

## RECENT TREND IN WILD LIFE IN THE BRAHAMPUTRA VALLEY OF ASSAM

**Tongdi JAMIR\***

Department of Environmental Studies, D.I.E.T, Mokochung, Nagaland, India,  
email: [tongdi.jamir@gmail.com](mailto:tongdi.jamir@gmail.com)

**Kakheto SUMI**

St John Higher Secondary Residential School and College, Dimapur -797112, Nagaland, India,  
email: [Kakhetosuminaga@gmail.com](mailto:Kakhetosuminaga@gmail.com)

**Akambo YEPHTO**

St John Higher Secondary Residential School and College, Dimapur -797112, Nagaland, India,  
Email: [akamboyeptho@gmail.com](mailto:akamboyeptho@gmail.com)

**Abstract:** Assam is situated in a rich bio diverse region of India. But now, with the growth of human population natural landscape has been changed. There are reports of poaching, encroachment, logging and various developmental projects etc. With this in mind, the Brahmaputra valley of Assam was selected to assess the wild life status annually during the period ranging from 1981-2011. The study reveals significant decrease in Rhinoceros poaching; this can be attributed to adequate staffing, patrolling, intelligence gathering and control over the use of firearms. It is also observed that natural death for elephants show decreasing trend significantly. The studies also conclude that attacks by wild elephant on human shows significant increasing/decreasing trend at Sonitpur and Goalpara district respectively. The attacks on human can be attributed to the clearance of forests for settlement/agriculture. The data were subjected to correlation analysis which indicates positive relationships exist between Rhino and Swamp deer with that of forest cover unlike elephant. In a nutshell, the increase in Rhino, elephant, Tiger and Swamp deer during the study period can be attributed to the increase in allocation and expenditure to train the staff for protecting the animals.

**Key words:** trend, increase, decrease, correlation, analysis, significant

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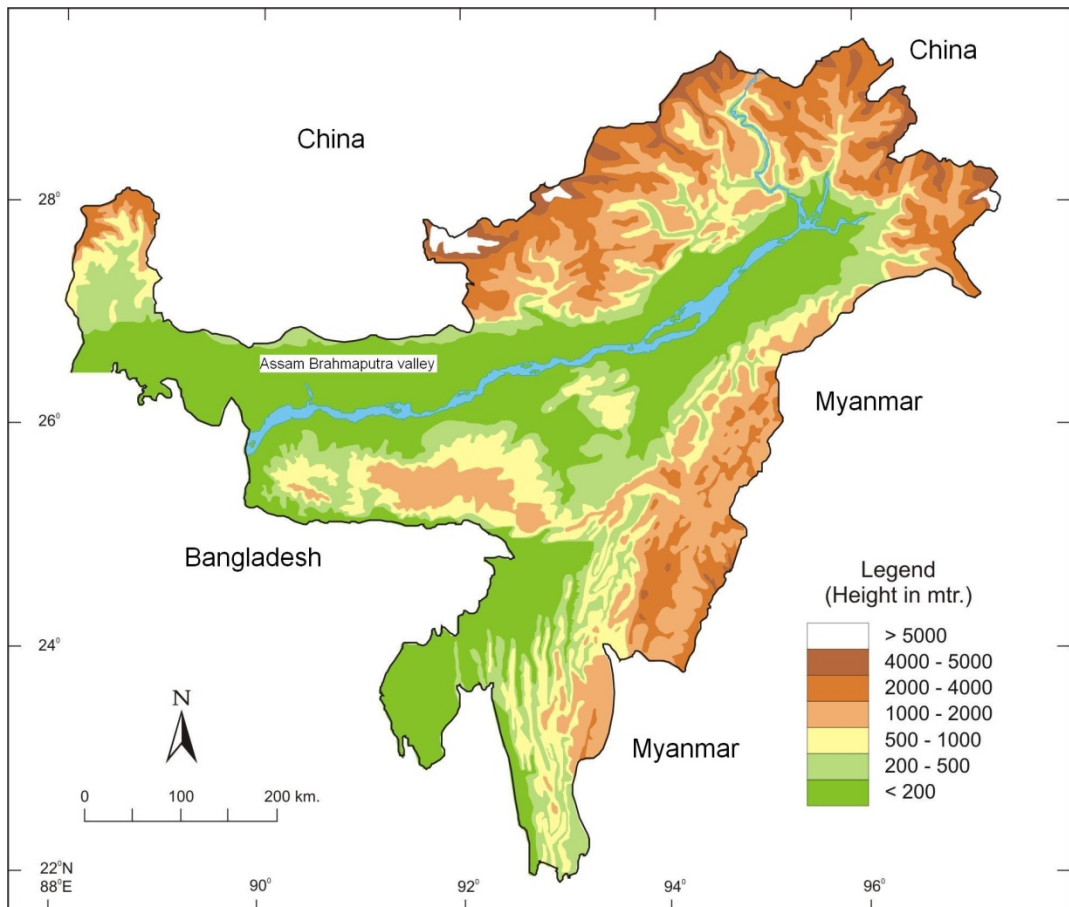
### INTRODUCTION

