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Man-Animal Conflict and the Sustainability of the Sunderbans

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ABSTRACT: Discovery India and WWF India have come together to protect the world's only mangrove tiger habitat, in partnership with the Forest Directorate, Govt. of West Bengal and local communities in the Sunderbans. The initiative builds on WWF India's work in the region to promote sustainable livelihoods, access to clean energy, and effective human-wildlife conflict management. By adopting an integrated approach, the project aims to assist the Forest Directorate for effectively managing populations of tiger, prey and their habitat in Sunderbans, and reduce human-tiger conflict. It will work with Panchayats help build resilient communities in this ecologically fragile and climatically vulnerable region.

The Sunderbans region is highly vulnerable to the impacts of climate change, which threatens the safety and livelihood of local communities. With a vision to create climate-smart villages in the Sunderbans, WWF India and Discovery India are working with government agencies, civil society partners and scientific institutions to build the capacity of village panchayats and local communities to incorporate climate resilience into development planning, thereby helping secure livelihoods, biodiversity and ecosystem services. The initiative also focuses on enhancing farmland productivity through low-cost measures, and adjusting crop calendars to deal with of climate change. The initiative will also include work towards securing habitats for tigers and prey species. This will entail building datasets on impacts of climate change on the estuarine ecosystem. Through this project, in partnership with the West Bengal Forest Directorate and IISER Kolkata two Sunderbans Ecological Observatories will be set up, each featuring data loggers, monitoring buoys and an onsite laboratory.

KEYWORDS: Man-animal, conflict, sunderbans, sustainability, resilient, habitat, ecosystem, biodiversity

I. INTRODUCTION

As part of the partnership, the Forest Directorate has also been supported with nylon net fences to prevent tigers from straying out to villages adjacent to the mangrove forests. Such nylon net fences have contributed greatly towards reducing human injuries and fatalities. A floating camp and speed boat are also being provided to the West Bengal Forest Directorate, to accelerate the response time of forest personnel during various emergency situations.[1]

Mr. Ravi Singh, Secretary General & CEO, WWF India said, "This partnership between WWF India and Discovery India is significant as it brings together different institutions for the benefit of communities and wildlife of Sunderbans. This additionally includes the setting up of ecological observatories, reduction of human-wildlife conflict and providing scientific inputs for proper management."

"The project at Sunderbans is part of a global movement – Project C.A.T – Conserving Acres for Tigers – aimed at building healthy habits for Tigers wherein we support conserve nearly six million acres of protected land across four countries. In India, beyond Sunderbans, a detailed intervention is also being implemented at Manas Tiger Reserve," said, Megha Tata, Managing Director – South Asia, Discovery. "Discovery is a purpose-driven company with a

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mission to educate and inspire audiences around the world. We remain committed to leverage our brand strength to galvanize people power for the cause of Tigers and other endangered species.”[2]

WWF India is engaged in wildlife and nature conservation in the country. It has an experience of over four decades in the field and has made its presence felt through a sustained effort not only towards nature and wildlife conservation, but also through sensitizing people by creating awareness through capacity building and enviro-legal activism. The key areas of the work of WWF India include conservation of threatened wildlife species and their habitats, management of rivers, wetlands and their eco-systems, promoting sustainable livelihoods, environment education and awareness activities within a variety of social structures, mitigating the impacts of climate change, transforming businesses and markets towards sustainability and combating illegal wildlife trade.

Indian Sundarban covers an area of 4,262 sq km. Government of India (GOI) constituted Sundarban Biosphere Reserve in 1989 to promote and facilitate conservation and harmony between man and environment. In November 2001, UNESCO recognized Sundarban Reserve Forest (SRF) under its Man and Biosphere programme. Sundarban Tiger Reserve (total area of 2,585 sq km) was created in 23rd December 1973. GOI has identified SRF as Ramsar Site (a wetland of international importance). For its unique biodiversity, UNESCO had declared Sundarban National Park as a World Heritage Site in 1987. Sundarban is the only mangrove forest in the world, which is the home of tigers and having the highest population of tigers in the world. The Sundarban ecosystem is a unique natural wonder of the world and carries a great ecological significance. It has a rich biological diversity of aquatic and terrestrial flora and fauna and the mangrove forests [3,4]

(1). The Sundarban mangrove forest supports 334 species of plants, 44 species of fishes, 8 species of amphibians, 53 species of reptiles, 315 species of birds, 49 species of mammals

(2). Sundarban's highly productive ecosystem acts as a natural fish nursery; mangrove acts as a natural shield against the fury of cyclonic storm and prevents erosion due to tidal action and checks atmospheric pollution. Finally, millions of people depend on Sundarban ecosystem for their livelihood and sustenance through fishing, collection of honey, fuel wood and timber. Sundarban is one of the poorest and most densely populated regions of South Asia, with an estimated 8 million people (India and Bangladesh combined) directly dependent on its fragile ecosystem. The Indian Sundarban comprises 19 community development blocks- 13 under South 24 Parganas and 6 under North 24 Parganas district of West Bengal with a total population of 4.1 million[5,6]

