Dams and Discontents

THE CASE OF THE FLOATING POPULATION OF LOKTAK LAKE

by
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Dedicated

To

The Loktak Khangpok People
Of
Loktak lake

CENTRE OF SOCIAL MEDICINE & COMMUNITY HEALTH
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CERTIFICATE

This is to certify that the dissertation entitled DAMS AND DISCONTENTS: A CASE STUDY OF THE FLOATING POPULATION OF LOKTAK, submitted by Ramananda Wangkheirakpam of Jawaharlal Nehru University, for the degree of Master of Philosophy is his own bonafide work. This dissertation has not been previously published or submitted for any other degree of this University or any other University.

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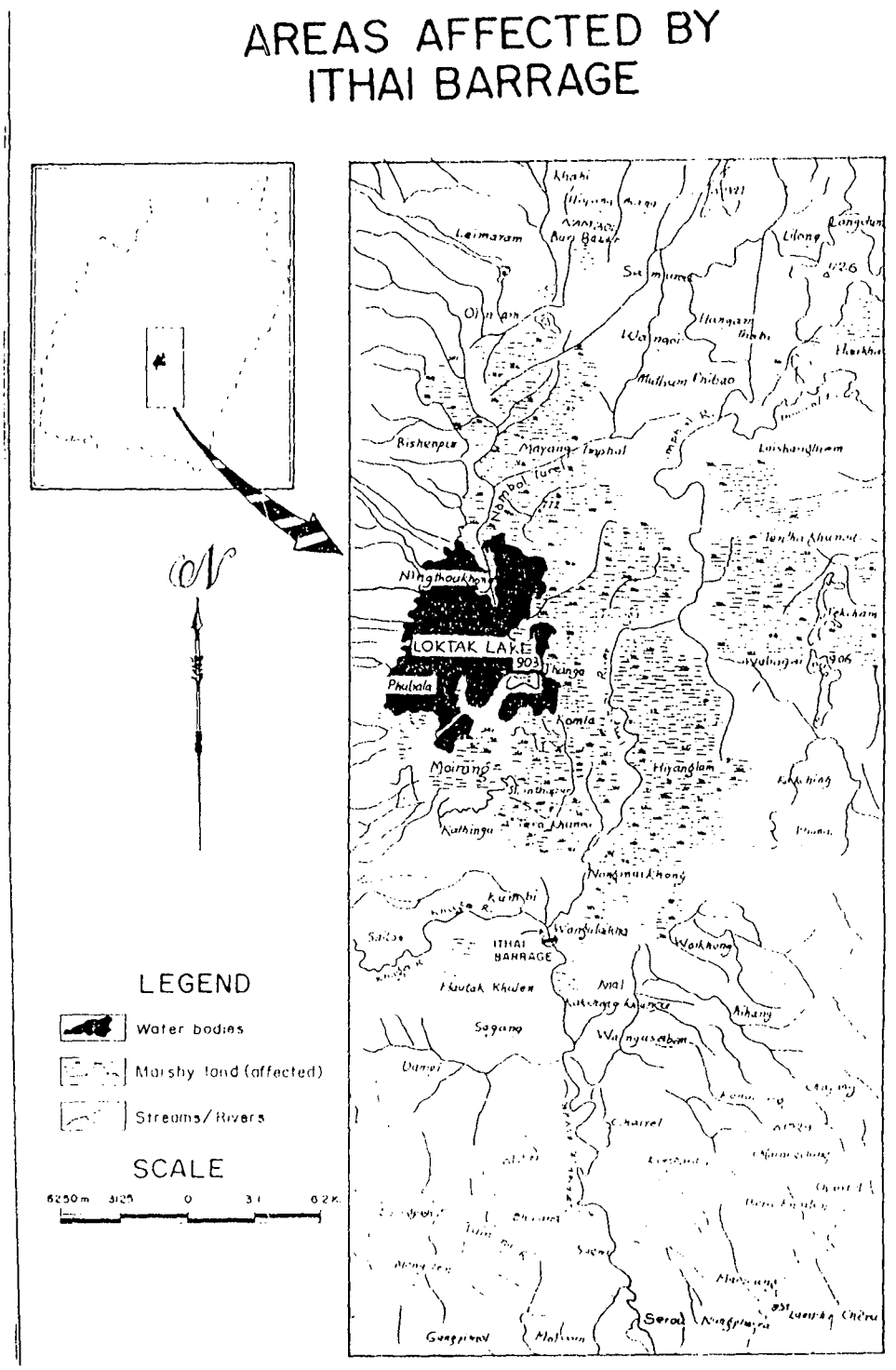
Map



Source: Gangmumei Kabui, (ed.), *Ithai Barrage, 1993*

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CONTENTS

CHAPTER 1

Contextualizing the Issue

" Beautiful dance of the tidal-waves will not be seen again,
on the stage in front,
New appearance will not be seen."
(Tonu Laijinglembi: Ningthoukonda Koukhatpa)[1]

" The uninterrupted flow of power radiating from Loktak is transforming pastoral Manipur into an emergent industrialized state. Power so vital for economic and industrial growth, will play a catalytic role in Manipur's overall development and in raising the quality of life of the people."
(National Hydro-Electric Power Corporation Ltd.)

1.1 Introducing the subject

This dissertation attempts to look at the impact of a barrage on local people, which converted a wetland[2] into an artificial reservoir for generation of electricity and irrigation in the state of Manipur. The study is taken up twenty years after the construction of the barrage, which necessitates a look at the long-term effect of it.

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[1] Quoted from a play titled Tonu Laijinglembi by Ashangbam Maniketan.

[2] There are many definitions of wetland, but a generally accepted one is given by the Convention on Wetlands (Ramsar Convention) is 'areas of marsh, fen, peatland 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'. In a wetland, water is the primary factor in controlling the environment and the associated human habitation, fauna and flora. Some of the functions of wetland include flood control, water storage, ground-water recharge, retention of sediments and nutrients and stabilisation of local climatic conditions. Environmentalists contend that the whole of the valley of Manipur is a wetland system because of the number of lakes and marshy land it contains.

However, due to the constraints of space and time, the focus of this study uses qualitative approach to understand the impact on a small group of a 'well-differentiated' population of the lake, i.e., the Loktak-Khangpok people.

The negative effects of the Ithai Barrage on the Loktak wetland system and the people whose lives have been threatened as a result of it are mentioned in a few published studies and articles. However, those who are supposedly concerned with the Loktak and its people seem to be oblivious of the Loktak-Khangpok people.[3] The Loktak-Khangpok people live far from the land, floating on the water, leading a life different, not affected by the rising water that submerges the agricultural lands. To people who visit the lake, for different reasons, the facade is still of immense beauty. But a little scratch on the surface reveals a dying lake. There is dearth of data or studies that deals with Loktak-Khangpok People. The effort here is to bridge this gap. During my visit to Manipur, before the fieldwork for this research, there were enough debates in the local newspapers and seminars on environmental issues in Manipur, raising fear in particular about the proposed Tipaimukh High Dam in Manipur.[4] Most of these debates center on conservation of environment, for environment's sake only and disregard the broader idea of political economy and the dynamics of subsistence within the greater logic of resource struggle. Few studies have been carried out on the impact of the barrage on the

[3] People who live on the floating hut are known locally as Loktak-Khangpok people. Khangpok means hut. For convenience Loktak-Khangpok, Khangpok and Hut will be used interchangeably.