Assam is situated between 24° 09' - 27° 58' N and 89° 42' - 96° 01' E and has a geographical area of 7.84 million ha. Topographically, the state can be divided into three parts - the Brahmaputra valley, the Barak valley and the Assam mountain range. Assam is dominated by the Brahmaputra River and its drainage area is roughly 935,500 sq. km. The climatic condition and

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\* Corresponding Author

wide variety in physical features have resulted in a diversity of ecological habitats such as forests, grasslands, wetlands, which harbour and sustain wide ranging floral and faunal species. The State of Assam is one of the two biodiversity „Hot Spots” in the country. Assam is part of the transitional zone between the Indian, Indo-Malayan and Indo-Chinese Biogeographical regions. With existence of one of the most diverse faunal population; Assam provides the gateway for spread of both oriental and Palaeartic fauna to other parts of the country. Assam’s mammalian diversity is represented by 193 species which are widely distributed in this region. As per the Forest Survey of India report (2011), the total recorded forest area is 26, 832 sq. km which constitutes 33% of the total geographical area of the State. The dense forests constitute 1.84%, open forest 18. 90% and non-forest 64.49%. There are five national parks (2.51% of State’s geographical area) and 18 wildlife sanctuaries (1.88% of State’s geographical area) in the State. The total protected area is 3, 43,996 ha which constitutes 4.39% of the total geographical area of the State. Manas Tiger Reserve is a Biosphere Reserve and a World Heritage site and Kaziranga National Park is also a World Heritage site in Assam.



**Figure 1.** Study Area

Numerous studies on wildlife by different researchers were undertaken in India. Initial Management Effectiveness Evaluation Report (2003) stated that stresses and threats in Kaziranga National Park (Assam) are poaching, high flood, loss & degradation of habitat (Erosion/weeds), illegal fishing, heavy traffic and breach in embankments. Fernando et al., 2005; Talukdar & Barman, 2003 conclude that growth of human population have changed the landscape leading to

