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Concern and conservation perspective in Laokhowa Wildlife Sanctuary of Nagaon district, Assam, India

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Abstract: Laokhowa Wildlife Sanctuary one of the oldest Sanctuary is situated in the Nagaon district of Assam, India. It lies between the latitudes $26^{\circ}30'N$ to $26^{\circ}32'N$ and longitude $92^{\circ}40'E$ to $92^{\circ}47'E$ in the flood plains of the river Brahmaputra. The Sanctuary is about 25 km from Nagaon town, the district headquarter of the Nagaon district. It is situated in the extreme northern boundary of Nagaon district and the southern boundary of Sonitpur district and is bounded by Burachapori Wildlife Sanctuary, Lawkhowa suti (wetland), Haldia suti (wetland), and Mara suti (wetland) in the north, Nagaon –Silghat PWD road in the east, Leterijan (wetland) in the south and forest road in the west. Geomorphologically, the Sanctuary consists of basically a flat land and the monotony of the plain is to a certain extent broken by the presence of wetlands. The land has gentle slope from south to north and east to west. It is a part of Brahmaputra valley. The soil of the area is mostly alluvial deposits of the river Brahmaputra. Soil is generally fertile, clay loam mixed with silt. Ironically, the floodplain ecosystem of the Sanctuary is poorly understood. Hence a better understanding of the Sanctuary is the priority need or effective and efficient management of these fast dwindling natural resources. A comprehensive scientific research effort including experimental field trials and long term in-built monitoring programme would greatly enhance the chances of survival of this unique ecosystem and its processes and functions. The basic premise to answer by scientists and managers would be what are harmful effects of current management practice, developmental activities, and other biotic pressure on floral and faunal diversity and productivity on one hand while on the other hand which are the best management practices those are ideal for maintaining at least the current level of diversity and long term conservation goals. The paper provides an insight on the current knowledge: identify threats and concerns: and gaps, priority conservation and management needs.

Keywords: Laokhowa Wildlife Sanctuary, conservation, management needs

I. INTRODUCTION

Wildlife Sanctuaries, National Parks, Game reserves, protected areas play a vital role in protecting the biodiversity and natural ecosystem of a particular area. Nature Conservation means the rational use of the earth's various resources such as plants, animals, the soil, water, air to achieve highest quality of living mankind. The various conservation programs have been launched worldwide for the conservation of natural resources. In India various protected areas are developed under the Indian Forest Act (1927) and wildlife protection Act (1972) for protecting, propagating of wildlife in their natural habitat. In order to ensure that wildlife species are preserved and efficiently managed, it is essential for proper documentation and proper assessment of the biodiversity of a particular region, which will provide information for formulating protection partly, or wholly the biodiversity by national laws and thus provide good habitat for the conservation of both flora and fauna

In Assam a number of researches in protected areas were done in different period. [1] conducted floristic study on Kaziranga and Manas National Park. In the latter period, [2], [3], [4] made some remarkable contribution on Orang Wildlife Sanctuary and Pabitora Wildlife Sanctuary of Assam respectively, which included primarily floristic works. Barua [5], worked on the vegetation dynamics and periodic migration of animal population in relation to flood and fire in Kaziranga National Park. [6], worked on the ecological study of Gibbon Wildlife Sanctuary. In this context with vast and biodiversity rich areas, these works appeared to be significant.

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The Laokhowa Wildlife Sanctuary is one of the protected areas that are an ideal habitat for Indian one-horned Rhinos and other wild lives. The vegetation of the area, a complex of deciduous forests grasslands and wetlands provide an ideal habitat for herbivores, including avifauna, fish fauna and other animals. The area with varied vegetation types, wetlands, flora and fauna can support helping in developing various disciplines like ethnobotany, ecology, genetics, forestry, conservation biology etc.

II. STUDY AREA

Laokhowa Wildlife Sanctuary is situated in the Nagaon district of Assam, India. It lies between the latitudes $26^{\circ}30'N$ to $26^{\circ}32'N$ and longitude $92^{\circ}40'E$ to $92^{\circ}47'E$ in the flood plains of the river Brahmaputra. The Sanctuary is about 25 km from Nagaon town, the district headquarter of the Nagaon district of Assam. It is located in the central part of the state of Assam and is situated in the extreme northern boundary of Nagaon district and the southern boundary of Sonitpur district. It is bounded by Burachapori Wildlife Sanctuary, Laokhowa suti, Haldia suti, and Mara suti in the north, Nagaon –Silghat PWD road in the east, Leterijan (water body) in the south and forest road in the west. Geomorphologically, the sanctuary consists of basically a flat land and the monotony of the plain is to a certain extent broken by the presence of wetlands (nallas, beels). The land has gentle slope from south to north and east to west. It is a part of Brahmaputra valley. The soil of the area is mostly alluvial deposits of the river Brahmaputra. Soil is generally fertile, clay loam mixed with silt.