[4] The Government of India has proposed to build a huge dam whose height is 162.8 m. and with an installed capacity 1500 MW. Because of non-disclosure of information on the dam to the public many concerned citizens, NGOs and other civil groups in Manipur have raised doubts about the dam. For further readings: 'Hydropolitics of Tipaimukh High Dam' (R. K. Ranjan, 1999).

ecology of the lake, but no proper assessment has yet been conducted on the affected[5] people. This is particularly so in case of the Loktak-Khangpok people. The concern for the people who depend on the ecosystem and the hitherto scarce research on this pertinent issue, and need for debates for the future environmental policies are the motivating factors for taking up this research. Another aspect concerns the people whom the Ithai Barrage directly affects and whose marginalized voices are not represented in the mainstream discourse on environment and development. The immediate objective of this study is to explore the perceptual environmental changes as a result of the Ithai Barrage, and its impact on the people as experienced by them. Though, the study does not have an emphasis on the diseases, it substantially addresses them. The study will engage with the issues of socio-economic, cultural, and psychological changes in the life of the people, which will highlight the sufferings of the affected people, including health of the residents. During the preliminary visit, it was observed that the people who live on the floating huts, i.e., the Loktak-Khangpok people, who have been living on and around this lake for many generations now, have been most neglected by the Government. Basic facilities of drinking water, health services, and electricity provided by the Government is available only on the mainland.[6] It is ironic that the Khangpok residents have never directly benefited from electricity and/or irrigation, which were the promises of the Loktak Hydro-Electric Project, though their livelihood has degenerated as a result of the dam. One may understand that

[5] Affected people include both of those who benefit and those who loose from the project. Throughout this thesis the word is used to mean negative fall-outs of the dam.

[6] Mainland here means land areas around the lake. This also includes the hill Islands on the lake.

because of the terrain, the benefits of the hydroelectric Project cannot reach them directly, but this does not explain the sufferings of 800 plus floating families living off the Loktak. Instead they have been criticized for over-fishing, contaminating the fresh water, accelerating the process of eutrophication of the lake, and increasing their population, i.e. the number of Khangpok. (LDA, p.35.1996). The issues and objectives of this study have been evolved on the basis of the above perspective, which locates people and their suffering at the center of its concerns.

1.2 OBJECTIVES OF THE STUDY:

a) To locate and contrast the perceptual changes in the ecology and the habitat in the pre and post barrage phase on the individuals and community social health status of the Loktak-Khangpok people of the Loktak Lake.

b) To evolve an understanding of the responses of this community to the resulting changes in their eco-system.

c) It also proposes to look into the effect of imposed dominant 'developmental' and 'environmental' movement on local people.

1.3 METHODOLOGY:

While some part of this study uses census, published works etc., major part of this research is based on case studies, informal interviews and observations, which are termed as qualitative methods. Because of the nature of the objectives, quantitative

study is clearly inappropriate, but at the same time the perceptions and experiences of the residents are corroborated with available data and studies about the lake and the people. Deviating from the positivist framework of working out 'objective truth' by a "neutral" researcher, this research instead believes that there are different contested notions of reality. The narratives constructed here are posed to present the 'reality' of the Loktak-Khangpok dwellers of the lake. Here the ideological position, background and values of the researcher play a crucial role in the research process and the product.[7] Recognizing the limitations there in, this work does not claim to be absolute, and is one among many of the many representations of the Khangpok people.

In order to be able to capture the psychosocial 'reality' of the population under study, it demands a methodology that is sensitive and flexible, and which embraces the views and opinions of the residents in their own terms. It also requires that the context of the population under study be incorporated, so that their views do not become divorced from the meanings in which they were originally situated. In order to fulfill this, multiple strategy of information gathering was used for different phases of the research. Statistical and other secondary information covering the state and the local population have been used to corroborate case studies and other informal interviews.

1.4 POPULATION:

[7] It is acknowledged here that the researcher's background is manifested in the formulation of research agendas, choice of theory and methodology; and in the apprehensions of the interpretative process.

The study population of fishing families living on the Loktak-khangpok that dots the lake is presently estimated to be around 800. The fieldwork was conducted from the beginning of December and continued till the second week of March 2000. Fifteen families were chosen randomly for case studies (Given in Appendix- Case Studies). The study's focus was on three different areas of the lake, based on three approaches to the lake. The first approach was from ***Khoijuman*** village in Bishnupur Sub-division. The second approach was from ***Thanga*** and ***Karang*** hill islands. And the third approach was from ***Ningthoukhong Channel***. These approach villages are chosen because of the convenience and easy access to the lake, and the two islands were selected for the fact that the residents' only source of livelihood is based on the lake. Dug out canoe used by the fishers was used to reach these huts. The fishers and local clubs concerned with their deteriorating ecosystem of the lake, were more than kind to take this researcher to the various locations on the lake for this research.

Case studies of male and female heads of each family constitute the main building block for this research. Those families who are new (post barrage) to the lake are not part of this study for it is presumed that they are not expected to represent the pre-barrage scenario. Those that stay on the lake for less than six months of the year have also been excluded. This is done keeping in view of the fact that some of the families from the mainland resort to fishing only to supplement their income from their farming or other activities on the mainland. However, this exclusion does not restrict informal interviews with those who were encountered during the fieldwork on the lake. Some of the most

important views were gathered from elders, women organizations and local clubs from the island of Thanga and Karang.

The major tools adopted for this research include case studies of the families selected randomly from the Khangpok population. Informal interviews of local club members, women organizations, elders, Government officials, health officials and NGOs are included in the primary data collection. Secondary data for this study include the Census Reports of the Government of Manipur, research conducted by environmentalist groups, published studies from Manipur University, articles from newspapers and journals, Gazetteers, leaflets and books. In order to conduct the case studies of the fifteen families, this researcher stayed with some of the families in their huts. This had an advantage of observing the various activities of the fishers. This researcher also stayed at all the approach villages including that of the islands for various informal interviews with the local people.

1.4 Chapterization

This section deals with the thematic organization and based on it the layout of the chapters followed in the consequent pages. The first chapter of this dissertation introduces the subject of inquiry and also discusses the methodology adopted for the study. The second chapter discusses different approaches and frameworks to the environmental issues in terms of its relation to individual and groups. It also proposes to look into the debate pertaining to it in both its national and international context. It also

looks at the micro/local policies in relation to environment and ecology, with specific reference to the state of Manipur. The third chapter gives a detailed account of the lake and its ecosystem, the study population in its social, economic, political milieu, and also the Hydroelectric project, the effects of which are under scrutiny. The fourth chapter is the main part of the study as it includes the analysis of the information gathered in light of the two preceding chapters. This chapter offers perspective to the issue of research in a substantive sense and includes the concluding observations to the study.

Chapter 2

What Is Wrong With Dams?

2.1 The Conception of Environment and Ecology

Here Environment and Ecology is understood as a matrix or an interface of the natural, physical, socio-economic and psychological settings where people live and work. Natural environment as the name suggests, are our surroundings that are not created by humans. Physical environments on the other hand are those created by humans, here to our concern is the Ithai Barrage on the Manipur river. Socio-economic subsystem of the environment is the subtler aspects of human organization. This includes class and caste organization, gender structure, production system, education, etc. The psychological or the cognized environment is the constructed explanation or understanding of the other sub-systems. Constructed over many generations, such cognition is important to understand the working of local environment and the changes that takes place. As already laid before, this study incorporates all the above subsystems to understand the negative effects of Ithai Barrage on the Loktak Khangpok people.

In order to locate this study in the labyrinth of present day environmental discourse a brief run on some of the approaches are given below. However it is acknowledged that it

cannot do justice to the various approaches. Basic Needs Approach to environment, recently adopted by international bodies like United Nations Environmental Program and the World Bank, deviates from the classical GNP boosting strategy to 'a multisectorial approach involving economic, social, political, psychological and cultural aspects of life' (Nayar, K.R. 1998). Despite this, it is pointed out that this approach failed to incorporate the social reality of home nations. The Neo-Classical approach on the other hand treats environment as commodity tradable in the market, and environmental degradation can be corrected by willingness to pay by those who created harm. But this has a basic problem of giving a market value to the environment. For one finds it extremely difficult to agree to assign value to non-renewable natural resources or the commons?

Early response by Marxists to environmentalism was one similar to views they have about the capitalist west (Guha, R. and Martinez-Alier, J. 1998). But attention on environmental issues became important at a latter stage[1]. The struggle over nature has an inherent class dimension because nature also provides resources, which are the bases of production. In an agrarian society the most important means of production, and the central reason of conflict for power, is land. And water decides production of agricultural

[1] The only connection of Marxism and ecology is traced to Marx's attack on Malthus' theory of population and his argument for subsistence wages (Barry, J. 1999).

goods[2]. In India conflicts over nature are mostly the battle lines between those who produce and those who own the means of production (ibid.).