conflict with elephant. World Bank, 1999; World Wide Fund for Nature, 2004 reported that most severe threats to Protected Areas are poaching, encroachment, agriculture, ranching, urban development and logging. Conflicts in northeastern states are unique because of aggression by the local people and retaliatory persecution of snow leopard (Mishra et al., 2004) and dholes on account of livestock depredation (Aiyadurai et al., 2004). On the threat to protected area in southern India Barve et al., 2005 used G.I.S, physical and socio-economic attributes which are strongly correlated with the human activities. The increase in wild meat consumption by indigenous communities in Northeast India correlates with the increase in income (Hilaluddin, 2005). Pokhrel & Thapa, 2008 investigate on habitat preferences of wild ungulates which are high in Sal forest for blue bull (64.51%) and grassland for swamp deer (92.18%). The primary threats to the snow leopard are poaching and killing by villagers (Satterfield, 2009) and large scale killing for making shahtoosh shawls (Shawl & Takpa, 2009). According to Maheshwari et al., 2010 the diet of snow leopard in Ladakh is Blue sheep. Das et al., 2012 reported that Human elephant conflict is due to the population growth and conversion of natural habitat to human dominated landscapes. It is observed that there is an increase in golden Langur from 1,500 (1997) to 5,600 (2007-2012) in Assam and Bhutan (Horwich et al., 2013). Kumar & Subudhi, 2013 investigate on the occurrence of the wild animal species after relocation of people from Rajaji National Park which indicate that wild animals use the grasslands for feeding after the removal of anthropogenic pressure. A recent study reveals that harvesting of wild animals in Ziro valley of Arunachal Pradesh is mainly for subsistence purpose Selvan et al., 2013.

In the light of the above discussions, the state of Assam was selected to assess the wild life status. Many researchers in India have investigated wild life on different levels-characteristics, spatial and temporal scale. Therefore, there is an urgent need to quantify the intensity of wild life species and assess its trend.

## **DATA AND METHODS**

Annual wild life data during the period ranging from 1981-2006 were used for this study. The annual data was obtained from the Department of Environment & Forests

Government of Assam. To determine the significance of trend, linear regression and correlation coefficient were used and the time series graphs were plotted for the entire period. The trends are tested at 0.05% and 0.01% significant level.

## **RESULTS AND DISCUSSION**

### **Trend in causes of death among the wild life**

The above table reveals that among the causes for Rhinoceros death are Infighting and predation which show increasing trend but not significant. The data for poisoning and retaliatory killing are insufficient so it was not analysed. On the other hand, Natural death, poaching, accident and unknown shows decreasing trend but significant for poaching. The decrease is more for natural death (3.4) and poaching (3.3). It is observed that the animals caused by diseases are few.

Government of Assam initiated measures against poaching and slowly the rhino population increased in the state. For controlling poaching, authorities constructed new anti poaching camps, adequate staffing, providing mobility, patrolling, intelligence gathering and control over the use of fire arms around the park. Erecting physical barriers, mobile patrolling during the flood and cropping seasons as well as the health/nutritional requirements of the animals are conducted by the authorities. Further, regular immunization of the cattle living in the fringe villages prevents the spread of diseases among wild animals. With effective protection methods the number of poaching cases has declined. Thus, this has led to the decrease in number of animals being killed.

As for Elephant, Accident, Diseases, Infighting (the three words are not with capital letters) and predation shows increasing trend. The increase varies from 0.2 to 1.3 per year. On the other hand, natural, poaching, poisoning and unknown show decreasing trend but significant for natural. The decrease varies from 0.1 to 0.4 per year. There is insufficient data for Retaliatory killing so the

data were not processed. The death of elephant population in Assam shows an increasing trend as a result of vehicles plying in the National highway No. 37 and also by having close contact with the domestic animals transmitting diseases. The decrease in natural, poaching, poisoning and unknown was due to anti-poaching camps, proper patrolling and management by the authorities.

