern is that male - female ratio is 1: 1.15 while ideal ration is 1:3 (One male Rhinoceros and three female Rhinoceros). The male-female sex ratio in Garumara is 1:0.77 while the ideal ratio is 1:2 (One male Rhinoceros and two female Rhinoceros) (Fig 5, Fig 6).

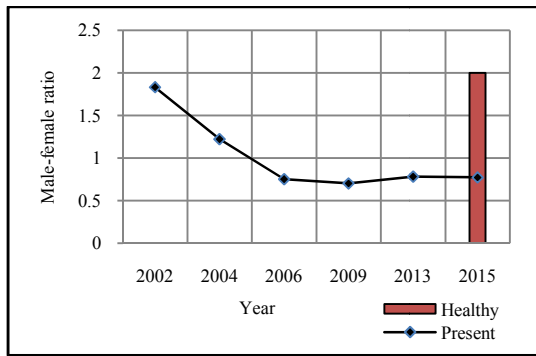


Figure 5 Male-female ratio in Garumara National Park

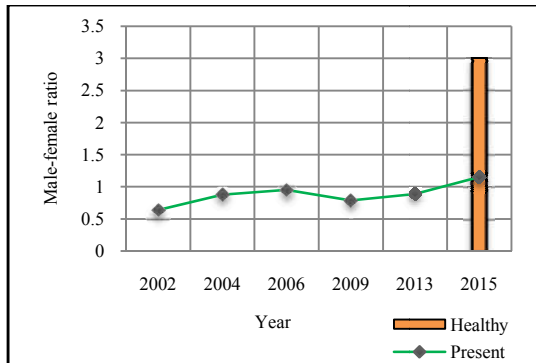


Figure 6 Male-female ratio in Jaldapara National Park

According to foresters a healthy male-female ratio would be 1: 2 and 1: 3 in Garumara and Jaldapara respectively but unfortunately it is 1:1 in round number. The number of deaths of Rhinoceros while contending for female Rhinoceros is greatest in Jaldapara.

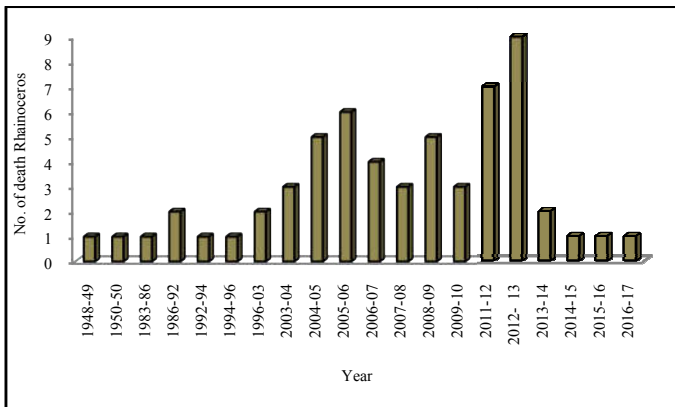


Figure 7 Death of Rhinoceros due to contending for female Rhinoceros

Due to the fall of the female Rhinoceros in male-female ratio more and more male Rhinoceros are getting killed while contending for the female. Death of Rhinoceros while contending has been recorded 47 in between 1st April 2003 and 31st March, 2013 and in 2009-10 one male Rhinoceros was poached by poachers. (Fig 7, Fig 8) This type of incidents clears the picture of the relationship between uneven sex ration and death of a male Rhinoceros due to contending for female. There is a positive correlation (Fig.8, $r=0.118$) between year and Rhinoceros poaching in Duars forest area. Male Rhinoceros like to show off their strength upon another male Rhinoceros, especially while contending for female Rhinoceros. This kind of bull dominant Rhinoceros likes to fight with middle aged male Rhinoceros. The horn of this dominant bull Rhinoceros can cause a severe wound to the

middle aged or young Rhinoceros. Sometimes kill them or banished them from the forest. In 2011, four Rhinoceros in Garumara and two in Jaldapara lost their way and entered the unreserved forest area while contending for female companionship.

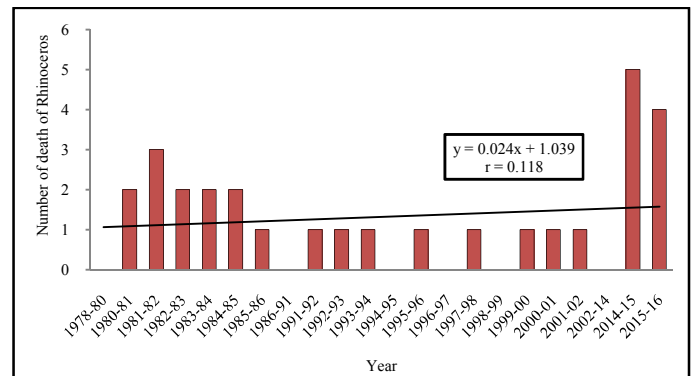


Figure 8 Death of Rhinoceros due to poaching

Source: Computed by authors from State Report on West Bengal Forest, 1990-91 to 2015-16

