

Evaluation of Socio-Economic and Anthropogenic Activities in and Around 'Thol Lake Wildlife Sanctuary, North Gujarat



Science

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ABSTRACT

Socio-economic factors play a vital role in controlling the dynamics of any ecosystem with existence of human society. The anthropogenic disturbances that operate in many regions are far beyond the capacity of evolutionary adjustment, mainly due to their unpredictability. Human society operates very complex socio-economic activities. Thol Lake Wildlife Sanctuary experiences a wide range of such activities. Agriculture, livestock grazing, industries, oil drilling and tourism are the major activities being conducted in and/or around the sanctuary. The study area is designated as a protected area. Though the forest department of the state is taking all the primary steps as per the norms for the wildlife protection of Thol Lake Wildlife Sanctuary, several recommendations has been developed after analyzing results of the present study and impacts of anthropogenic activities.

Introduction

Gujarat is unique in considering its wealth of natural and man-made water bodies of wetlands. Gujarat state recognizes geomorphologic, floral and faunal values of important wetlands and constitutes seven sanctuaries to preserve total area of 13,052 sq. km. Five such wetlands in the state have been established as sanctuaries primarily for conservation of waterfowl. These are Nalsarovar, Khijadia, Porbandar, Great Rann of Kachchh and Thol (GEER, 1998).

Being familiar with the need of present research at Thol Lake Wildlife Sanctuary popularly known as "Thol Bird Sanctuary (TBS)" since a decade was the major reason behind selecting the area for research. As TBS is a bird sanctuary, obviously a lot of efforts have already been made for research on documentation of its biodiversity. Even though the area is rich in biodiversity (especially in birds and plants), and announced as a protected wetland, no regular monitoring or research in detailed have been carried out for the investigation regarding socio-economics, anthropogenic activities and threats in and around the sanctuary so far (Vyas, 2014). In the present study an attempt has been made to reveal status of the mentioned objective and develop recommendations in the concern of sustainable maintenance and development of biodiversity and sanctuary along with socio-economics of the locals.

Study area

The study area falls under Mehsana district of North Gujarat region, which is a semi-arid zone and mostly composes dry deciduous vegetation. In physiognomic manner forests of the district are of scrub type where vegetation is open i.e. trees and shrubs are widely spaced. The vegetation on the whole consists of co-dominant by thorny shrubs and trees capable of resisting drought. Such vegetation falls under Bio-geographic zone - IV. The area under present study also falls under the same conditions and categories naturally. In addition to that it is a protected area which is considered as wetland. The vegetation found here mainly was of scrub type with mixed flora of aquatic and marshy plants. Avifauna including residence and migratory waterfowl is a major attraction of the sanctuary. TBS comprise a total area of 699 ha. with 5.62 km. long periphery. The area experiences three distinct seasons, winter, summer and monsoon. Temperature ranges here from as low as 8°C in winter to as high as 43°C in summer. Average annual rainfall is 600 mm, ranging from 100 mm to 800 mm. The study area is also facing anthropogenic pressures viz. agriculture, grazing, industrialization, oil drilling and tourism. There are three villages viz. Thol, Bhimasan and Jethalaj (Iswarpura) on the immediate periphery of TBS. Of these, Thol is located to West, Bhimasan to North and Jethalaj to East. Major communities in these villages include Patel, Thakor, Rabari and groups of Brahmin, Kumbhar, Darji and Muslim etc. Thol dominated by Patel community holds population of 6,866 including 3,536 male and 3,330 female as per census 2011.

Methodology

Present investigation was based on the survey of more than three years of extensive and intensive, regular excursions. Excursions to the study area were undertaken at least once in a week to collect detailed information on biodiversity, socio-economics, anthropogenic activities and threats in and around the sanctuary. For this purpose, well-organized field trips in various parts of the study area and adjoining villages at regular intervals were carried out. Data regarding above mentioned objectives were collected using variety of field data sheets developed for documenting each concerned parameter.

Human society operates very complex socio-economic activities. Hence, for evolving sound management strategies for the development of any protected area, knowledge of the socio-economic set up of the surrounding is essential. For the purpose villages surrounding TBS i.e. Thol, Jethalaj and Bhimasan were visited frequently to know about socio-economic activities and livelihood of the vernacular people. Interviews and interactions with the villagers provided thorough information about the same. An attempt was made here to identify its status and impact on the sanctuary. Secondary data like viz. human and livestock population literacy etc was collected from 'Gram Panchayat' of the above mentioned villages and 'Kadi Taluka Panchayat'.

TBS experiences a wide range of anthropogenic activities. Agriculture, livestock grazing, industries, oil drilling and tourism are the major activities being conducted in and/or around the sanctuary. Several special visits to the sites with such activities were made to evaluate their status and impacts on the study area. Again here interviews of local people, regular observations, interactions with experts, use of reference material were carried out to identify an actual scenario of anthropogenic activities.

