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## ENVIRONMENTAL ISSUES AND ENVIRONMENTAL CONSCIOUSNESS OF THE PEOPLE RESIDING IN THE PERIPHERY OF THE LOKTAK LAKE, MANIPUR, INDIA

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### ABSTRACT

The present study was conducted in the periphery of the Loktak by interviewing with 300 selected respondents using purposive sampling technique to assess the environmental issues of the Loktak lake and its surrounding areas and also to assess the environmental consciousness of the people living in and around the lake. All (100%) respondents reported the natural resources of Loktak lake is declining and most of them (28.33%) felt that the decline of the natural resources of Loktak lake was found to be pollution of the lake water. In the overall percentage of major environmental issues of the areas or villages in and around the Loktak lake water pollution (37%) was highest. The study found that the highest percentage in terms of the level of environmental consciousness people had was "Average" (87.33%). Improvement of education, organizing effective awareness programmes for the conservation and sustainable management of the Loktak lake and its surrounding environment, seeking alternative means of livelihoods are suggested.

**KEY WORDS :** Natural resources, Conservation, Sustainable management, Livelihood

### INTRODUCTION

Humanity is causing a rapid loss of biodiversity and, with it, Earth's ability to support complex life. But the mainstream is having difficulty grasping the magnitude of this loss, despite the steady erosion of the fabric of human civilization (WWF, 2020). With rapid catastrophic loss of biodiversity, the ecosystem services it provides have also declined and these include inter alia reduced carbon sequestration, reduced pollination, soil degradation, poorer water and air quality and more frequent and intense flooding (Bowman *et al.*, 2020). Adamu *et al.* (2017) studied about the local people's attitude and willingness to pay for conservation in Yankari Game Reserve Bauchi, Nigeria. Campo-Pais *et al.* (2021) reported about the Environmental problems and Geographic education in Ontinyent (Spain). Diengdoh and Jayakumar (2021) also conducted a study of local attitudes and perceptions of sacred groves among village communities in Meghalaya,

India.

The present study was carried out in Loktak lake of Manipur, India. People residing around the lake depend on its resources such as fishes, vegetable items, fuelwood, mollusca, mussel, prawn, fodder, thatching, handicrafts materials and medicinal plants for their livelihood and income generation. Recently, the resources of the Loktak lake have been facing several threats due to rising human dependency on the lake, haphazard agricultural practices, contamination of water, siltation, building of Ithai dam, encroachments in the lake by constructing fishponds, construction of roads and settlements, human activities in the lake, proliferation of *phumdis* (floating masses of vegetation) etc. These have lead to several environmental issues in the surrounding areas of the Loktak lake. The people residing in the surrounding areas are well aware of about these issues. As Loktak lake is the main source of livelihood of the people living in and around it the people have the desire for

the conservation of the lake and some of them took active participation for conserving it. So, large scale awareness and documentation on the present status of this important lake is very necessary so as to inform the authorities, people of the state and international scientific community to attract them for the conservation and management of the lake. Moreover, in the present study area very few studies on environmental issues of the Loktak lake and environmental consciousness of the people have been done in the past. So, to fill up this gap the study has been undertaken. Therefore, the present study has been taken up with the objective of assessing the environmental issues of the Loktak lake and its surrounding areas and environmental consciousness of the people living in and around the lake.

## MATERIALS AND METHODS

### Study area

Loktak Lake is located between 93°46' and 93°55' E and from 24°25' to 24°42' N in the southern part of the Imphal valley of Manipur. The lake is in oval shape with maximum length and width of 26 Km and 13 Km respectively. The depth of the lake varies between 0.5 to 4.58 m with average depth recorded at 2.7 m. Loktak lake can be considered as a sub-basin of the Manipur River basin. It has a direct catchment area of 980 sq.km and indirect catchment area of 7157 sq.km. There are 55 rural and urban settlements around the lake with a total population of 100,000 (LDA and WISA, 1999).