(3). 44% of population belongs to schedule caste and tribe, 85% are living on agriculture, of which 90% are landless agricultural labourers and marginal farmers. Other occupations are fishing, pisciculture, woodcutting and honey collection. The level of literacy and per capita income is much below the state average and most of the people fall below the poverty line. The communication and transport network is very poor and most of the areas are inaccessible. Provision of health care is extremely poor and electricity is almost non-existent. Frequent climatic insult is a regular feature—cyclonic storm; inrush of tidal waves and flooding is the cause of recurrent damage of life, crops and property every year. There are 3,500 km man-made embankments on the rivers and water channel around the human settlements to prevent the tidal floods and estuarine saline water from entering the agricultural fields. Sundarban is an extremely backward region with a very poor quality of life of its inhabitants

(4). Gosaba is one of the Sundarban blocks under South 24 Pargans, bounded by the Matala and Zilli rivers/creeks and within the geographical coordinates of 22° 9' 47" North, 88° 48' 10" East. It is the last inhabited area before the deep forests start. It is about 110 km from Kolkata, the state capital. The total population is 222,764 (male 113,827, female 108,937). It has 14 Gram Panchayat (local self-government unit) of which Bali I and II, Gosaba, Lahiripur and Satjelia Panchayats are facing the SRF, separated by Sajina, Gomor and Melmel rivers. In the context of a rural mental health programme in the Sundarban Delta[7,8]

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(5) a community study had previously identified deliberate self-harm by pesticide poisoning and human-animal conflicts as a locally recognized priority problem. This research was thus undertaken with reference to a framework that examined the problem of human-animal conflicts in relation to occupational nature, socio-economic factors and its impact on mental health and environment.

II. DISCUSSION

52.10% tiger attack had been occurred during noon because local villagers are mainly encroached in the forest area during this time for different activities. Highest rate of tiger attack was found in Satjalia because of its proximity of Sundarban Tiger Reserve and over-dependency of the local people on forest resources. The predominance of tiger-attack was generally found during pre-monsoon. In post-monsoon season, the incidents of tiger attack were not so remarkable. As pre-monsoon is the peak season for wood and honey collection, the human-tiger conflict is the inevitable feature during this time. In this context, the main victims are wood collectors, honey collectors and fishermen because they are encroached into the protected pockets of the forest area due to the shortage of alternative occupations. The result indicates that the intensity of crocodile/shark attack was maximum in Dulki village. Mainly fishermen and crab and TPS collectors were most vulnerable because they intrude into habitat of crocodiles and sharks while doing their job. Crocodile and shark attack is very common along the river bank and creek. The rate of crocodiles/shark attack was maximum (61.30%) in evening because crocodiles and sharks take rest along the river bank in evening when the fishermen, crab collectors and TPS collectors come back to home. It is evident from the survey that during monsoon the majority of people were engaged in fishing related activities and that's why the magnitude of crocodile and shark attack as very high at that time. In the surveyed village, snake attack was very common in monsoon season because snakes frequently move from one place to another. In these study area, 31.64% people were attacked by snakes. The magnitude of snake attack is highest in Luxbagan village. The study clearly indicates that the rate of snake attack was highest (5.21%) in night. The maximum incidents of snake-bites have been found to occur during sleeping at home.[9,10]

In the surveyed villages, 17.45% people have lost their live due to tiger, crocodile/shark and snake attack. In this context, the most vulnerable village was Luxbagan followed by Dayapur, Sudhanshupur, Satjalia, Lahiripur, and Hamilton Abad. The local people of these villages were highly vulnerable because they were bound to depend on forest resources for their livelihood. On the other hand, Dulki, Rangabelia, Pakhiralay villages were least vulnerable due to the lower rate of engagement of local villagers in forest-based activities. Although 48.44% people have survived, but many of them have been suffered from post attacking trauma. In the study area, 77.22% people were victim of physical and mental disability and 22.78% people have attempted suicide due to social an economic deprivation. Among the injured an survived people, 86.9% people have committed suicide. Not only that, during post-attack phase many people specially the widows were victimized due to social isolation and they were bound to choose the profession of daily labour or maid servant as their livelihood.[11,12]

1. Due to rapid population explosion and lack of alternative sources of livelihood, local people of the study area were forced to enter into restricted parts of the forest.
2. The study identified highly vulnerable villages namely Luxbagan, Dayapur, Sudhanshupur, Satjalia whereas the magnitude of vulnerability was low in Dulki, Rangabelia and Pakhiralay village.
3. The male of the study area were mainly victimized due to tiger attack because they were generally engaged in forest-based activities like wood collection, honey collection, fishing and crab collection.
4. The majority of female have been suffered due to crocodile attack as their main occupation as tiger prawn seed collection.