III. CLIMATE

The climate of the sanctuary is characteristically monsoonal with a rhythm of changing season. It changes with respect to the changing climatic elements, which effectively controls the biodiversity of the area. The climate of the Laokhowa Wildlife Sanctuary can be treated as sub-tropical monsoonal type climate. Annual temperature of the sanctuary varies between $9.6^{\circ}C$ (min) and $33.8^{\circ}C$ (max). Average annual rainfall remains around 2000 mm and about 70% occurs during June – September. The relative humidity varies between 65 – 95% and is lowest during the month of March.

IV. METHODOLOGY

The methodologies for the study were:

- Intensive field visits in the villages. Field study with different user groups and knowledgeable individuals helped to understand different aspects related to biodiversity.
- Information collection through interviews with the forest officials, forest villagers and the villagers living around the Sanctuary.

V. VEGETATION

The forests and woodlands are dominated by many tall deciduous trees of the top canopy. The dominant tree species are *Bombax ceiba*, *Albizia procera*, *Trewia nudiflora*, *Lagerstroemia reginae*, *Dillenia pentagyna* etc.

The middle canopy is not very dense and continuous, and is dominated by some shrubs and tall herbaceous plants. It is composed of dominant shrubs like *Ardisia solanacea*, *Leea indica*, *Litsea monopetala*, *Litsea salicifolia*, *Zizyphus mauritiana* and *Costus speciosus*. The undershrubs present in the forest includes *Cassia occidentalis*, *Cassia tora*, *Sida rhombifolia*, *Solanum myriacanthum*, *Solanum torvum*, *Triumfetta rhomboidea*, *Urena lobata*, *Hydrocotyle asiatica*, *Colocasia esculenta* etc. The climbers like *Mikania micrantha*, *Smilax perfoliata*, *Paederia foetida* etc are climber, which climb on small trees shrubs and herbs.

The ground vegetation becomes rich during the rainy season and the flora is regulated by the change of season. The ground vegetation is mainly composed of herbaceous members of the I.families' viz. Asteraceae, Euphorbiaceae, Papilionaceae, Rubiaceae, Solanaceae, Poaceae, Cyperaceae etc along with terrestrial ferns and fern allies. Fern like *Diplazium esculentum* etc dominates some forest patches. The weeds viz. *Ageratum conyzoides*, *Alternanthera sessilis*, *Croton bonplandianum*, *Chromolaena odorata*, *Euphorbia hirta*, *Frimbristylis dichotoma*, *Gnaphalium luteo- album*, *Polygonum barbatum*, *Rotala rotundifolia*, *Xanthium indicum* etc represent ground vegetation.

In the extensive grassland of the study site the dominant species is *Imperata cylindrica*. Some of the common grass species found in the grassland includes *Erianthus ravannae*, *Themeda villosa*, *Saccharum spontaneum*, *Saccharum procerum*, *Cynodon dactylon*, *Vetiveria zizanioides*, *Phragmites karka*, *Tamarix dioica* etc.

A number of water bodies have intersected the forest of the sanctuary and created many submerged saturated areas throughout the sanctuary. Some of the common aquatic plants found in the wetlands of the area are Eichhornia

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crassipes, Nelumbo nucifera. Ipomea aquatica, Hemarthria compressa, Cynodon dactylon, Lemna perpusilla, Vetiveria zizanioides, Pistia stratiotes, Nymphaea nouchali, Hymenachne pseudointerrupta, Alpinia nigra, Trapa natans, etc.

VI. WILDLIFE

Laokhowa Wildlife sanctuary is primarily a flood plain grassland area on the bank of the river Brahmaputra representing the ideal alluvial Brahmaputra valley grassland ecosystem. Laokhowa Wildlife Sanctuary is a combination of grasslands in serial stage and varying stages of other natural succession process of different representatives of plant species. The area harboured by Rhinos was only till 1983 after which the population of this endangered species came down to nil.

The Eco-system of the sanctuary is a unique combination of grasslands, wetlands and different riparian forest types. It supports both migrant and resident waterfowls along with other terrestrial ones, avi-fauna of the Sanctuary includes Bengal Florican (*Houbaropsis bengalensis*), White Eyed Pochard (*Aythya baeri*), Pelecanus Anocrotalus), Greater Adjutant Stork (*Leptoptiles dubius*), Black Stork (*Ciconia nigra*) etc. The important mammals of which it supports are tiger (*Panthera Tigris*), Elephant (*Elephus maximus*), Buffalo (*Bubalus bubalis*), Gangatic Dolphin (*Platanista gangetica*), Hog Deer (*Axis poranus*) etc. The place is a breeding ground of various species of fishes. However, the protected area is under massive confrontation with biotic interference in the form of encroachment, cattle grazing, illegal removal of Non-Wood Forest Produces (NWFP) and other forest produces. Still the protected area has high potential of harbouring a significant population of Rhinos and other wildlives due to its ideal highly productive habitat.