**Table1.** Causes of death among the wild life

Note: ID-insufficient data; \* Indicate 0.05%, \*\* 0.01% Significant level

Animals	Causes of death	Slope value	R <sup>2</sup>
Rhinoceros	Natural	$y = -3.4x + 55.8$	0.127
	Poaching	$y = -3.3x + 23.5$	0.856*
	Poisoning	NA	
	Retaliatory killing	NA	
	Accident	$y = -1.8x + 11.8$	0.587
	Diseases	ID	
	Infighting, predation	$y = 0.1x + 22.3$	0.000
Elephant	Unknown	$y = -0.2x + 2.8$	0.031
	Total	$y = -9.6x + 119.4$	0.426
	Natural	$y = x - 0.4$	0.657*
	Poaching	$y = -0.1x + 1.7$	0.019
	Poisoning	$y = -0.4x + 2.8$	
	Retaliatory killing	NA	
	Accident	$y = 0.2x + 18.2$	0.005
Tiger	Diseases	$y = 1.3x + 8.7$	0.330
	Infighting, predation	$y = 0.5x + 0.5$	0.178
	Unknown	$y = -0.1x + 15.3$	0.001
	Total	$y = 2.4x + 46.8$	0.252
	Natural	$y = -0.3x + 1.7$	0.132
	Poaching	ID	
	Poisoning	ID	
	Retaliatory killing	ID	
	Accident	ID	
	Diseases	NA	
	Infighting, predation	$y = -0.2x + 2.4$	0.021
	Unknown	Less	
	Total	$y = -0.2x + 5.2$	0.015

The analysis also reveals that for Tiger; Natural, infighting and predation shows decreasing trend. The decrease ranges from 0.2 to 0.3 per year. However, poaching, poisoning, Retaliatory killing and accident data were very few. The data related to death due to disease and unknown were insufficient so it was omitted.

#### **Trend in death of human by wild elephants**

Keeping these at the background, an attempt is made to understand the death of human by wild elephants in all the districts of Brahmaputra valley. The results are presented in Table 2.

The above table indicate that number of human being killed by wild elephants at Sonitpur, Sibsagar, Nagaon, Jorhat, Lakhimpur, Tinsukia, Kamrup, Dhemaji and Udalguri shows increasing trend. It varies from 0.1 to 3.6 human being per year but significant for Sonitpur. The increase in human being killed by wild elephants at Sonitpur district can be attributed to the decrease in forest cover from 19 percent in 2001 to 18 percent in 2011. This is due to the wild elephant competing with humans for space and food as a result of clearance of forest. Thus, this has led to the

increase in death. On the other hand Golaghat, NC Hills, Dibrugarh, Goalpara and Baksa show decreasing trend but significant for Goalpara. The slope varies from 0.4 to 1.6 per year. In the case of Goalpara, there is an increase in forest cover from 17 percent to 18 percent in 2011. Hence, there is a decrease the number of people being killed. The data for Bongaigaon, Kokrajhar, Darrang, Dhubri, Barpeta and Golaghat are scanty and statistical analysis could not perform.

Table 2. District-wise Record of Killing of Human Beings by Wild Elephant 2007-2011

Note: ID-insufficient data; \* Indicate 0.05%, \*\* 0.01% Significant level

District	Slope value	R <sup>2</sup>
Sonitpur	$y = 3.6x - 0.2$	0.944**
Sibsagar	$y = 0.114x + 1.685$	0.028
Nagaon	$y = 0.8x + 4$	0.130
Jorhat	$y = 0.6x + 1.2$	0.2
Lakhimpur	$y = 0.9x - 0.3$	0.613
Bongaigaon	NA	
Tinsukia	$y = 1.1x - 0.5$	0.643
Kamrup	$y = 0.2x + 0.4$	0.2
Dhemaji	$y = 0.6x - 0.8$	0.45
Udalguri	$y = 2.3x - 2.1$	0.595
Goalpara	$y = -1.6x + 9.4$	0.727**
Baksa	$y = -0.9x + 5.3$	0.152
Golaghat	$y = -0.4x + 5.8$	0.031
Dibrugarh	$y = -0.5x + 2.5$	0.625
Dhubri	ID	
Udalguri	ID	
Barpeta	ID	
Golaghat	ID	
Darrang	ID	
Kokrajhar	ID	

### Trend in wild life population

In order to understand the overall status of Rhino, elephant, Tiger and Swamp deer during the last decade linear regression was used to find out the trend. The results are shown in Table 3. Table 3 indicate that annual population of Rhino, Elephant and Tiger is increasing significantly. The rate is highest for Rhinoceros while it is lowest for Tiger.