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5. The intensity of illegal hunting, poaching, wildlife trafficking are increasing indiscriminately in the study area. It is assumed that the magnitude of man-nature conflict will be increased in near future. Development of alternative sources of livelihood and overall socio-economic upliftment can mitigate the severe conflict and vulnerability at man-nature interface in Indian Sundarban region.[13,14]

III. RESULTS

Apart from the human-animal conflict faced by the population dependent on the forest resources for their livelihood, the region is living under the threat of another reality—climate change. As Sundarbans is a low-lying region and extremely prone to cyclones, climate change significantly impacts the region's flora, fauna and its population. It has been observed that the surface water temperature in Sundarbans, over a period of 37 years, has increased at an accelerated rate of 0.50 C in comparison to global increase in the surface water temperature, which stands at 0.06° C every decade. Not only has this adversely impacted the avifauna life, it is proving to be detrimental for the health of the mangrove ecosystem, which is now regenerating at a much lower rate. There has been a recorded increase in the intensity of cyclonic storms hitting the Sundarbans between 1951 to 2010. Frequent damage to property and crop failure have rendered the population poverty-ridden, inducing increased migration from the region to nearby cities. Low agriculture yield due to erratic rainfall has also contributed to the above. [23]

While human interference such as deforestation in the past years has contributed to the degradation of the forest and increased human-animal conflict; pollution, toxic silt and untreated domestic and industry effluents carried by the rivers downstream has restricted the fresh water supply, causing further loss in the biodiversity of the region. The region also generates considerable amount of waste internally, and in the absence of efficient recycling mechanisms the burden is further increased. The Sundarbans is a fragile ecosystem housing one of the largest stretch of mangrove forests that provides a variety of ecosystem services and must be protected. On the other hand, there is the impact of human activity in the region which depends on the climate change-induced adaptation challenges of the population, in the absence of required development initiatives, social equity and governance system. It is observed that despite several rules and policies passed for conserving the mangrove forest, encroachment in the protected area for agriculture and extraction of resources continues, and is aggravating the pressure on the ecosystem. [15,16] Natural scientists and economists have been raising concerns on the lack of planning that has hurt the region and has brought the ecosystem at the threshold of its carrying capacity. The lack of planning has been attributed to the region's administration that is handled by multiple agencies which were set up to support implementation of national and international conservation initiatives attached with the Sundarbans. The protection strategy of Sundarbans has been critiqued as follows:

[i] It may be noted that the entire Sundarbans (both the forested as well as the inhabited areas) has been designated as a biosphere reserve by the Central Government. However, while the areas demarcated as protected forests for tiger conservation and for the protection of the coastal zone are being regulated directly by the Central Government, the inhabited areas are governed by the State Government. This is a cause for communication breakdown, loss of time and resources and duplication of work between the Central and State forces.

[ii] Further, the absence of a master plan of conservation for the region despite the presence of two planning agencies, the Sundarban Development Authority and the Sundarban Development Board, functional for past 25 years, has drawn criticism from the development workers in the region. [17,18]

IV. CONCLUSIONS

It has been reiterated that while ecosystem and biodiversity is conserved, it is important that the governance system is redesigned to improve the natural resource base legally accessible to the population, supporting them in uplifting their income generation capacity and reducing their dependence on the conserved area. This would require extensive planning that considers the challenges in all spheres of development and socio-economic pressures, in alignment with

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the impacts of climate change on the forest and lives of the people. The planning process will need to include integrated efforts for restricting growth of population in the region. Policies targeted at universal education, eradication of gender bias and women empowerment will need to be strengthened to curb the growing pressure on the ecosystem. [19,20]

To address the region's conservation challenges, internalisation of a development plan with strong components on land management, sustainability of natural resource base, disaster management and livelihood management in the context of climate change is imperative. Substantial focus must be placed on relocating and rehabilitating the population living in critically vulnerable areas of the islands, identified based on a zone-wise vulnerability assessment of the region. Given the significance of embankments on the living conditions of people, the government will need to take initiatives to reconstruct embankments based on renewed designs in sync with the land and soil conditions, using raw materials that can withstand high-intensity weather events. Further, efforts in the direction of strengthening already existing capacity building initiatives to reduce dependence on the land and forest, in collaboration with civil society organisations and regional stakeholders, can support internalisation of alternative livelihood opportunities. Given the region's aesthetic value, community-based tourism can be encouraged as an alternative livelihood measure. While this may be a positive step for the community towards sustenance, it is important that the administration and community take equal responsibility in restricting the impact of this initiative on the forest to a minimum. Building capacity of the population for the same would require a renewed effort towards education on the relation between population, environment and development to inculcate the notion of ecologically sustainable development in comparison to merely economic growth. The interventions for poverty reduction and development, primarily directed at building the adaptive capacity of the vulnerable, bear the brunt of hostile climatic conditions which make these interventions expensive, pressing the need for new investments across sectors. The region has received 38 billion dollars for disaster relief and recovery over the last two decades, in the form of loan and grants, as per the World Bank estimates. [21,22]

This necessitates a debate on 'adaptation debt' which presses the responsibility of paying for the injustice that has been done with the developing countries, on the developed countries. In addition, converging on the larger picture, a higher level organisational transboundary collaboration is sought to achieve effective conservation and restoration of the mangrove ecosystem. In this case, both the Indian and Bangladeshi government will require an integrated vision for approaching human well-being and ecological sustainability in the Sundarbans. [24,25]

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