The study area is designated as a protected area. Though the forest department of the state is taking all the primary steps as per the norms for the wildlife protection of TBS, several recommendations has been developed in the present study after analyzing results of the present study and impacts of anthropogenic activities. In developing these recommendations obviously benefits to the wildlife of the sanctuary were kept in the front. Nevertheless needs of local human society have also not been kept out of counter. Expert's advice was also taken in account for the purpose by discussing issues or conflicts if there were any.

Result and conclusion

1. Socio-economics and human welfare

TBS falls under the territories of Kadi taluka of Mehsana district. Mehsana district has the distinction of being one of the top food grain producing districts in Gujarat (Rajyagor, 1975). Population count of the district is 20,27,727 as per the census in 2011. TBS is bounded by Thol, Jhaloda, Jethalaj, Bhimasan, Karoli, Adhana, Vayana and Hajipur villages. There are three villages viz. Thol,

Bhimasan and Jethalaj (Iswardpura) on the immediate periphery of TBS. Of these, Thol is located to West, Bhimasan to North and Jethalaj to East. The main communities in these villages include Patel, Thakor, Rabari and groups of Brahmin, Kumbhar, Darji, and Muslim etc. There is population of 3,536 male and 3,330 female, thus of 6,866 in Thol as per census 2011. Majority of population in these villages is engaged in farming either as landholders or labourers. Others practice animal husbandry or are workers in industries.

It came out during the interview with farmers that they make two-three times more money than their investment by cultivating paddy in their farms if everything goes fine. Another fact is considered here to mention that prices of agriculture land in the surrounding villages were as low as Rs. 50 thousand per 'vigha' a decade back. In recent years raised prices of land around metro city Ahmedabad has influenced the prices of agricultural lands of villages surrounding TBS also, which are not very far from the metro city. In consequence prices of agriculture land have gone up. Especially in Thol it has been raised over Rs. 50 lakhs per 'vigha'. The situation has attracted farmers to sale their land for becoming rich quickly.

Rabari and Bharwad communities are engaged in animal husbandry. The livestock includes cattle, buffaloes, goats and sheep. Other communities also own livestock mainly cattle and buffaloes in less number. The livestock grazes in fallow lands and gauchers (common lands). A considerable number of people are now engaged in industrial labour.

2. Anthropogenic activities

Even though TBS is designated as a protected area, it is not exempted of anthropogenic activities. Major such activities are as follows.

2.1 Agriculture

TBS was created as an irrigation tank initially and it has traditionally been the right of people to draw water from it. The state irrigation department administrated and controlled the distribution of water for irrigation. For the reason farmers of this region have long been growing paddy, it is believed that water used to be present in the region throughout, even though if it does not rain at regular intervals. Since the irrigation department does not permit creation of bore wells in the command area of TBS water body, the villagers are left with no option, but to depend on TBS for supply of water. This also limits them in a way and most farmers take one or at the most two crops as compared to three or four crops taken in some intensively cultivated areas of the state (GEER, 2002).

Major crops include cereals such as wheat, paddy (rice) and jwar in the region. Other food crops consist of jeeru, mustard (rai), tuver and chana. Castor and rarely cotton are also grown here. Paddy is mainly grown in the farms of Thol village and also in those villages, which receive water from TBS water body. Paddy being a major crop is a main source of income to the farmers of the surrounding villages. Fertilizers and pesticides reach aquatic ecosystems either through leaching or by the way of run-off from crop fields. Leaching of fertilizers containing nitrogen and phosphorous, which turn into nitrates and phosphates could cause eutrophication of TBS.

2.2 Industries

The catchment area of TBS is dotted with industrial estates and independent industrial units at Kalol, Kadi and Khatraj. There are many small and medium units such as chemicals, pharmaceuticals, metallurgy, plastics, textiles, ceramics, paper and packaging etc. Some large units like IFFCO and Aravind mills are also located in this region. Chemicals, paper and packaging and metallurgical units can be categorized as hazardous. Metal-

lurgical units can be sources of heavy metals such as zink, copper, nickel and cadmium, which are considered to be the most dangerous of all pollutants. Small units of paper and pulp present around TBS have to rely on recycling of paper, which involves bleaching that releases harmful effluents. These wastes are often dumped along the roadside or in the ditches close by.

2.3 Oil drilling

There are 7 crude oil wells belonging to the public sector company Oil and Natural Gas Commission (ONGC) inside the sanctuary area, which pump oil. It is then transported through pipelines. The eminent danger posed by the oil wells in and around TBS is of an oil spill. Oil spills are often seen here resulting danger to the biodiversity and ecosystem of TBS. This phenomenon spoils soil and water particularly during monsoon when oil could mix with water and get accumulated into soil. Although, no major oil spill was reported during present study but evidences of small leakages were observed as stained soil in South-East direction of the sanctuary. In addition to that exposed ditches filled with oil were also observed. During the rain the oil present in surrounding ditches could easily reach the water body. This might result in contamination of soil and water then eventually a huge damage to the biodiversity of the area.