### Data collection

The present study is mainly based on primary data and information collected through household questionnaire survey from 300 selected respondents residing in and around the Loktak lake. These respondents were selected purposively for the study based on their knowledge acquired related to the present study. The questionnaire used in the study was designed in English and asked in Manipuri, which is the local language of Manipur. Purposive sampling technique (Shrivastava and Heinen, 2007; McElwee, 2010) were used for the selection of 300 respondents. The questionnaire sought to obtain information on the environmental issues of the Loktak lake and surrounding areas and the consciousness of these issues by the people living in the surrounding areas. It was prepared referring (Brönmark and Hansson, 2002; Asilsoy, 2012;

Kangabam *et al.*, 2015) and in consultation with other relevant literatures.

### Data analysis

The data obtained from the survey was compiled and interpreted statistically. Overall Response percentage of the respondents was calculated using Microsoft Excel as: Percentage response = Frequency of responses/total number of respondents X100

## RESULTS AND DISCUSSION

Environmental degradation of the Loktak lake and its surrounding areas is represented in Table 1. All the respondents (100%) felt that the natural resources of Loktak lake is declining. Highest percentage of overall reason for the decline of the natural resources of Loktak lake as opined by respondents was found to be pollution of the lake water (28.33%) and the lowest 0.33% was construction of Ithai dam.

The causes for declining the natural resources of Loktak lake is because of increasing dependency on the lake and human activities like unsustainable agricultural practices, water pollution, siltation, construction of Ithai dam, encroachments in the lake by constructing fishponds, construction of roads and settlements, etc. Laishram and Dey (2013) reported that the communities living in and around the Loktak lake are highly dependent on it for livelihood and income generation and various anthropogenic pressures had led to pollution of the lake water and ecological degradation. Similar study was conducted by Gairola *et al.* (2009) who found an increased in resource dependency by the villagers in the Garhwal Himalaya on surrounding forests and unplanned extraction have negatively affected the biodiversity of the region. The study is also in agreement with Singh and Moirangleima (2011) who noted that due to the construction of the Ithai Barrage Dam, the *phumdi* area of Loktak lake, Manipur has increased from 1989 to 2002 impacting the ecological processes and functions of Loktak lake. Singh (1997) also stated that the changing ecosystem of the Loktak lake due to constant erosion, heavy degradation of forest and Jhuming and also construction of Ithai barrage were found to bring constant effect on the morphometry and general biomass of the lake. Similarly the respondents of the present study are also affected. Loss of biodiversity of the surrounding areas of Loktak lake and *phumdi* removal were also

**Table 1.** Environmental degradation of the Loktak lake and its surrounding areas

Particulars	N=300
<b>1) Do you think the natural resources of Loktak lake is declining?</b>	
1) Yes	300 (100)
2) No	0 (0)
3) Not known	0 (0)
<b>2) Reason for decline of the natural resources of Loktak lake</b>	
1) Overutilisation of lake resources	51 (17)
2) Water Pollution	84 (28.33)
3) Increase in human population	32 (10.67)
4) Lack of conservation and management	42 (14)
5) Floods	51 (17)
6) Siltation	10 (3.33)
7) Weeds infestation	39 (13)
8) Loss of biodiversity	29 (9.66)
9) <i>Phumdi</i> removal	6 (2)
10) Construction of Ithai dam	1 (0.33)
<b>3) Is there any sacred grove in and around the Loktak lake?</b>	
1) Yes	215 (71.67)
2) No	85 (28.33)
	<b>N=215</b>
<b>4) Causes for degradation of sacred grove</b>	
1) The disappearance of traditional belief systems	5 (2.33)
2) Deforestation due to rapid urbanization and development	9 (4.19)
3) Encroachment by the increasing human population	11 (5.12)
4) Dying of trees due to old age	66 (30.7)
5) Not disturbed	118 (54.88)
6) No idea	6 (2.79)

mentioned as reasons for the decline of the natural resources of Loktak lake. Loss of biodiversity was caused mainly due to deforestation of the surrounding areas of the lake, water pollution and overutilization of the lake’s resources. The respondents were also of the opinion that with the removal of *phumdis* by government the breeding places for fishes were destroyed and all the economically important plants grown in the *phumdis* were also removed thereby declining the natural resources of the lake.