Table 3. Population Trend among the wild life

Note: \* Indicate 0.05%, \*\* 0.01% Significant level

Animals	Slope value	R <sup>2</sup>
Rhino	$y = 51.29x + 1604.$	0.997**
Elephant	$y = 39.83x + 5135.$	0.808**
Tiger	$y = 18.2x + 51.6$	0.999**
Swamp Deer	$y = 32.44x + 322.9$	0.805**

### Correlation coefficient

The data were subjected to correlation analysis and the results are illustrated in figure 2. The analysis indicates that positive relationship exists between Rhino and Swamp deer with that of forest

cover in the state while it is reverse for elephant. For tiger, the data are insufficient for analysis. From the above study, it can be seen that there is increase in the Rhino and Swamp deer in the state of Assam. This increase also appears to be related with increase in forest cover as a result of afforestation effort taken by the government of Assam. However, other data are required for its support.

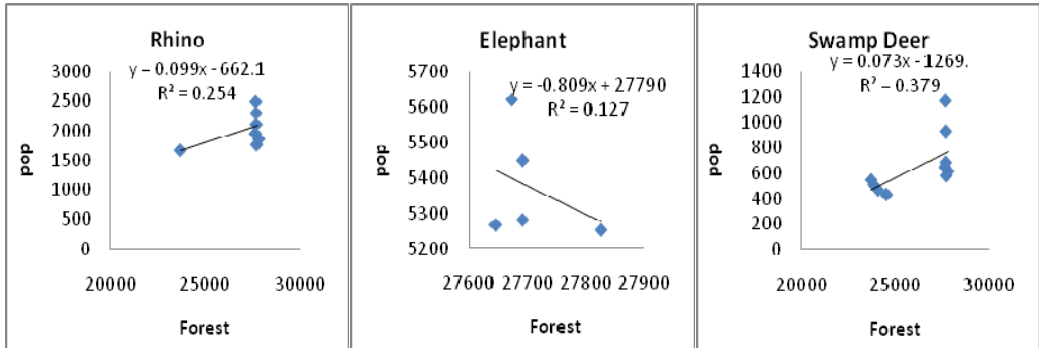


Figure 2. Scatter plot of some wild animals with forest cover in Assam

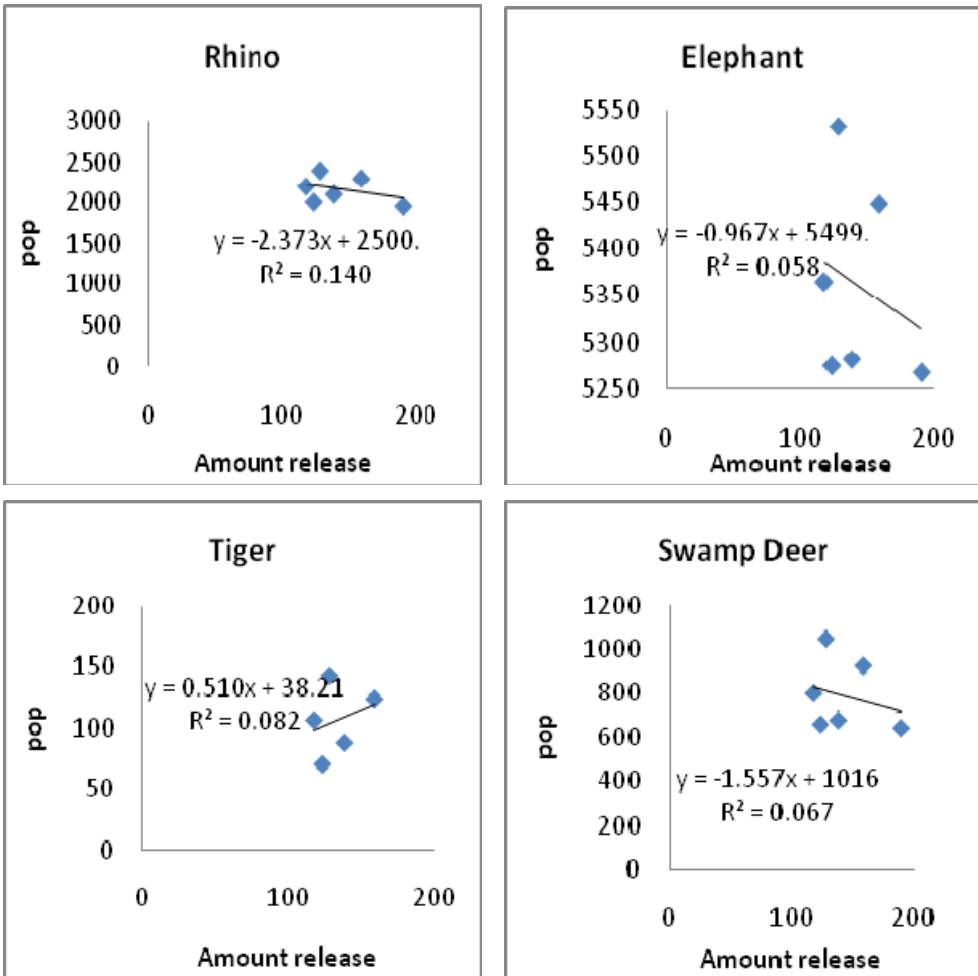
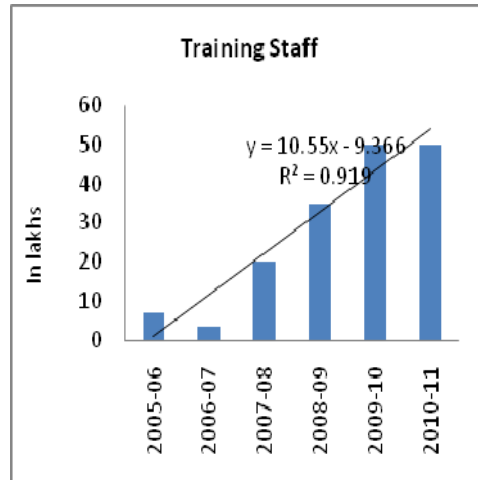


Figure 3. Scatter plot of some wild animals with allocation and expenditure in Assam

An attempt is being made to understand the relationship between government allocation and expenditure for developing National park and Sanctuaries with that of forest cover. The scatter plot is illustrated in figure 3. The result indicates negative relationship between rhino, elephant and swamp deer with that of allocation and expenditure. However, for tiger there is a positive relationship.