2.2 Population - Environment Relationship

There are two main views on the issue of population and environment relationship. The first is that of the wild life enthusiasts and the mainstream/legitimized environmental movements where they believe that population is the major cause of environmental degradation. On the other hand are the proponents of social justice who say that consumption patterns and inequity within and between societies is the prime cause of environmental degradation (Prabhakar, R. and Gadgil, M. 1994). This issue is important here because of the high increase in number of fishers on the lake, and for which the environmentalists and the state like to view them as one of the major cause of destruction to the ecosystem of the lake. The dominant environmental movement in order to explain the pressure of population on environment usually evokes the concept of *carrying capacity*[3]. But because there is inequity in resource use, and it is possible to increase production through technical innovation, this concept fails to explain the human situation. Nevertheless population pressure and/or production pressure on resources can take place in any given system. It is also possible that production pressure on resources turn into

[2] Satyajit Singh (1997) explains that water is an important productive force in itself and plays a crucial role in dictating social relations. Land owners' demand for water is in direct proportion to land size and cropping pattern they adopt.
[3] The carrying capacity of a specific area is the maximum population of a given species that can be indefinitely maintained without a degradation of the resource base that might lead to a reduction of the population in the future.

population pressure on resources (Guha, R. and Martinez-Alier, J 1998). In the case of people affected by a project, the displaced people may shift to a new location where there is already human habitation. The new population can put pressure on various resources that the already existing population was depending on. Social/group conflict is a possibility if the original settlers find it threatening to their livelihood. In case of break down of community regulation as a result of destruction of ecosystem by Interventions projects the consequences can be intrusion by outsiders or the state leading to exploitation of natural resources.

In other instances of depletion of resources (for example fish) as a result of a dam, fishers may have to demand more from the already depleted resources in order to sustain their livelihood. This may cause immense pressure on the environment. Given the 'opportunity' they may emigrate to towns and cities as ecological refugees[4].

[4] " Community rights will tend to have a comparative advantage where mechanisms exist to reflect collective interest and preferences, individual cost of exclusion are high, the ratio of non-market to market benefits is high, and the rate of technological progress and exploitation is relatively low" (Devlin, A. and Grafton, R. Q. 1998).

2.3 Current Debates on Dams:

Debates on Dams can be categorized by five major themes. These are not unassociated issues but they have to be linked and understood as a whole to fully grasp the effects of dam.

- *Social and Distributional Issues.*
- *Environmental issues*
- *Economic and financial issues*
- *Resettlement and rehabilitation issues*
- *Health issues*

These areas of concern are discussed here individually:

2.3a Social and Distribution Issues

From the point of view of the proponents of the dam the impact of dams and reservoirs on the people, their land and settlements, their economy and traditions are inevitable and undeniable. However they agree on the need for paying attention to social aspects and equity dimensions of dam projects. Critics of the dam consider these, among others, as key issues of unsatisfactory performance of dams. The 1994 Manibeli Declaration, the 1997 Curitiba Declaration, and the 1998 Walker Creek Declaration strongly charge large dams as catering only to powerful interest groups. Large dams are perceived as having

essentially 'benefited large land holders, agribusiness and speculators', while they ' dispossessed small and marginal farmers, rural workers, fisher people.

The 'environmental and social cost' of large dams is also considered to have fallen disproportionately on women, indigenous/tribal communities and the poorest and most marginalised sections of the population (World Commission on Dams, '99). Contending views has different things to say. For e.g. a review of the World Bank concluded that 'rural populations.... received a large share of direct and positive impacts from large dams'. Dam related benefits included jobs generated for unskilled rural workers at the construction stage, the mitigation measures accompanying resettlement programs, community water supply, irrigated agriculture which strongly benefits the rural economy (OED, 1996:23). Another issue of this debate states that analysis of the concept of equity in sharing resources should not be restricted to local levels, but also examine benefits and impacts at regional and national levels. They contend that irrigation increases food productivity and thus food security, and also provide stability by acting as insurance in case of monsoon failure. It is argued that priority should be given to economic efficiency, which when achieved inherently generates benefits for the entire community. This implies giving priority to industrial water and energy supply and allocation of irrigation lands to commercial farmers. The pertinent question here is whether such developmental

efforts have brought substantial changes to people who have been displaced by dams, both big and small.

2.3b Environmental Issues

The closure of river is a dramatic event in the ecosystem. For instance the change that could take many years, like silting which can convert a lake into land, would take only a few years. The ecological niche before the dam gets submerged, modified or simply vanished. Ecological problems include reduction in the flow of water and silt downstream which changes the ecosystem below. In the reservoir siltation is a major problem as it shortens life of dams. According to the Government of India's estimate of some dams, the inflow of sediments is as high as four times from the initial calculation. It does not end with this, even after the dead level of the reservoir the silt accumulated will be unsuitable for irrigation and will remain as a wasteland. The structure also blocks migration of fish changing the aquatic composition upstream. This lead to a depletion in the fish catch throughout the river basin or the lake, causing enormous reduction in the availability of protein to the local populace and in many instances the loss of livelihood for the fisherfolk (Singh, S. 1997). Reservoirs and canals become stagnant and inevitably get infested with aquatic weeds that are not conducive to the survival of fish and fishing activities. Ashish Kothari (1999) reports that 'large dams have already submerged 1.5

million hectares of forests and countless other ecosystems' and endangering 'several species of fish and mammals by drowning their homes or blocking their migration . . .'.

Dams relate to global change in two ways. On one hand, the role of dams in global energy policies in the age of carbon dioxide reduction programs could be a positive one, as hydropower offsets thermal generation and could therefore potentially help to reduce the GHG emissions of the electricity sector. Dams can also contribute to offset changes in hydrological patterns be it as storage reservoirs in the regions of decreased precipitation or as flood control devices in the regions of increased precipitation. On the other hand, although hydro is generally seen as a power generation technology with very low net GHG emission level, recent studies claim that hydropower reservoirs may in fact emit substantial amounts of methane into the air. In terms of global warming, methane is 22-24 times as potent as carbon dioxide[5](WCD.99).

2.3c Economic and financial issues

One of the main reasons for construction of a dam is to increase production capacity of the local community and the nation, i.e., the GDP. Investments made in dams are irreversible, and it is important that in the final cost-benefit analysis, profit outweighs investment. But cost-benefit analyses are seldom comprehensive, and the terms of any

[5] Methane is emitted from reservoirs that are stratified and where the bottom layers are anoxic, leading to degradation of biomass through anaerobic processes.

analysis tend to be defined by whoever does it. For example, planners and decision-makers in most cases pay respect only to tangible economic consequences and tend to disregard the less tangible socio-cultural, environmental and health aspects. It is not sufficient to calculate the cost incurred for building materials of dam and the benefits it will bring in terms of the taxes it will generate from the people. But more than that it is important to look into damages it does to the environment and the people who depend on it i.e. the social and environmental cost-benefit analysis.[6] Looking at investment made in dams in India, it is reported by Public Accounts Committee (PAC) of 1982 that:

- 32 major on-going and initiated projects studied by the PAC show cost overruns of 500% or more, and
- No project has been completed within the approved cost estimates since independence (Quoted from Singh, S. et al. 1992).

This cost and benefit calculation mainly concerns the state and other stakeholders. However the loss of livelihood of people who are displaced are rarely taken into account. For indigenous/tribal peoples whose social and economic base is the common forest or water, economic estimation of benefit/loss in the market framework is unsuitable.

[6] It is impossible to give a market value to environmental, socio- cultural loss incurred, as these fall beyond of the purview of the market system. The above cannot have a price as they have no 'owner'. For further readings Guha, R. and Martinez-Alier, J. (1998).

Valuing what cannot be valued depoliticised the debate over dams and its effect, and in the process marginalizes the already marginalised section of the society.