Table 1 Recent Rhinoceros poaching record

Year	Hunting Place
20th April, 2014	Holong
11th August, 2014	Kodalbusti
16th August, 2014	50Feet Beat
6th October, 2014	Chilapata
17th October, 2014	Core area of GNP
21st January, 2015	Mendabari
4th February, 2015	Holong
4th July, 2015	Chilapata
8th August, 2015	Holong

Source: Computed by author

The maximum poaching activities have occurred in the year of 2014-15 and 2015-16 which is higher than the past. Poachers poached the Rhinoceros and cut their horn. (Fig 9) The Chilapata and Holong area of Jaldapara national park has become a vulnerable for Rhinoceros due poaching activity. (Table 1) Death of Rhinoceros due to interspecies fight for contending for female or for securing their territory and also for poaching are not a good sign for conservation effort in Duars.

Table 2 Distribution of grassland area in Percentage to total geographical area

Name of the National Parks (NP)	Total Geographical Area (Sq km)	% of grassland area to total area
Garumara NP	78.55	14
Jaldapara NP	216.51	45

Table 3 Rhinoceros-grassland ratios

Name of the National Parks (NP)	Grassland area (Sq km)	No. of Rhinoceros	Rhinoceros-grassland ratio
Garumara NP	11	49	4/1sq km
Jaldapara NP	97.42	204	2/1Sq km

Table 4 Gap between grassland area requirement and presently distributed grassland area for one one-horn Rhinoceros

Name of the National Parks (NP)	Grassland area requirement for one One-Horn Rhinoceros (Sq km)	Presently distributed grassland area for one Rhinoceros (sq km)	Gap between required grassland area and presently distributed grassland area for one One-Horn Rhinoceros (sq km)
Garumara NP	0.75	0.25	0.50
Jaldapara NP	0.75	0.52	0.23

Table 5 Grassland area need to be developed

Name of the National Parks (NP)	Grassland area requirement for one One-Horn Rhinoceros (Sq km)	No. Of One-Horn Rhinoceros at present	Grassland area need (sq km)	Grassland area presents (Sq km)	Grassland area need to be developed (sq km)
Garumara NP	0.75	49	36.75	11	$36.75 - 11 = 25.75$
Jaldapara NP	0.75	204	153	97.42	$153 - 97.42 = 55.58$

Source: Computed by authors from management plan for the period 1997-98 to 2006-07

The present study suggests that the distribution of grassland area in comparison to the total geographical area in both the national parks of Duars region is not sufficient for present number of Rhinoceros. For better one-horn Rhinoceros conservation 0.75 sq km grassland area per Rhinoceros is required in Duars region, but in Garumara and Jaldapara national park the amount of grassland for per Rhinoceros are 0.25sq km and 0.52 sq km respectively, which is less than the required amount and even the amount is less than half for per one Rhinoceros in Garumara national park. The area of grassland in Garumara national park is about 11 sq km against 78sq km of total area, for 43 Rhinoceros. On the other hand, in the Jaldapara national park the area of grassland is 97.42Sq km out of total geographical area of 216.51 sq km, for 184. The higher percentage of grassland has been found in the Jaldapara national park. This may be due to large part of it has gone under water during flood in every year. The Rhinoceros-grassland ratio is comparatively stable in the Jaldapara national park in comparing to Garumara national park. (Table 3) The maximum number of interspecies fight among Rhinoceros for securing their territory or for female found in Garumara national park. Moreover the grassland of Garumara and Jaldapara is not only the source of food for one-horned Rhinoceros but also for bison, deer, lots of small herbivores present there and for grazing animals. The Rhinoceros habitat being situated in the flood plains of the river of Duars is always susceptible to destruction on account of change of course of river. That's situation create a food crisis for the wild, which force the Rhinoceros move out of their own habitat and sometime get involved in fight for securing their own territory. Poachers also use this situation for Rhinoceros poaching activity.

CONCLUSION

Being an umbrella species the Rhinoceros have great role in grassland terrestrial ecosystem of Duars. The foresters will have to take necessary step to make the male-female ratio ideal for one horned Rhinoceros of Duars so that death of Rhinoceros due to contending for females is less. The carrying capacity of the grassland of both the national park of Duars should be improved so that it can support without hampering the ability to supply food and shelter for future populations. Forest guard should be recruit with modernize equipment for the sake of reducing poaching activities. To address the Rhinoceros conservation scenario of Duars, the surrounding overall development for human welfare should also be focused. A Rhinoceros friendly conservative environment should be established with progress of human society.

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