VII. RESULT AND DISCUSSION

CONCERN OF BIODIVERSITY CONSERVATION IN LAOKHOWA WILDLIFE SANCTUARY

- **Over grazing Livestock** -around villages inside and along the boundary from outside villages
- **Cutting for Fuel wood** – Villages inside and along peripheries - results in habitat loss
- **Lopping for Fodder** – Villages inside and outside - that leads to degradation
- **Spread of Invasive Species** –*Mimosa pudica* and *Eichhornia crassipes* inside forest and village peripheries.
- **Small Timber & Other MFP**- Collection by local villagers living in the villages inside and outside, who are increasingly practicing destructive means of collection i.e., by cutting the twigs and branches for removing the product of their interest that includes fodder, fruits, leaves and others.
- **Encroachments**: The loss of forest due to encroachment mainly for agriculture and grazing animals.
- **Over and uncontrolled fishing**: Catching fish and in recent times have begun to use explosives, which has resulted in loss or local disappearance of many of the species including fingerlings and small fishes.

VIII. CONSERVATION PERSPECTIVE IN LAOKHOWA WILDLIFE SANCTUARY

Formation of Village Forest Committees (VFC) – The member would be the villagers or the local communities living in the villages located both inside and outside the sanctuary. The villages falling within the critical areas are the priority villages in which these committees can be formed. This could probably be involved in managing, including protection of forest both inside and outside; planning and implementing restoration within & around village environment and be involved in all monitoring and protection activities.

Removal of invasive and weeds- systematic and phased manner of removal of invasive and weeds should be done and simultaneously restored with native species so as to give enough time for the species that are already adjusted with these exotics, using them in the form of cover and food.

Fodder Improvement & Management – Species of high palatable value to be grown in the areas where the invasive and weeds have encroached, both inside the forest where removal is to be done for use of wild animals and the village grazing areas. Systems like rotational grazing cut and carry to be tried and encouraged.

Encourage Farm Forestry Activities – Farm forestry should be seriously considered and encouraged along the agriculture bunds and edges in the villages inside and outside, so as to carry out planting of tree and plant species of high utility value to the local community for which they go into forest.

Provide/ Encourage Alternate Energy: Biogas and solar lamps can be tried in some sample sites so as to check its value and use that could reduce the present rate of pressure in the forest.

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Eco-development Program: Villages inside and outside the areas of conservation priority (critical areas) – plan for better livelihood and other above mentioned aspects with empowerment of the VFCs so that they involve in conservation actively.

Awareness and Education Program: A systematic, regular and timely awareness programs should be taken up by the forest department and the NGOs where the importance and significance of these forests and the biodiversity therein are very clearly told for the better understanding of the local, so that they would get involved or help in the conservation efforts.

Stop Fishing: The VFC should take care to stop or regulate the present rate of fishing and totally avoid or discourage use of destructive means of fishing specifically that causes large scale loss of fish and killing of young and small sized fishes.

IX.CONCLUSION

The protected area network in India has helped to conserve country's biodiversity. The network of PAs currently covers an area of 8.1 million ha, encompassing about 14 percent of the country's forest area and 4.61 percent of its land mass. From six national parks and 59 wildlife sanctuaries in 1970, the numbers increased to 85 and 462 in 1998, respectively [7]. According to a survey carried out in the mid-1980s, over 65 percent of the PAs were characterized by human settlements and resource use [8].

The basic approach to management of PAs has been isolationist, based on the questionable assumption that certain areas are pristine or primary and that management must protect the park from people living in surrounding areas and shield wildlife and other natural resources from exploitation. The need and importance of exclusion of people from protected areas is in itself debatable. Numerous ecological studies have shown that not all human use is detrimental to wildlife conservation. Throughout the world, present-day forest quality and biodiversity patterns reflect the influence of past land use practices [9]. In fact, in some particular cases, it has been observed that excluding human activities from ecosystems can actually reduce biodiversity and lead to habitat deterioration [10], while certain habitats have improved following human use/habitation [11].

It has been found from the studies of the vegetation, that frequent floods and biotic disturbances like felling of trees, excessive grazing etc. led to a series of ecological problems, such as extinction of plant species, soil erosion, depletion of wildlife and other germplasm resources of the sanctuary. The management policies of the sanctuary should be aimed to preserve and protect the native flora and fauna of the sanctuary as they are directly interdependent on each other and help in maintaining ecological balances. Therefore, it is essential that the area be preserved involving everyone in general and local people in particular. The present management policies in the sanctuary should be improved to stop over exploitation of the resources viz., unauthorized collection of timber, over fishing, collection of wood for fuel and house building material, collection of thatch, livestock grazing.

Therefore it has become essential to conserve biodiversity in sizable natural areas for scientific, educational, ecological, recreational and economic development. The forest cover is decreasing day by day due to the human activities leading to ecological problems. Although there is no encroachment inside the sanctuary, but un friendly villagers surrounding areas who are poor and illiterate constantly destroying the habitat by way of forcible fishing, felling of trees. The various problems of the sanctuary and protection of the natural habitat of the Wildlife conservation of the flora and fauna should be given prime importance. This study would be helpful to the students, Researchers, Environmentalists, NGO and also the Foresters for proper management and conservation of bioresearches of the sanctuary.

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