71.67% of the respondents reported that there is sacred grove in and around the Loktak lake while 28.33% reported that there are no sacred groves. In sacred groves trees like *Eucalyptus globulus*, *Grevillea robusta*, *Ficus microcarpa*, *Musa x paradisiaca*, *Ziziphus jujuba*, *Ficus cunia*, *Delonix regia*, *Celtis timorensis*, *Parkia timoriana*, *Ficus religiosa*, *Tamarindus indica*, *Mangifera indica*, *Artocarpus heterophyllus*, *Ficus benjamina*, *Caryota urens* were found grown and protected according to religious beliefs. In Hindu religion the trees growing in the sacred grove were considered as sacred trees and sacred grove was considered as a place for deity. Hence the people

conserved the trees grown in the grove. Similar observation was made by Diengdoh and Jayakumar (2021) who conducted a study of local attitudes and perceptions of sacred groves among village communities in Meghalaya. In the reason for the causes for degradation of sacred grove only 2.33% of the respondents responded “The disappearance of traditional belief systems”, 30.7% responded “Dying of trees due to old age” and the majority 54.88% responded “Not disturbed”. This means the trees in the sacred groves died only after their life cycle is over. This also showed that the people have got attitude for conservation and the traditional way of conservation still exists in the areas or villages surrounding the Loktak lake. Pruthi and Burch (2009) in their study on the significance of Memorial Parks and Sacred Groves to the environment and deeply rooted significance it had to the people found that parks and groves played an important role in biodiversity conservation and environmental protection. Dash (2005) also reported 35 sacred groves in North Sikkim that are either attached to the local monasteries (Gumpas) or maintained by the village community. Similarly Khumbongmayum

*et al.* (2005) also carried out detailed study in four selected sacred groves in Manipur and inventoried one hundred and sixty-six sacred groves in Manipur valley and noted 96% of the species found were used for medicinal purposes. From the present study in recent years it can be seen that new trees have not been planted to replace dead trees and hence the reason for the cause for degradation of sacred grove as given by the respondents was dying of trees due to old age.

In the overall percentage of major environmental issues of the areas in and around the Loktak lake water pollution (37%) was highest and soil erosion and solid waste disposal (1%) each as lowest (Figure 1). The pollution of the lake water was mainly due to discharge of municipal sewage, domestic wastes, fertilizers and pesticides from agricultural practices. The study is in line with Nonga *et al.* (2010) who observed that unsustainable agriculture, overgrazing, deforestation, urbanization and mining had resulted in environmental destruction endangering the existence of Lake Manyara in Tanzania. Singh and Moirangleima (2012) also noted that the Loktak lake was under severe stress mainly due to the construction of Ithai Barrage Dam, weed infestation, pollution, encroachment, overexploitation of resources and siltation thereby causing flooding of the agricultural fields and villages, decrease in fisheries production and loss of biodiversity. Campo-Pais *et al.* (2021) also reported about the environmental problems in Ontinyent (Spain).

When the overall percentage level of environmental consciousness people had is considered it was found as "Average" (87.33%)