**Figure 4.** Allocation and release for training the staff in Assam

It is interesting to note that there is an increase in initiative given by the government to train the staff protecting the animals (figure 4). Thus, all these are due to the government effort to fund more for protecting the wild life in the state.

## CONCLUSION

In conclusion, trend analysis reveals significant decrease for Rhinoceros poaching as well as natural death of elephants. Further, the attacks by wild elephants on human show significant increasing/decreasing trend at Sonitpur and Goalpara district respectively. Correlation analysis indicates positive relationships exist between Rhino and Swamp deer with that of forest cover unlike elephant. In a nutshell, trend analysis reveals significant increase in Rhino, elephant, Tiger and Swamp deer during the study period.

The study concludes that providing proper adequate human resources by the state Government the animals are survived from poachers as well as from diseases. Further, the increase in forest cover goes hand in hand with the increase in animal population too. Apart from this, the state Government also funds for the welfare of the wild animals. Government allocates the fund to train the staff and this has led to an increase in wild animals and hence there is an increase in the animal population in the valley as concluded from this study.

## Acknowledgement

The authors are thankful to Department of Environment and Forests, Government of Assam, India for allowing me to collect the relevant data for the present work.

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Submitted:  
July 13, 2014

Revised:  
August 17, 2014

Accepted and published online  
September 22, 2014