2.3d Resettlement and Rehabilitation issues

One of the most hotly debated issues in the present debate on dams is on resettlement and rehabilitation of displaced people[7]. India is presently the world's third largest dam builder. It is estimated that many millions have been displaced, and their present condition is largely unknown. This veneration of the large dams by the state has come under severe criticism in recent years[8]. Hirakud Dam built on the river Mahanadi displaced some 1.1 to 1.6 lakh families of some 2000 villages. Most of these families were reduced from landowners to waged laborers. Studies on rehabilitation of displaced families numbered around 5,098 families of Nagarjunasagar project in Andhra Pradesh, revealed that 'displacement not only creates psychological and cultural insecurity but also takes away the existing livelihood of the oustees without offering any viable means of sustenance' (Thukral, E. G. 1992). The Ukai dam in Gujarat completely submerged one hundred villages with a population of 52,000. The displaced population was given

[7] When people are displaced, issues of human rights concerning the people affected by the dam cannot be overlooked. It is not only socio-economic rights that are affected, but also civil and political rights such as the right to be informed about the displacement procedures, right to information and participation which are violated in many of the cases of displacement by large projects.

[8] Arundhati Roy (1999) in her article ' The Greater Common Good' estimates that about 33 million are displaced by large dams alone. Much of these people are tribals uprooted from their original habitation. Without any National Rehabilitation Policy many of the displaced people land up in slums and jhuggis working as labourers.

smaller and poor quality land in exchange for fertile lands that did not require irrigation or fertilizers. Further studies revealed low levels of education, motivation for occupational change, and seasonal distress migration for work. (Mankodi, K. 1992). One can list several dams in India where the displaced people are sacrificed for the 'greater' good of the nation.

2.3e Health issues

Immediate health problems associated with dams include stress from displacement, and those arising from conditions of housing, sanitation, crowding etc. Medium and long-term medical implications mostly arise from water related diseases. Studies done by Oomen (1981) on the effect of dams in Africa showed that health problems as a result of dams could be serious enough to jeopardize the economic viability of the project. Some of the major water related diseases caused by reservoirs are onchocerciasis (river blindness), schistosomiasis, trypanosomiasis, malaria, filariasis, encephalitis, fluorosis, yellow fever, dengue, gastroenteritis, cholera and other water related and water based diseases. Other effects with implication on health include decrease in nutrition intake as a result of loss of livelihood and exposure to new diseases like STI brought by labor hired for the construction.

A subtler problem, yet having a debilitating effect on the people affected by dams is psychological in nature. Sudden loss of one's space and adjusting to new or modified environment can result in various problems of stress. For indigenous/tribal communities who have close ties with the ecosystem, it means much more than being a simple issue of displacement. Replacement of traditional conceptions of time, work, learning, economy with 'modern' conceptions contributes to loss of identity, which in psychological terms can mean death of one's self. Once the 'owner' of vast forests and running water they are forced to become construction workers or ecological refugees in towns and cities. It was reported that in rehabilitation sites of some dams drinking alcohol and gambling became a major problem. Reason being forced 'idleness'. Previously people lived in huts, worked on the fields usually owned communally and got their requirements from their surrounding free of cost. In the new surrounding they are forced to live in an entirely differently setup.

2.4 Dams and Development

'Resource-intensive industrialization, technicalization and commercialization of agriculture are the hallmarks of the growth oriented development model of this country. In the post-independence India under the Nehru-Mahalanobis model of development, capital-intensive, heavy industrialization strategy run by the public sector, irrigation and hydroelectric generation became one of the major agenda of the government in order 'to

catch up with industrial revolution' (Singh, S.1997). And in the words of the first Prime Minister of India, dams are the "Temples of Modern India" in this developmental project. It is no wonder that those 'agents of resource-intensification are given preferential treatment by the state'[9].

Environmental concerns form an important by-product of such a growth pattern (Nayar, K. R. 1998). Environmental degradation is attributed to assumed demographic trends, using the old Malthusian logic, by policy makers who believe that, since local land/water is degrading due to over use, more people must mean more degradation. And using the 'Tragedy of the Commons'[10] logic they further believe that the only way to save degraded environment is to regulate use of resources so that locals do not degenerate the commons further.

Instead of the reasons professed by the state, this degeneration of the resources has occurred through the process of the State sponsored subsidized flow of these to a narrow elite comprising organized industry and services and the more powerful landowners. Gadgil, M. (1994) points out that the iron triangle of (1) Organized industry, services and

[9] Guha, R. and Martinez-Alier, J. (1998) in tracing back the ecological history write that it is encroachment by the state rather than the poor that led to degradation of forest.

[10] Garret Hardin (1970) in his article ' The Tragedy of the Commons' argues that 'freedom in a commons brings ruin to all' as population has increased manifold and that the means to avert ruin is to convert the commons into private property. Opposed to this thesis Ramachandran Guha and J. Martinez-Alier (1998) argued that, instead private property undervalues future, which will ruin human kind. This is because families, individuals or firms have shorter time horizons, as compared to communities.

bigger land holders who benefit from State subsidies, (2) Bureaucracy, and (3) politicians has led to a liquidation of the country's base of natural resources. Baviskar (1995) notes that this ideology of national development is used to legitimize exploitation, and that this structure is embedded in the global arrangement of the world into nation-states and the expanding international capitalism.

It is true that after years of development effort the GNP has increased,[11] quality of life has improved and that there is no more cases of mass starvation like the one that happened in 1942. But the above picture obscures the experience of many. UNDP (1999) figure shows that 52.5% in India still lives below the poverty line; GDP per capita (1980-94) of the poorest 20% and of the richest 20% are 527 and 2641 respectively. The fact is that development has not trickled down to the vast poor and marginalised sections of the society. In the highly stratified Indian society where rural livelihood depends primarily upon land and water based occupations,[12] the issue is of economic and ecological access to basic needs. And in some respect ecological access will determine the fate of economic well being and the 'freedom of opportunity of an individual' to a livelihood.

[11] Using GNP as indicator of development is not adequate, as it does not take into account considerable amount of production that does not enter the market, nor does it take the class differences and the social institutions of different societies. In terms of environment, GNP does not consider the health of environment and the 'cost' of destruction of natural resources.

[12] Swaminathan, M. S. (*Hindu*, June 4,2000,P.1)

Writing about the genesis and pattern of the 'Indian Environmental Movement' Ramachandran Guha and J. Martinez-Alier note:

'The Chipko movement was the forerunner of and in some cases the direct inspiration for a series of popular movements in defense of community rights to natural resources. Sometimes these struggles revolve around forest, in other instances, around the control and use of pasture, and mineral or fish resources. Most of these conflicts have pitied rich against poor: logging companies against hill villagers, dam builders against forest tribal communities, multinational corporations deploying trawlers against traditional fisher folks in small boats. Here one party (e.g., loggers or trawlers) seeks to step up the pace of resource exploitation to service an expanding commercial-industrial economy, a process which often involves the partial or total dispossession of those communities who earlier had control over the resources in question, and whose own patterns of utilization were - (and are) less destructive of the environment.'

A classic example of conflict between the state (in hand with large landowners, industrialist and other stakeholders) and tribal/affected group in recent time is that of the Sardar Sarovar Project.[13] Taken up mainly by Narmada Bachao Andolan (NBA), the anti dam movement has brought up various issues contesting the notion of dam as a development tool. It has raised the issues of large dams displacing large number of

[13] The Sardar Sarovar Dam is part of the Narmada Development Project that envisages the construction of major dams, 135 medium dams and 3,000 minor dams on the river Narmada and its tributaries.

people without proper rehabilitation and resettlement, of equity and distribution, of environmental destruction and lack of transparency about the project.

Guha and Martinez (1998) further delineate the environmentalism of the poor from those of the West or the "pot filled" environmentalism. First, for the poor, the struggle for livelihood is the main concern in fighting environmental destruction. The poor include indigenous/tribal people, marginalised people, women, and landless peasants. Secondly, the environmental solutions they articulate strongly questions the equity of political and economic distribution. Both of these groups are concerned with conserving the environment but for different reasons. For the poor destruction of environment amounts to loss of livelihood. The environmentalism of the North is evident in the number of sanctuaries, national/wild life parks, botanical gardens etc.

