WETLANDS AND ITS IMPORTANCE : A CASE STUDY OF LOKTAK LAKE IN MANIPUR

Akoijam Amitkumar Singh
Junior Project Fellow, DESM
National Council of Educational Research and Training
New Delhi

Wetlands are the primary habitat for many flora and fauna. The *Loktak lake* was designated as "Wetland of International Importance" under *Ramsar Convention* in 23 March, 1990 due to its rich and unique biodiversity. The present study was undertaken to understand the resource linkage and livelihood options of the surrounding inhabitants of the Loktak lake. The sites chosen for the study included Sendra, Ithing, Thanga II and Karang Islands. The analysis of the socio-economic data collected from the regions shows that a large population of the study area depends upon the resources of the lake for their livelihood (fishery and vegetation for domestic consumption and commercial purposes). On the other hand, the study also shows that most of the inhabitants engaged in fishing lack modern scientific and technical knowhow of fishing which has adverse impacts in the production and efficacy of the whole process.

Women of the region were also found to be involved in making fishing-nets for income generation rather than weaving of traditional clothes, which later results in declining of small scale industries. Most of the inhabitants were found to be aware of the importance of the lake in their life and hence would actively support any conservation programme. The findings suggest that proper management of *Phum*, introduction of modern techniques, sustainable fishing, improved tourism, etc., will take care of most of the problems.

Introduction

Wetlands are the areas of lands where the soils are saturated with moisture either permanently or seasonally. Such areas may also be covered partially or completely by shallow water. They include swamps, marshes, and bogs, among others. The water found in wetlands can be saltwater, freshwater or brackish. According to the Wetland Conservation Act of 1991, a wetland is defined by the following criteria: (a) it has mostly hydric soils, (b) it must generally be inundated or saturated above or below the surface, and (c) support vegetation adapted to wet soil conditions. They are highly complex ecosystems due to interactions of diverse factors relating to land and water resources.

A large population consisting of about 1, 00, 000 people living in 55 rural and urban settlements in and around the *Loktak lake* depend upon the lake resources for their nourishment. But nowadays, increasing demands and pressures lead to the degradation of the lake which is threatening the livelihoods.

Ramsar Site

The 1971 *Ramsar Convention* held in the Iranian city of Ramsar has defined wetlands as 'areas of marsh, fen, peat land or water, whether natural or

artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters.'

The Convention identified and listed certain wetland sites as wetlands of international importance or *Ramsar Site*. Under the Convention, 25 wetlands in India have already been declared (up to 2 February, 2007) as *Ramsar Sites* (Table 1). The *Loktak lake* has been designated as Wetland of International importance under *Ramsar Convention* on 23 March, 1990. Some of important reasons that make the *Loktak lake* as a *Ramsar Site* are:

- Its enormous socio-economic and cultural importance for the people living in and around the lake.
- Its extensively occurring floating *Phumdis* proving specialised habitat for many biota, besides being useful to the local peoples in several ways.
- Supports the only home of the endangered *Sangai (Cervus eldi eldi)* in the floating *Keibul Lamjao National Park (KLNP)* in the southern part of the lake.
- It is a significant home of a variety of resident as well as migratory waterfowls.
- Its being a suitable breeding ground of a number of riverine migrating fishes from the *Chindwin-Irrawady* river system, specially being a vital fish habitat.

Table.1: List of Ramsar Site in India (up to 2 February 2007)

Wetland	Declaration	State	Area (Km^2)
Ashtamudi Wetland	19/08/2002	Kerala	614
Bhitarkanika Mangroves	19/08/2002	Odisha	650
Bhoj Wetland	19/08/2002	Madhya Pradesh	32
Chandertal Wetland	8/11/2005	Himachal Pradesh	49
Chilika Lake	1/10/1981	Odisha	1165
Deepor Beel	19/08/2002	Assam	40
East Calcutta Wetlands	19/08/2002	West Bengal	125
Harike Lake	23/03/1990	Punjab	41
Hokera Wetland	8/11/2005	Jammu & Kashmir	13.75
Kanjli	22/01/2002	Punjab	1.83
Keoladeo	1/10/1981	Rajasthan	28.73
Kolleru Lake	19/08/2002	Andhra Pradesh	901
Loktak Lake	23/03/1990	Manipur	266
Point Calimere	19/08/2002	Tamil Nadu	385
Pong Dam Lake	19/08/2002	Himachal Pradesh	156.62