2.4 Livestock presence and grazing

Livestock of the surrounding villages as well as of the pastoral people visiting this part of the state from Kachchh and Saurashtra graze in and around TBS. The livestock graze in and around TBS included cattle, buffaloes, sheep, goats and some time camels too. Their presence at TBS was on purpose of grazing and drinking water. Very often during summer buffalos were seen wading and even wallowing inside the pond. Herds of sheep and goats larger than 300 in numbers were seen often. Livestock presence in the sanctuary was seen throughout the present study. Vegetation was noticed destructed mostly in South and South-West locations of the sanctuary by activity of grazing. Disturbance to birds also noticed many times as livestock waded through the water.

2.5 Grass cutting for fodder and collection of minor products

Almost all the livestock holders are depended on natural fodder resources to feed their livestock. Grass and herb vegetation of TBS is not an exemption in that. Along with heavy grazing local people usually were seen cutting, collecting and hauling fodder for their livestock. The phenomenon is virtually affecting the plant diversity, density, frequency and abundance. Especially globally and threatened species are at extreme danger. It is well understood now by the vernacular people leaving in surrounded villages, that TBS is a protected area. More significantly management staff and guards appointed by the forest department of Gujarat are also consciously working to protect the territory of this area which is rich in biodiversity. As consequence except from grazing and grass cutting very little collection of minor products from TBS by people was seen. During monsoon people who do not have enough source of income were trend to collect fruits of *Coccinia grandis* (L.) Voigt (Ghiloda), *Momordica charantia* L. (Karela) and *Momordica dioica* Roxb. (Kankoda) – popular vegetables from the sanctuary and make little money by selling them in the market for their livelihood. People were also seen collecting dried up tree trunks and twigs as firewood.

2.6 Lopping, cutting and burning of trees

Lopping and cutting of the trees are directly or indirectly associated with management of any forest or protected area. As impacts of the activity soil damage, resulting compaction and erosion, damage generally to the residual stand in logged forest, changes in forest microclimate, changes in food qualities and loss of habitat for many animal species may take place.

During present study lopping and cutting mainly of *Acacia nilotica* (L.) Del. subsp. *nilotica*, *Acacia leacophloea* (Roxb.) Bth., and *Prosopis chilensis* (Molina) Stuntz was noticed at many occasions in TBS. Though, it was not seen at a very large scale. A major concern is about burning of live trees of *Prosopis chilensis* (Molina) Stuntz to make charcoal out of it. Evidences of burnt trees of the species were noticed frequently in the sanctuary.

2.7 Tourism



(Plate 1 to 6: Anthropogenic activities in and around "Thol Lake Wildlife Sanctuary")

During the study it came out that since last decade number of tourists has increased rapidly at TBS. Since last three year it is at its maximum. The purpose of visitors are varied here viz. picnic, bird watching, photography, education, school or institutional visits and to find a lonely place as a couple. Surprisingly, most popular activity here was seen as picnics rather than bird watching or any other educational activity. Many families and groups of college student visit TBS for the purpose of picnic. At many occasion they were seen shouting and noising in the sanctuary without even carrying about wildlife in a wildlife protected area. Many groups were seen playing outdoor games devastating the vegetation under their feet at many locations. Apart from this many enthusiastic people come here for bird watching and nature education.

3. Recommendations

Based on the entire study related to biodiversity and ecology of the TBS, its socio-economic and anthropogenic activities, several recommendations have been developed for the concerned agencies to approach a well protected and sustainable wildlife including mankind as follows.

- 1) Awareness, Education and involvement of local residents to get them interested in wildlife and employed in the sanctuary.
- 2) Control on use of pesticides and fertilizers in agriculture in surrounding villages to decrease pollution and contamination threats to aquatic and terrestrial ecosystem of TBS.
- 3) Improvement and control of catchment area through efforts for soil and water conservation and by formation and implementation of strict norms to control pollution caused by industries and by forming guidelines to ONGC to operate oil wells inside the sanctuary and in the catchment area as well.
- 4) Control on heavy grazing, grass and tree cutting along with collection of minor produces to avoid vegetation loss and to

conserve threatened plants.

- 5) Improvement of habitat by planting native tree species and removal of *Prosopis chilensis* (Molina) Stuntz.
- 6) Eco-tourism as a contrivance to get lay people interested in wildlife and involved in conservation.
- 7) Creation of a nature education centre at the sanctuary for the purpose popularizing nature, wildlife, biodiversity inside and outside the sanctuary.
- 8) Monitoring and long term studies to keep records and facilitate upcoming researchers in the field of biosciences.
- 9) Creation of germplasm bank to store seeds of plants available, especially threatened and medicinal plants in TBS.

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