Another major area of concern is of the indigenous people's and ethnic minorities' loss or gain from dam projects. The social, economic and political status of such 'minorities' restricts their capacity to assert their interest and rights in land and natural resources; restricts their role in decision-making that affects them; and prevents or excludes them from being represented. Until recently, the problems faced by indigenous/tribal peoples and ethnic minorities as a result of dams were accepted as inevitable. The most critical impact, namely, displacement and dislocation was justified as a 'minor sacrifice' for

greater common good of the nation. This may have meant erosion of the legal and political rights of these peoples and loss of cultural attributes. For a long time, compensation mechanisms have not appropriately addressed the loss of customary and non-formal rights over land, water, forests and other common property resources (WCD, 1999). Similarly, fragmentation, purchase and sale of lands for profit or for other developmental activities have never traditionally resulted in alienation of lands from communities. In fact, indigenous/tribal peoples have recognized the concept of land ownership only recently, after 'coercive' imposition of contact with colonial culture.

The State, either at the Union or at the Federal level also reserves the right to dispose of land and resource utilization rights to industry. Since India has been pursuing, a policy of subsidizing industry since independence, these lands or derived resources are leased or sold for private profit[14]at the expense of indigenous/tribal communities and other minorities. The development paradigm being thrust upon indigenous/tribal communities presumes and fosters individual as opposed to community ownership and social and economic inequity, the concentration of assets and capital in the hands of either a few individuals or the State. No attempt has been made to modify and develop traditional community ownership as an alternative form of asset control and distribution. In the

[14] Assam receives little beyond nominal royalties for its oil profits accruing to the Oil and Natural Gases Corporation, a Government of India public undertaking. Hydroelectric projects are similarly public corporations owned by the central government. Loktak Project, now twenty years old, gives no benefit to Manipur especially in relation to the damages and costs.

North East hill areas, as in many parts of India, forests are subject to legislation concerning their protection and use, which strangulates community control and use; whereas the wetlands are neglected to the point of abandonment. Wetlands are well recognized for their vital importance both as a resource and as an invaluable and rare ecosystem. The Indian Forest Act of 1927 has protected only limited areas of forests of the region, most of these areas being "Unclassified Forests", over which indigenous/tribal and minority communities exercise traditional rights of usufruct without legally being recognized as autonomous territories with full land rights[15].

The Forest and Wildlife Protection Acts have been extensively criticized for their tendency to alienate communities with traditional rights over these lands and resources on the pretext that they are responsible for the `mismanagement and destruction' of these. Legislation has consistently ignored the fact that these are the only such resources remaining in the world, and it is therefore obviously due to guardianship by these communities that these exist at all. The true motive of expropriation of these resources are, in fact, to allow exclusive commercial exploitation, either for the benefit of state revenue or for private interests in the self-defeating race to "catch up" with the West.

[15] Status Report of Forest Department, Government of Manipur, 1996.

Thus, gathering of minor forest produce, hunting for food and fishing rights are criminalized, while slash and burn (swidden) cultivation is rejected as destructive by the crude logic of scientific forest management. The Forest Departments raise revenue by leasing rights to agro-forest industries and timber contractors who indulge in large-scale clear felling of forested land and monoculture plantation of exotic species. The Forest and Wildlife Preservation legislation and machinery has contributed greatly to the breakdown of this self-sustaining system, economically, socially and environmentally by alienating indigenous communities from such lands.

The wetlands, on the other hand, were perceived by both the British and later Indian governments as nothing more than an impediment to the acquisition of more agricultural land. Thus, they have been ruthlessly destroyed in the name of agricultural development and "reclamation". Being 'ignorant' of the value of the wetlands in ecological and economic terms, the dominant motive in management has been to either convert them into `lakes' or to drain them into rice fields or urban settlements. Both of these endeavors have resulted in disastrous consequences.[16] As a consequence, these wetlands have been arbitrarily destroyed and continue to be destroyed by hydroelectric cum irrigation

16 Annual flooding in the Manipur Valley has increased in severity, inundating lands and habitat which were exceedingly well drained (Brown, R. Statistical Account of Manipur. Office of the Superintendent of Government Printing. Calcutta, 1873:9) in 1997, the floods affected over 50,000 hectares of paddy-land and thousands were made homeless.

projects[17], by reclamation of land for urban expansion[18] and agriculture. The 'sophisticated'[19] system of earthen dikes and canals evolved by the valley people of Manipur over millennia[20] have been neglected. This efficient system of water management is now falling apart, with the consequence that large areas of the valley of Manipur are waterlogged, uncontrollably flooded annually and soil alkalization has progressed enormously. Waterways, rivers and streams are silting up at a very rapid rate and high levels of pollution are evident, from irremovable silt, garbage and waste disposal. The state heavily promotes chemical agriculture, and residual chemical levels have risen drastically[21]. In conjunction with the dam in Ithai, these contaminants have almost totally destroyed the fishing grounds and flora of the wetlands. More than 30 species of indigenous fish have become extinct.[22] Since a large portion of the nutrition

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[17] Ithai Barrage. *op cit.*

[18] Draft Master Plan for Greater Imphal. Manipur Gazette Extraordinary; No.4 (B), April 5, 1994. Out of over 135 Sq.Km. to be newly designated as urban area, reserved forest areas and common lands such Langol Hills and Lamphel-pat have been included without respecting the rights of the peoples or Government's own existing environmental norms.

[19] This does not imply that traditional systems are the solution to present day demand of irrigation and energy. Instead it is sought that a proper understanding of traditional systems are required for renovation or for implanting new technology to traditional societies.

20 The ancient Meitei manuscript, Tuteng-Lon, gives a detailed account of the planning, construction and maintenance of a system of dikes and canals for drainage, irrigation and sanitation.

[21] Singh, H. T. and Shyamananda, R.K. (1988) reports that because of heavy promotion and use of fertilisers and pesticides many environmental problems including pollution of water takes place in the lake. Latest estimate by the Government of Manipur (1999) on consumption of fertiliser stands at about 94 Kg/hec. against the national average of 70 Kg/hec.

[22] Singh, A. L (1993), Impact of the Ithai Barrage on the Ichthyo-fauna and Natural Fishery of Manipur. Ithai Barrage, op cit. 73-75.

and diet of the valley peoples is dependent on harvesting and fishing these ecosystems, the subsistence level economy of the peoples, particularly the Meitei, is seriously compromised.

In context of dams and its impact on tribals and indigenous people, the record shows a dismal picture. In a study by the Working Group on Development and Welfare of Schedule Tribes during the Eight Five Year Plan (1990-95) on Rehabilitation of Displaced Tribals, reports that out of 16.94 lakh persons displaced by 110 projects (as studied by them) about 8.14 lakh are tribals. Another report[23] estimates that Schedule Tribes make up just 7% of the population of India but they account for 40% of the 30 million people displaced by development between 1951 and 1995.

In many parts of India, particularly in the Northeast, access to and control and management of land, land based resources, and water bodies are linked up with the communities that survive on it. With the coming of the State, such de facto rights became the property of the State. More often than not, such rights are not recognized or are suppressed by the state. There is even a general feeling among State functionaries that de facto communal resource holding systems have stagnated development activities in these areas (Roy Burman, B. K. 1999). The new ownership has led to a 'take-over' of the more

[23] MARG 1999:19

productive resources by powerful individuals and groups and opened access to resources that were previously managed by communities (Swallow and Bromley, 1995; Moorehead, 1998). A closer look at land acquisition act at the local level reveals the State's role in dismantling common property resource system and its effect on the people and the eco-system managed by these communities.