Renuka Wetland	8/11/2005	Himachal Pradesh	0.2
Ropar	22/01/2002	Punjab	13.65
Rudrasagar Lake	8/11/2005	Tripura	2.4
Sambhar Lake	23/03/1990	Rajasthan	240
Sasthamkotta Lake	19/08/2002	Kerala	3.73
Surinsar-Mansar Lakes	8/11/2005	Jammu and Kashmir	3.5
Tsomoriri	19/08/2002	Jammu and Kashmir	120
Upper Ganga, Narora	8/11/2005	Uttar Pradesh	265.9
Vembanad-Kol Wetland	19/08/2002	Kerala	1512.5
Wular Lake	23/03/1990	Jammu and Kashmir	189

Importance of Wetland

Wetlands are primary habitat for hundreds of species of waterfowl as well as many other birds, fish, mammals and insects. They naturally filter and recharge the water that later comes out of our faucets downstream. They act like giant sponges, slowing the flow of surface water and reducing the impact of flooding. They also prevent soil erosion, and they buffer water bodies from potentially damaging land use activities such as agriculture. Wetlands can also remove and store greenhouse gases from the earth's atmosphere, slowing the onset of global warming. Traditionally, wetlands were considered wastelands, which bred mosquitoes. But, we have seen the importance of wetlands, not only for the environment, but also for humans. Development around wetlands is a major threat to how they function and their survival in general and therefore must be preserved.

Objectives

Keeping in view the importance of wetlands, the present study was undertaken with respect to *Loktak lake*. The main objectives of the study are given as follows:

- To access the resource linkages and livelihood options of the surrounding inhabitants.
- To study the social and economic profile of the communities living in and around.
- To analyse the various habitats of different plants found in the lake that supports their livelihood.

There are 55 settlements in and around *Loktak lake* located in the valley districts of *Bishnupur, Imphal East* and *Thoubal* which are directly or indirectly linked to the lake. For this study, 4 villages of *Bishnupur* district namely, *Sendra, Ithing, Thanga II, Karang Islands* were identified as study sites. It is located between 24°25'-24° 42'N latitudes and 93°46'-93°55'E longitudes (LDA, 2002). These 4 villages are adjacent villages and situated about 48 km. away from *Imphal*, the capital city of Manipur.