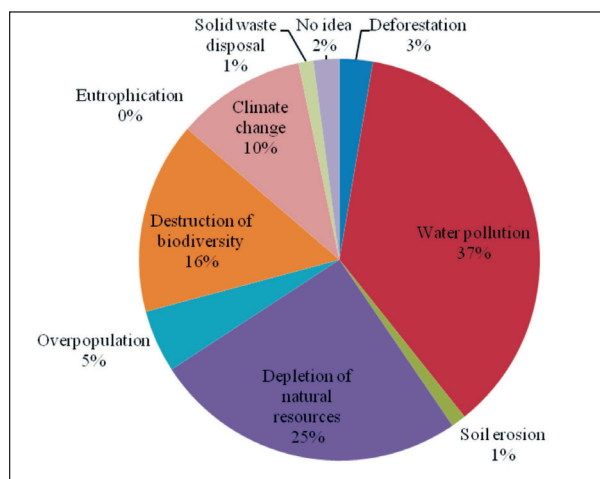


Fig. 1. Major environmental issues of the areas in and around the Loktak lake

followed by "Low" (6.67%), "Above average" (5.33%), "High" (0.67%) and "Nil" (0%) (Figure 2). The sources of environmental consciousness of the people were found received from education, radio, television, newspaper and other environmental awareness programme organized by the government. Nonga *et al.* (2010) also studied the local community awareness on causes of environmental changes, degradation in the wetlands and their effects. In another study Chun *et al.* (2012) also found high awareness and willingness of the local public in the river conservation project of an urbanized Temiang River watershed located in Peninsular Malaysia. The study is also in congruent with Adamu *et al.* (2017) who examined the local people's attitude and willingness to pay for conservation in Yankari Game Reserve Bauchi, Nigeria.

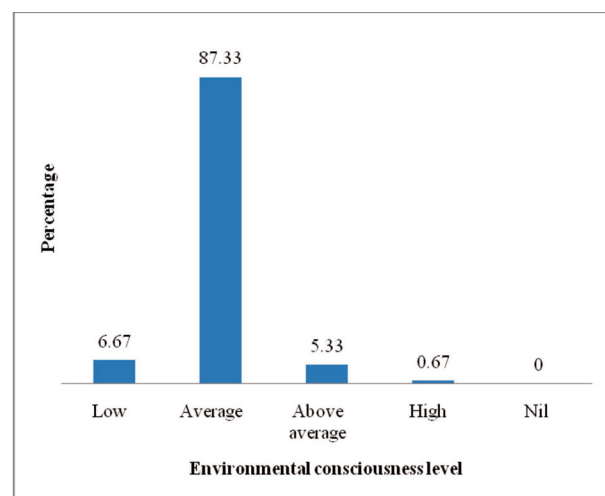


Fig. 2. Level of environmental consciousness

The awareness level of the respondents was tested by putting 10 simple questions which the respondents have to answer in either "Yes" or "No". Each question carried 1 point, and the categorization of the respondent according to their responses was done as "Nil" those who could not answer any questions correctly, "Low" those who could answer 1-4 questions correctly, "Average" those who could answer 5-6 questions correctly, "Above average" those who could answer 7-8 questions correctly and "High" those who could answer 9 or more questions correctly. The questions used in this test were: 1) Is conservation of plants and animals important for the survival of mankind? 2) Should waste be dumped into the Loktak lake? 3) Should planting of trees be done for the overall improvement of the natural

environment? 4) Should use of chemical fertilizer and pesticide in agriculture be encouraged? 5) Do coming of migratory birds destroy the lake ecosystem? 6) Should the conservation of the lake be done by the concerned authority only? 7) Is use of plastic good for the health of the environment? 8) Should chemicals and pesticides be used for easy catching of fishes? 9) Should only adult fishes be caught from the lake? 10) Should treatment of water of those rivers draining into the lake be undertaken before entering into the lake to prevent pollution of the lake water?

### CONCLUSION

The present study found that the natural resources of the Loktak lake was declining and pollution of the lake water was one of the main environmental issues of the Loktak lake. The cause for degradation of sacred grove was dying of trees due to old age. Most of the sacred grove in the villages remained undisturbed and were considered as deity. Hence, the traditional way of conservation still exists in the villages. This study also found that the majority of the respondents have "Average" level of environmental consciousness. Hence, for the conservation and sustainable management of the Loktak lake and its surrounding environment improvement of the educational level of the people is suggested. This will make the villagers eligible for getting government or private jobs resulting in less dependency on the natural resources of the Loktak lake. The villagers can also seek for alternative means of livelihood like culture fisheries, handloom and handicrafts, food processing, business etc. which will make them less dependent on the natural resources of the Loktak lake and this will conserve the natural resources of the lake. Organizing effective awareness programmes on conservation and involving the communities in the conservation of the Loktak lake by the concerned authorities which will make the communities environmentally conscious. Laws for the overall conservation and management of the Loktak lake and its surrounding areas should be implemented strictly.

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