The *Manipur Land Revenue and Land Reforms Act* was enacted in 1960 to establish the State's right over the entire landed area in Manipur. It extends to the whole of the state of Manipur except the hill areas where the VIth schedule is in vogue. According to the Act "Land owner" is defined in relation to any land, and means a person who acquires rights to ownership in respect to such land. It is defined as "a person" singularly limiting the concept of ownership to individual private property. By this clause only the right to individual or Hindu joint family holding is recognized. All other holdings are de-recognized automatically. The Act also declares that "All lands, public roads, lanes and paths and bridges, ditches, dikes and fences on or the same, the beds of rivers, streams, nallahs, lakes and tanks and all canals and water courses, and all standing and flowing water and all rights in or over the same or appertaining thereto which are not the property of any person are and are hereby declared to be the property of the Government". In Manipur waterways and water-bodies have traditionally been held as community property. This clause has been specifically inserted to invalidate community rights.

Concerning the right to fisheries the Act says, "The Deputy Commissioner with the previous sanction of the State Government may, by notification published in the prescribed manner, declare any collection of water, running or still, to be a fishery so declared shall be deemed to have been acquired by any person or group of persons either before or after the commencement of this Act". Similar to land, waterways and water-bodies have traditionally been held as community property and fishing rights have been customarily been held by specific clans/villages. Women have traditional inheritable fishing rights in the community. With the State de-recognizing these rights and enforcing individual ownership system, the traditional indigenous system seem to be in disarray as these alter people's traditional relationships with nature. *The Land Acquisition Act of 1894* is the second important legislation that impacts powerfully on the territorial and land holding norms and practices of tribal/indigenous peoples. This act specifies the powers of the Government of India in the person of the Deputy Commissioner (previously called the Collector), a bureaucrat of the Central Administration Service, to acquire lands in the name of the State, arbitrate disputes pertaining to such acquisition and set terms for acquisition. Lands may be acquired under this Act without consent of the dispossessed parties, for any "public purpose", so designated. Thus, lands belonging to communities are routinely acquired by the State for reservation of forests and wildlife sanctuaries, provisions of utilities such as roads, hospitals government administrative constructions, public enterprises, mineral extraction, power generation etc.

The Land Acquisition Act of India, as its name clearly suggests, empowers the government to take over land for various "public purposes". This law, which was enacted in 1894 by the British in order to pave their way mainly for the increasing demands of an expanding railway and also for factories, has never been amended or repealed by the government of free India. The spirit of this Act, is therefore, colonial if at best a paternalistic one. It is an ethos in which the government - colonial or otherwise, is the sole arbitrator and controller of resources, only partially and incompletely recognizing inhabitants' rights as those of economic compensation.

Chapter 3

The Lake and the People

2.1 History

The Imphal valley, originally a lake fed by the numerous rivers from the encircling hills is drained by a single river, the Imphal river, to the South of the valley. Over a period of time, according to the oral histories of the Meitei, the valley partially dried itself out and was settled permanently by some of the peoples of the surrounding hills, who later evolved into the Meitei people. Several thousand years ago, settlers then proceeded to harness the waters of the valley, channeling the major rivers into more permanent courses by the construction of massive earthwork dikes. Some lands were reclaimed as permanent dry land for agriculture and habitation, some were left open to seasonal flooding so as to facilitate wet rice agriculture, and some areas retained as *pat* or reservoirs of water or lake, with the capacity to absorb the annual monsoon floods and conserve the source of water through the dry months. The greatest such reservoir is the *Loktak-pat* to the South of the valley, from where the Imphal river drains the entire valley. Regretfully, this is now almost the only such reservoir left, the rest having fallen prey to reclamation of land for unplanned urban expansion in the last few decades, or fallen into neglect by the disintegration or deliberate disconnection of the feeder channels that replenished them.

Moirang principality, now Moirang Sub-division of Bishnupur District, in southwest Manipur near the Loktak Pat[1] was the homeland of the Moirang clan. As some historians suggest, the people who came from the east and west settled here primarily for ecological reasons. There were abundant resources for the Moirang to build and sustain an independent principality for several centuries (Kabui, 1991). The surrounding hills in the west and the south with its vast forest resources gave protection, and the Loktak Lake with it's varied flora and fauna, especially fish offered easy means of water transport and rich agricultural lands. The *Moirang Ningthourol Lambuba*, the chronicle of Moirang, records the digging of Nongangkhong canal to connect the Loktak Lake with Khordak River; this was to drain away the excess water from the Loktak (Kabui, 91.p.184). The word Loktak is suspected to have been derived from *loklou*, the Moirang word for water. (Singh, W.I.1986. p.202). After settlement, and in due course of time, the people terra-formed the eco-system in accordance with their needs. This was supposedly done using indigenous understanding and technologies taking into account their economy, needs, and the ecosystem. This of course does not imply that their technology was perfect for harnessing the environment. Rather, it points out that ecosystem people tend to live in balance with their immediate environment (Gadgil, M & Guha, R. '92).

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[1] Pat is the Meitei word for lake, used for all sizes.

2.2 THE LOKTAK WETLAND SYSTEM:

Loktak Lake is situated 38 km. south of Imphal and between longitude 93.46 degree, 93.55 degree east, and latitude 24.25 degree to 24.442 degree north. Isotopic data indicates that the lake may date from the middle of the last glacial period, about 25,000 thousand years ago (NEC, 88.p. 4.01). The accepted version is that once the entire Manipur valley, which is some 2000 sq.km. (9% of the area of the total area of the state) was one vast wetland. With natural eutrophication, human settlement and agriculture what remained was patches of water bodies, with Loktak being the largest. It is reported that the present Lake has shrunk from 495 sq.km. in 1971 to just 289 sq.km. in 1990. There are also other lakes on the other side of the Manipur river, the major ones being Ikop Pat (2,600 ha.), Lousi Pat (450 ha.) Waithou Pat (275 ha.) and Phumlen Pat (3500 ha.). The pre-dam natural water rhythm[2] of the Loktak ecosystem spreads over an area of 82.9 Sq. Km. during lean season and expands to 275.52 Sq. Km during the rainy season (Sarat, L., 1999). Existing at 768.5 m above sea level, the area comes under the sub-tropical monsoons, and the annual rainfall varies from 982.21 mm to 1980.8mm. The rainy season is mostly from April to September, with the maximum rainfall recorded in the month of July. The mean daily minimum and the maximum temperature recorded were 1 degree centigrade and 29 degree centigrade respectively (Singh, R.N.et.al.99). The Loktak Lake acts as the only natural reservoir of water from the different rivers and streams of the valley, and the hills of Manipur. Some of the main rivers that flow into the

[2] Water rhythm means the filling up of the lake during the monsoon and the natural process of emptying out during the lean season.

lake are the Nambul River, Yangoi River, Tagjoi Macha, Thongjarok, Ningthoukhong, and Khuga River.

Loktak Lake is the largest fresh-water lake in the northeastern region of the country and has been identified as a major wetland of India by the IUCN. An important feature of the lake is the aquatic vegetation[3]; 86 species recorded (Sharma, B M., P.14, 1999) that cover large portion of the lake. Bhatia et al. (1979) listed 172 macro species: 14 floating, 15 submerged, and 5 rooted-floating.

The areas in and around the lake include Moirang, Lammangdong (Bisnupur), and Mayang Imphal, and the islets of Thanga, Karang, Sendra, and Ithing. These areas include 65 villages and an almost contiguous stretch of Phumdi land of about 40 Sq. Km. forming the present Keibul Lamjao National Park. The park is considered the only natural floating National Park in the world, and also the only habitation of the endangered deer known locally as Sangai (Cervus eldi eldi).

The Loktak Lake, comprising both the water and the Phumdi land, has to be understood in terms of the common property resources[4] system. According to Chongtham Budhi Singh, the traditional inheritance of fishing rights was distributed through agnatic inheritance systems within a small community of traditional fisher-folk. Though the government, for obvious political gains, has de-reserved some areas for distributing it to

[3] Sharma, B. M (1999) categorized vegetation on the lake into non-phumdi (clear-water) species and phumdi (floating mats) species.