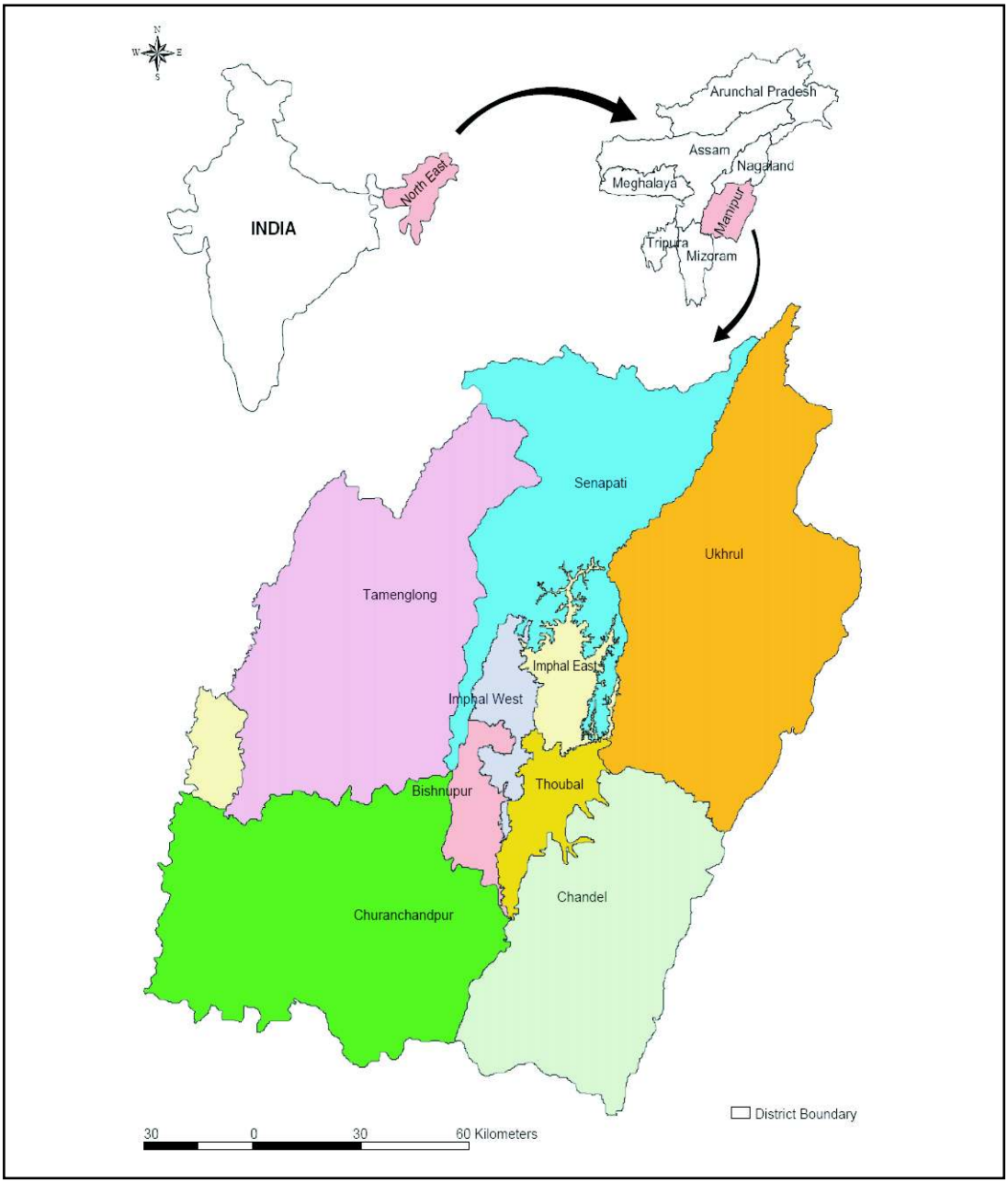

Fig.1: Location of Manipur in India

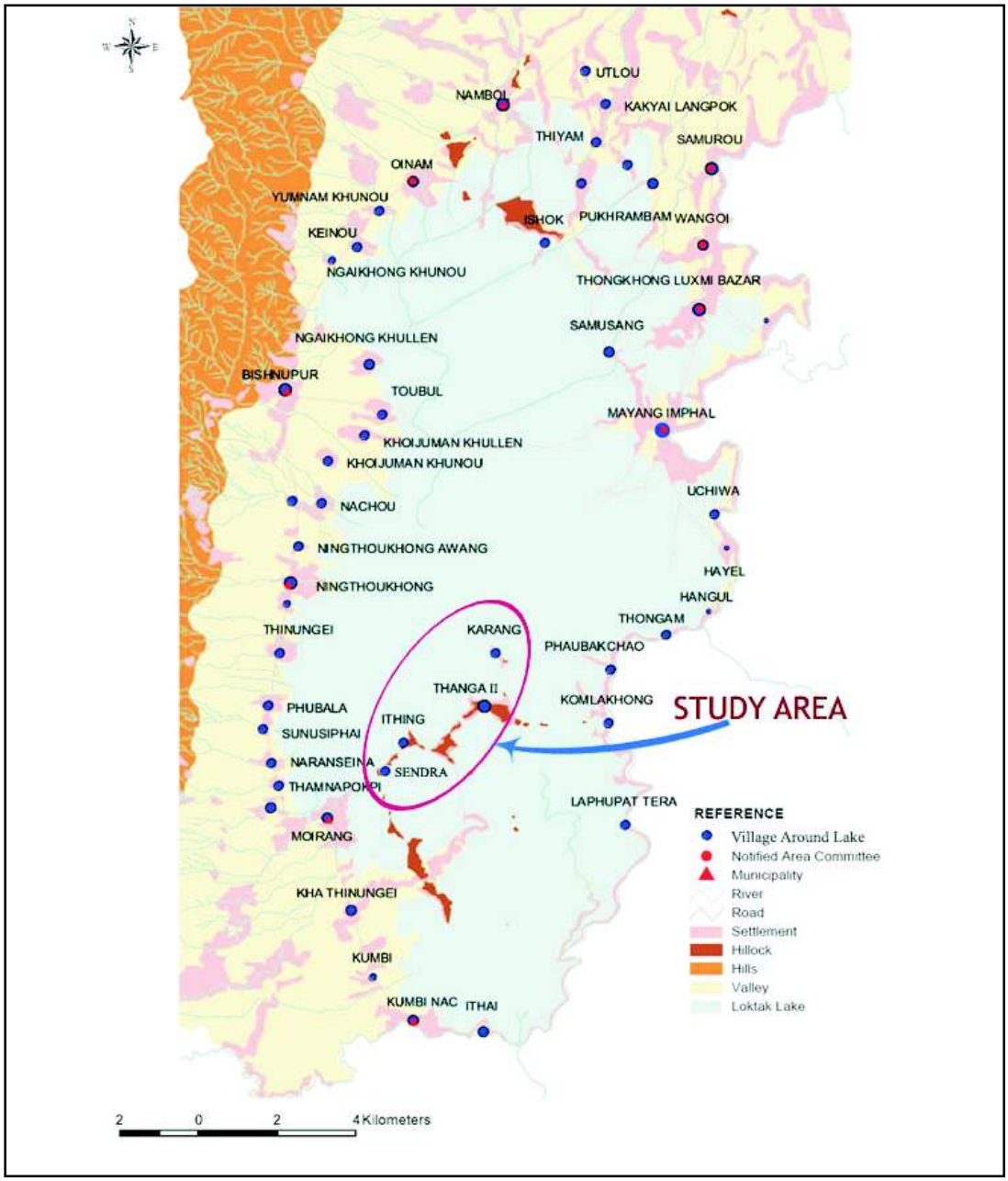

Fig. 2: Study area map

Study Methodology

This study has been conducted by collection and compilation of primary data and secondary information as per available household questionnaire survey with random visit to the study area was one of the study methodology components. The survey was done in 2008. The questionnaire for the survey was structured and covered the socio-economic data of the villages in and around the lake. Information gathered from interactions with the concerned agencies, local clubs and *Meira Paibi* (womenfolk's organisation) associations, governmental departments, researchers, institutions, etc., were also used while compiling this report.

Detail Profile of the Loktak Lake

The lake is the largest natural freshwater lake in the north-eastern region of India which occupies an area of 266 sq. km. which is approximately 1.3 per cent of the total geographical area of Manipur. The lake is oval shaped with maximum length and width of 32 km. and 13 km. respectively. The depth of the lake varies between 0.5 and 4.6m with average recorded at 2.7m. The commissioning of *Ithai* barrage in 1983 has brought about drastic changes in the character of the wetland from fluctuating water levels to more or less constant water level. The unique characteristic feature is the presence of floating islands, locally called *Phumdis* which are a heterogeneous mass of soil, vegetation and organic matter at various stages of decomposition (Trisal and Manihar, 2002). It plays an important role in filtering of mineral nutrients responsible for the deterioration of water quality.