[4] The notion of common property refers to resources, which belong to the public and accessible to everyone who 'owns' and its use regulated by common laws and ethics.

the local people who are not traditional holders, much of the lake continue to be held, in practice, under the traditional system. At present, in practice, even a person from Imphal, can take up fishing activities on the lake or even 'buy' or build a Loktak-Khangpok. As seen from the discussion in the first chapter on the Manipur Land Revenue and Land Reforms Act of 1960, the Government already 'owns' these water bodies. This highlights the conflicting move of the government to take over the age-old practices of the community land ownership. The power that was once of the fishing folk is gradually snatched by the local and state elite resulting in a sense of alienation and powerlessness for the people who have been the guardians of the ecosystem. But interestingly enough, despite the water and the land taken over by the Government the traditional ownership is still recognized in practice by the people living in and around the lake. But the hard fact keeps impinging whenever the Government allots plots, reserves lands for distribution, or starts blaming the fisher folk for over fishing and the farmers for contaminating the water.

Understanding the lake and the effect of the Ithai barrage on the lake and the people also needs proper understanding of the larger eco-system that surrounds it. Other than the various streams, the lakes situated nearby are particularly filled by monsoon water from the Manipur River, which is connected by the Khordak channel[5] making Loktak a natural reservoir. The importance of the lake to the people of Manipur is such that without the lake the densely populated valley will be under water during monsoon and drought

[5] Khordak Channel is a 10 km. long watercourse that connects the lake and the Manipur River. It is difficult to establish whether the channel was dug by the early settlers as mentioned in the Moirang Chronicle or a natural course that links the Lake and the river.

during dry period. (De Roy, R. 1992). The Manipur River further downstream is blocked by Sugnu Hump, an 8 m. high rocky barriers at Sugnu, which reflects the water back to the lake. During lean season Khordak channel also act as an outlet from the Loktak Lake, maintaining a delicate balance of water. This is the time when one can identify the various pats that otherwise make the vast water of the Loktak. What the Barrage has done is that the passage of water to and/or from the Manipur river is 'permanently' blocked except when the Dam personnel desire otherwise. With this destruction of the system the associated fauna and flora undergoes changes.

2.3 THE BARRAGE AND THE LAKE:

Ithai Barrage was constructed in 1979 at the downstream of the Manipur River as a part of the National Loktak Multipurpose Hydro-electric Project, to maintain sufficient water volume in the Loktak Lake by making it an artificial reservoir for maintenance of the project. This river is connected to the lake by Khordak Channel and is the only inlet/outlet from the lake. It should be noted here that the reservoir comprises not only the Loktak Lake but also the lakes on the left bank of the Manipur River, the Khordak cut and the channel storage up to the barrage (NEC, 88.p.4.3). The lake water is transferred through a mountain range, west of Manipur valley to the narrow Leimatak River, which is at an elevation of 312 meters lower than the lake (NHPC, 94). The Barrage is 10.7 m high with 5x10 m waterways across the river Manipur. " The main aim of the project was to regulate the water of the Loktak Lake where the rocky hump rises in the river bed near Ithai village" (ibid). The report for the construction of the project was prepared in 1967 and the actual construction work commenced in 1971 under the control of Ministry of

Irrigation, as a central sector project. The project was handed over to the National Hydroelectric Power Corporation on 1st January 1977. The construction was taken up under the Ministry of Irrigation and Power in 1971. It was executed by the National Hydro-Electric Power Corporation and commissioned in 1983 at an estimated cost of Rs.115 Crore, with a capacity of 105MW of power by 3 units (each producing 35MW) and to provide Lift Irrigation Facilities for 24,000 hectares of land. (Singh, T.H., 1993) This dam has 'permanently' raised the level of the lake to 769.12 meters (measured at park area), and has blocked the natural flow of water to and/or from the lake, and has completely altered the hydrologic cycle of this delicately balanced system. Before the construction of the Ithai Barrage, the natural dredging process continuously cleared the silt that is brought down by the various streams and rivers from the valley and the hills. The roots of phumdi and other aquatic vegetation during lean season, i.e., when the water level of the lake reduces, touches the bottom of the lake for nutrients. During monsoon water level rises and with this the vegetation rises up bringing up the silt with them. Much of these silt gets washed by the current of the rivers which flows out through the Manipur River, included in this process is that some of the vegetation's or the phumdi flows out through the river itself, serving as a natural control device for extra vegetation on the lake. This is the natural decay and the regeneration of the lake. In the post-barrage scenario the water level is maintained, or at least sought to, at a particular level all throughout the year resulting into silting up the lake at an unprecedented rate. Other changes include gradual thinning of floating phumdi (vegetation), endangering original aquatic vegetation, extinction of fish species, destruction of fish migration and the increase spread of phumdi now covering almost half of the total area of the lake. Remote

Sensing studies conducted jointly by the Manipur Remote Sensing Application Center and the Space Application Center, Ahmedabad (1999) shows that the area under phumdi have increased from 10499 ha. In 1990 to 13506 ha. in 1994. It is pointed out by the Water and Power Consultancy Services Ltd. (WAPCOS), Delhi, a consultancy under the Loktak Development Authority (LDA)[6], that the fast silting of the lake is caused by jhum cultivation, extensive deforestation and 'unscientific' land use practices in the catchment areas. Presently deposition of approximately 336,325 tons of silt annually in the lake is reported and as in other reservoirs this is 'more than the siltation rate expected when the project was conceived' (NEC, 88). According to the Loktak Lift Irrigation Project (Revised) Vol.1, May 1980, it will take about 160 years to reach the dead storage level of the lake. But considering the high rate of siltation the life expectancy of the reservoir is feared to be much lower[7]. The other problems associated with siltation and weed infestation and proliferation of phumdi is the gradual reduction of the water holding capacity of the lake, which results in reduction of power generating capacity of the project. Other than these diagnosis, they have further pointed out that the water pollution of the lake is due to the 'inflow of Organo-chlorine pesticides and chemical fertilizers used in agricultural practices around the lake. Further, municipal waste brought by Nambul River, soil nutrients from the denuded catchment areas and domestic sewage from the city settlements contribute to the slow death of the lake. But recent study under the aegis of Government of Manipur (Table B) indicates that the lake is found to be

[6] LDA was established under the Ministry of Law, Irrigation, Flood Control, and Minor Irrigation to oversee the management of the lake.

[7] The Loktak Hydel Project Authorities had in 1968-69, anticipated a flood time water spread area of 455 sq. km., however it is feared to be barely 390 sq. km. and could well be only about 280 sq. km. (De Roy, R. 1992).

chemically 'unpolluted'. It is instead microbial pollution that has exceeded in Keibul Lamjao area, beyond the permissible limits of drinking water. This finding indicate major health implications for the people who directly depend on the lake for their daily need of water.

According to some estimates done on the degree of inundation it is reported that some 20,000 to 83,000 hectares of cultivable lands got submerged when the dam was put up. The Government's estimate of 20,000 hectares is considered an under statement, on the other hand the estimate done by S. Ibomcha of an area of 83,000 hectares seems to be slightly exaggerated. (Singh, N. L., 1993) However proper survey and estimation has not been conducted on the total inundated area, either by the Government or by other Stakeholders. This could be particularly because the Loktak Lake does not have a definite shoreline and its extent is primarily determined by rainfall pattern (N. Randhir Singh et. al. 1999). Nevertheless, it is possible to come to a reliable estimate through an understanding of the dynamics of the lake, land use system and the cropping pattern of the population that surrounds the lake. With the inundated lands, it is also the pisciculture ponds that went underneath the water. De Roy (1992) estimates that 30 % of them along the lake got submerged. She further adds, "some 12,000 local people are now no longer able to use shallow fishing techniques".