The *Phumdis* occur in all sizes and thickness, occupying almost half of the lake area. The southern portion of the lake forms the *KLNP*, which is the only floating wildlife national park in India. The park covers an area of 40 sq. km. out of which approximately 15 sq. km. is covered by thick *Phumdis* constituting the core area of the National Park. The park is the natural habitat of

Fig. 3: Cervus eldi eldi (Sangai)

the most endangered ungulate species, the brow antlered deer, *Cervus eldi eldi (Sangai).*

Observations and Discussions

Demographic Profile

There are 1621 households in the study area with a population of 9714. The average size of the household is 6. These villages have sex ratio of 949. It also has 3316 schedule caste population. *Thanga-II* is the biggest village in the area with 1115 households and having a population of 6300 persons. *Sendra* is the smallest village with 60 household with a population of 450 persons. There is no schedule tribe population in these villages.

Thanga - II is the village which has both maximum number of schedule caste population and sex ratio. Almost all of the area has high sex ratio. While the lowest sex ratio is observed in *Ithing*. These four villages occupy about 5 per cent of the total population who live in and around the lake. There are about 421 *phum* huts located in these villages.

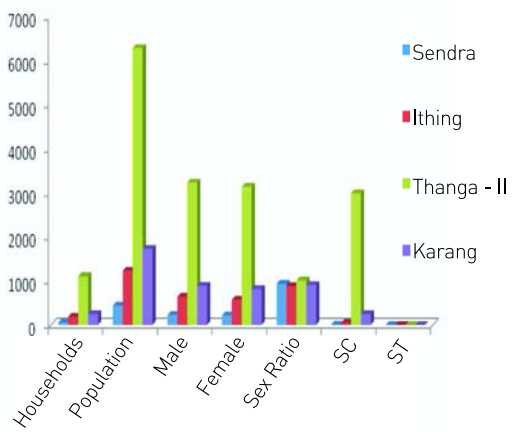

Fig. 4: Demographic profile

The maximum number of *Phum* huts is found in the *Karang* villages.

Occupational Pattern

The people perform different types of occupational practices for their livelihood. The primary source of income among the villagers is fishery. Apart from fishery, they are generally dependent on vegetable collection and agricultural practices. Other than fishery and agriculture livelihood, the people depend upon cattle farming, government and non-government jobs like teaching, business, etc.

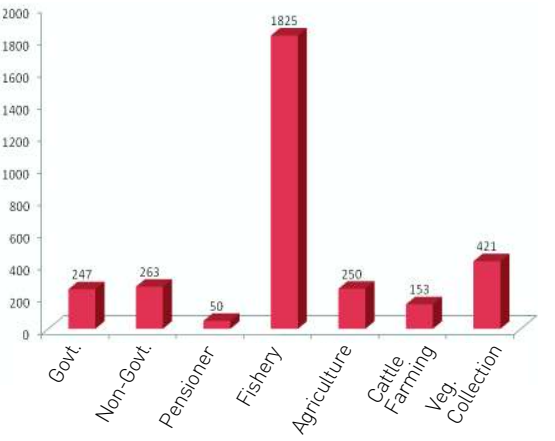

Fig. 5: Occupational profile

Main Occupations

A. Fishery

Fishery is the main occupation of the study area. It supports 65 per cent of the income to the household of the village living in and around the lake. Fishing is done throughout the year, but the maximum catch is during October to April. Every year around 1,440 kg of fish harvested by a common fisherman and traded in the nearest small markets around the villages like *Moirang Bazar, Kumbi Bazar, Thanga Bazar*.

However, lack of transport facilities and common market force them to sell their catch fish to the local middlemen often at a price much lower than the market price. Eighty five per cent of the catch fish is sold and remaining 15 per cent is used for either household consumption or future food security by smoking or simple drying methods. Average monthly income of a fishing household from sale of the fishes is ₹ 10,000 per month.

Generally, fishing is done together by both male and female members of the house. At least 2 members of the family are engaged in fishery. But mostly in case of fish trading, the female members of the household are involved. The main varieties of fishes are *Ctenopharyngodon idella (Napi chabi), Labeo rohita (Rhou), Cirrhinus mrigala (Mirgals), Catla catla (Puklaobi), Channa striatus (Porom), Notopterus notopterous (Ngapai) ,etc.*

Fish harvesting technologies and methods

Fishing gears, dip nets, lift nets, cast nets, hooks and gorges, traps, multi-pronged spear, etc., are the notable instruments used in the fishing. Nowadays, due to the rapid increase in fisherman population, there is a change in methodologies of the lake fisheries which has led the people to adopt several fishing techniques including use of small mesh size nets and *Athaphums* (making a circular enclosure with pieces of thick *phum*). The increase in *phum* fishing is due to various factors like inundation of agricultural fields after the construction of *Ithai Barrage*, increase in population, rising unemployment and overall decrease in fish yield. *Phum fishing* is a traditional practice while *Athaphum* is a recent innovation.

B. Aquatic Vegetable Collection

The lake provides several aquatic plants for fuel, fodder, vegetations and other materials for thatch and handicrafts. It has been estimated that 33 per cent of the villages' households harvest aquatic vegetation for use as food; 18 per cent for use as fuel; 2 per cent for use as fodder and 1 per cent for manufacturing handicrafts. The main plants species used for several purposes are discussed as follows:

I. Food

There are around twenty three (23) plant species which are collected from the lake. The main species are *Polygonum sp. (Yellang), Zizania sp. (Kambong), Nelumbo (Thambal), Nymphaea sp. (Tharo), Hedychium coronarium (Loklei), Alpinia galarga (Pullei), Oenanthe javanica (Komprek), Euryale ferox (Thangjing),* etc. They are widely found in the lake and harvested for local consumption as well as income generation of the household.

II. Fodder

There are around eighteen (18) plant species used as fodder which are collected from the lake. Some common species are *Echinochloa sp. (Hup), Alternanthera sp. (Kabo napi), Capillipedium sp. (Wanna manbi), Zizania sp. (Kambong)* and *Brachiaria sp. (Paragrass).* They are harvested by the villagers as feed for their cattle like cows, buffaloes, goats.

III. Fuel

There are around six (6) plant species which are commonly used as fuel especially for fish drying, smoking and cooking purposes. The main species are *Phragmites sp. (Tou), Coix sp. (Yawa chaning), Arundo sp. (Luwang tou), Erianthus procerus (Singnang), Saccharum sp. (Mom)* , etc.

IV. Medicinal Purpose

There are seventeen (17) plant species which are identified as medicinal plants. The most common amongst them are *Fuirena, Polygonum, Impatiens, Malaxis* etc. *Fuirena umbellata* are used for treatment of fever and jaundice. *Polygonum sp.* are used by communities as a health tonic. Rhizomes of *Arundo donax* are used as emollient and

diuretic. Flowers of *Eichhornia crassipes* are used traditionally for the treatment of skin diseases, particularly those of horses. *Enhydra fluctuans* is used in skin and nervous afflictions. Rhizome of *Hedychium coronarium* is used for stomach and liver disorders as well as for treatment of inflammations. Shoots of *Hedychium coronarium* as well as *Mikania cordata* are used as antidote for snakebites as well as fish poisoning.

V. Construction of Hut

There are around eight (8) plant species which are used for thatching, fencing and hutment construction.The main species are *Arundo sp. (Luwang tou), Phragmites sp. (Tou or tourel), Zizania sp. (Ehing kambong)* etc.

VI. Handicraft

There are two main plant species which are widely used for making mats, cushions, baskets, hats, handicrafts and other items of household utility as well as decoration. They are *Scirpus sp. (Kauna)* and *Cyperus sp. (Chumthang).* These products being ethnic are in high demand in other parts of the country.

Fig. 6: A view of Loktak lake (centre), clockwise pictures (from 3 O'clock position); fish fauna, different lake resources in the market, handicraft products, fishing activities, firewood collection, Hedychium coronarium, Phragmites sp. and Zazania sp. (Kambong).

VII. Cultural Purpose

There are around eleven (11) plant species which are used by villages for several religious and other cultural purposes. They use twigs of *Echinochloa stagnina (Hup)* for worship of their Gods and Goddesses. *Nymphaea* and *Nelumbo* sp. are used in several religious ceremonies.

Health and Sanitation

Adequate sanitation facilities are lacking in the entire villages. Only 38 per cent of the population has proper facilities of sanitation. There is no access to proper sanitation facilities. This leads to high amount of human wastes being discharged into the water bodies.

Similarly, access to safe drinking water facilities is critical in the villages also. Out of the 50 household surveyed, 81 per cent of the household depend on the lake as a main source of water for drinking as well as other uses. Though hand-pumps are available, only about 19 per cent of the household use them obviously because of adherence to certain cultural taboos since these were recently introduced and at the same time most people objected to the taste and odour of water. Types of water treatment methods used by the villagers included simple boiling, conventional method of filtration using cloth and modern water filter, etc.

The availability of safe and adequate drinking water and sanitary measures has a direct bearing on the working conditions and health of the people and their capacity for optimum output. While access to safe drinking water and sanitation have been proven to be essential to good health, and while the availability of water is a requisite for socio-economic development, there also exists a cause and effect relationship between water, health and development.

Public Opinion

A survey with respect to public opinion was carried out about the changes in the lake. Most of the people residing in the villages commented about the several drastic changes to their livelihood due to the construction of the *Ithai Barrage* in its downstream in 1983. The availability of fish in the lake has reduced in density and its diversity. They have witnessed the extinction of many plant species which were abundant earlier. Since fish and vegetable collection are the prime source of livelihood to poor villagers, such changes have a significant impact in their socio-economic life. Also the construction of hydraulic structures for irrigation and hydropower generation has further compounded the problem of lake siltation, nutrient enrichment and reduced migration of the fish fauna.

Conclusion

The lake is found to play an important role in ensuring ecological, economic and cultural security of the region for the following findings as per the studies conducted in the area. The lake is an important source of fisheries and vegetation both for home consumption and commercial purpose which provides sustenance to a large population dependent upon the lake resources for their livelihood. Most inhabitants engaged in fishing lack modern scientific and technical

knowhow of fishing. People were still found to be using traditional, outdated, primitive methods of fishing which was ineffective and low yielding. The lake vegetation is also harvested for use as food, fodder, fiber, fuel, handicrafts and medicinal purposes. Womenfolk are more eager in fishing-net making activities for income generation rather than weaving of traditional clothes resulting in decline of the latter small scale industry. The lake also provides water to the *National Hydro Power Corporation (NHPC)* for power generation while at the same time supporting agriculture by providing water for irrigation and domestic purposes. It also supports the world's only floating sanctuary – the *Keibul Lamjao National Park (KLNP)*, home for the endangered Manipuri brow-antlered deer (*Cervus eldi eldi*) locally called *Sangai*. This largest floating park is the only habitat and the last refuge for this highly endangered ungulate species which had attracted international community for its uniqueness. The denundation of lake catchments due to *jhum farming*, deforestation and increasing demands for fodder, fuel and other forest products contributed to enhanced siltation and reduction of water holding capacity of the lake. Most of the inhabitants were found to be aware of the importance of the lake in their life and hence would actively support the conservation programmes given a chance.

References

Loktak Development Authority (LDA) and Wetlands International - South Asia. 2002. Annual Report. *Sustainable Development and Water Resource Management of Loktak Lake*.

Trisal, C.L. and Th., Manihar. 2002. *Management of Phumdis in Loktak Lake*. Proceedings of Workshop Held at Imphal. Manipur.

Shamungou, Kh. 1999. *Conservation of Manipur Brow-Antlered Deer*. Vol. II. Mass Publication. Imphal.

Tombi Singh. 1992. *Impact of Hydel Project on the Environment of Manipur*. Technical Report, Department of Science, Technology and Manipur. Government of India.

www.wetland.org

www.ramsar.org