It is not just the inundation of agricultural lands and fishponds but also the loss of varieties of indigenous and migratory fish species and various aquatic vegetation that once were the major product of the Loktak. Among the varieties reported extinct from

the lake are *Labeo Dera, Labeo Angra, Labeo Bata and Cirrhina (locally known as Ngaton or Khabak), Osteobrama Belangui (locally known as Pengba or Tharak).*

2.4 The Loktak Khangpok People

Human habitation on the floating phumdi is claimed to have started many centuries back. The Gazetteer of Manipur of 1886 records that the lake is dotted with floating islands used by the inhabitants for fishing. In 1986 Singh, K.H. observed 207 Khangpok, and in 1993 the number of khangpok increased to 688 (DRDA, 1993). Present estimate by the Loktak Development Authority (1999) number around 800 Khangpok. It should be noted here that this phenomenal increase occurred during the post-dam scenario. At the time of this research the cost of one Khangpok is estimated by the residents at around Rs. 3000 to Rs.4000, depending on whether the flooring is of bamboo or of wood plank. In 1986 the cost was around Rs.350, which increased to Rs.1000 in 1993. The ownership of a hut, in this case, should not be understood in terms of the 'permanent' ownership of property. All hut moves from one place to another and the vegetation where it stands deteriorate with time. Any occupant may abandon their hut and 'buy' a new one, or may shift their hut to a different area of the lake.

Normally, each phum has one hut with only one room, which is used for all purposes of cooking, sleeping, eating, and as storehouse. Other than the door there is no other ventilation and this keeps the hut warm throughout the night. Architecturally the Khangpok is to give the minimum pressure to the vegetation below. Bamboo acts as the

main supporting framework while the walls are made of reeds grown on the floating vegetation, and the roofing is done by straw or kumbong mana (leaf of Zizania Latifolia). The flooring is usually by bamboo and/or wooden plank. Huts are usually of the dimension of 19.52-ft length, 12.76-ft breadth and 10.14-ft height in average (Singh, K. S. 97). To keep the huts in place and to resist strong winds two crossed bamboo poles fix them. Recently they have started using heavy stones to anchor it. In one survey (GENIM, 99) it is reported that the uses of stones to anchor the huts solidify the bed, which may further add to the deteriorating condition of the lake. It is pointed out that the main reason for extensive use of these stones is due to the water level, which is kept at a constant level, making it impracticable to use only the traditional bamboo poles (ibid). Like all Meitei traditional house almost all the huts face the east. The only inlet to the hut is a low single door, and windows are conspicuously absent. Cooking and drying of fish is done at a corner of the hut, and the rest of the space is used for sleeping, storing of the fishing equipment and the day's catch. All families, whether large or small, has to be accommodated in this small enclosed place. For those that possess land on the shore their children are usually kept there for their education. But for those without land, who are permanently based on the Khangpok, sending their children to school is constant risk[8]. Ownership of fishing grounds is based on the inheritance from their ancestors. Such grounds are collectively held by the male agnates of certain patrilineal kingroup, and prohibited to sell off these grounds (Singh Ch. B, 1978). It is believed that disposing of fishing grounds will invite the wrath of their ancestors. A non-member fisherman can

[8] Usually the kids take the boat by themselves to the shore where it is nearest to the school. There are reports of school ways blocked by the floating vegetations and sometimes overturning of boats resulting in deaths of children.

legally fish on such areas, only by getting the permission of the elders of the descent group. But not all parts of the lake are under the control of such patrilineal groups, and individuals in most parts of the lake can do their normal business.

It is reported that the disposal of fish is done through Unjas or local traders (Singh, K. S. 1997). The Unjas come to the huts in the morning with household requirements like firewood, rice, kerosene, sugar etc. for the residents; these are exchanged with the fish catch of the day. But during the field visits by this researcher the way of disposing of fish and the procuring of the household requirements are done by the family themselves. Usually the housewife takes the fish by a boat and anchors it in a place where it is nearest to the bus stop, from there the fish is taken to the local or the city market at Imphal. Loktak *was* the source for the indigenous species of fish for the valley population of Manipur. In 1992 it was estimated that almost 60% of the fish catch of Manipur came from Loktak lake alone, and more than 75% of the state's population consume fish, which is the main source of protein in Manipur. But of course the scenario has changed as the 'indigenous' varieties are almost totally wiped out by the humanly designed 'ecosystem' (Singh, K.S. 97; LDA, 99; De Roy, R. 1992). In turn the Government of Manipur has introduced major Indian and exotic Carps, Rou etc. With the loss of the indigenous varieties of fish species one also finds the degradation of the original varieties of aquatic vegetation, which in turn is substituted by alien varieties, much to the concern of the people who depend on these for their livelihood.

The economy of the Loktak-Khangpok people may be described as a nature-based economy, in so far as it draws their resources directly from nature. But at the same time one may not term it as a 'purely' nature-based one, as the inhabitants' only way of getting the other household items comes from the interaction with the local market and/or with the city. Sex based division of labour is quite pronounced. Typically men tend to confine themselves to do the 'harder' work with 'higher' productivity. During the afternoon and till the evening all the fishing gears are laid and early in the morning the gears are checked for fish. Women use lift-net, locally known as the nupi ill (ladies net), contributing in the production. It is usually the work of the housewives to look after the household needs and disposal of the day's catch. One may possibly say that in fishing, sex categories could contribute toward long-term resource conservation by moderating the total amount of harvest. It is also quite possible to say that such sex categories will maintain the gender power relation.

The Loktak-Khangpok people and those that live around have a history of maintaining their social relations and their production system resisting the forces that tried to change it. In the late 1950s the government introduced a co-operative fishing society at Thanga, one of the islands of the Loktak. A little before this the modern Panchayat system was also introduced. The Thanga Co-operative Fishing Society was registered in 1957-58 with 140 members. It is to be reminded here that majority of the fishing households living on the khangpok are mostly from the Islands that dots the lake. According to Ch. Buddhi Singh (1978) both the introduction of the Panchayati System and the Co-operative system did not find much participation from the fishing communities. He

found that most fishermen couldn't and do not like to pay the due share of cash installments to be realized to the Government as the auction price of the part of the lake the Co-operative Society uses on lease from the Government. During that time, i.e., 1967-68 a person can get loan from the local middlemen and women without interest. Depending on the Government invites a regular tax for using Government areas. Over and above this, it is observed that, following the rules of the Co-operative is tantamount to leaving the traditional co-operative fishing practices. The modern system of governance 'imposed' upon the people need not necessarily work for all peoples. For any intervention of any kind it is of importance to understand the perception of the local people on the foreign intrusion on their land, resources, and their form of governance. The Loktak Khangpok people, and others, who depend on the lake in general, are at present under threat from two main exogenous forces. *One* is from those who want to harness the waters of the lake for industrial development, and the *second* is from the dominant environmental movement. After converting the lake into an artificial reservoir, supposedly for converting Manipur from an agricultural state into an industrial one, a series of ecological changes occurred, and in the process marginalizing those who have always been the 'guardians' of the lake. With the water level kept at a constant level and with the proliferation of the aquatic vegetation the traditional tools and method of fishing has seen some modifications and innovations. For example, the fishing nets were small and made of simple cotton threads but they now have to use nets, which are larger and made of nylon. The pressure to use bigger nets may also arise from increase in population of the fishing families, and population of Manipur in general, which increased the demand for fish. Over this, the need to use better methods and tools is claimed by the

fisherman, as the quantum of fish catch in the post-dam period has reduced tremendously. In order to sustain their livelihood they have to exploit more than they used to. To add to this, many of the displaced families from the inundated agricultural lands had to take up fishing, many of them by permanently living on floating huts now. Recent survey shows a two-fold increase of Loktak-Khangpok, which is indicative of such a shift of profession.

The pressure from the environmentalist movement can be observed from the resistance by local population protesting against demarcating a large portion of the lake as the Keibul Lamjao National Park for the endangered Sangai. An undated leaflet of the Government of Manipur (A Note On Vandalism In Keibul Lamjao National Park) reports that about 600 villagers from Thanga Island attacked the wild life patrolling officers and burnt down the Khangadong-Khuningthek wild life check post when being treated as encroachers. Reeds with other vegetation found inside the demarcated zone are used for various purposes[9].

The resultant conflict with the communities living on and around the lake with those interested in 'conserving' the lake is yet to be manifested at a larger scale but one can see various groups involved in raising up the issue of the affected people. The ecological basis of such conflict can be seen in terms of the conflicting interest of the different groups asserting their rights on resources. As of now, one can point out that the people

[9] The present area under the Keibul Lamjao National Park was a source for various needs of those that depend on the Lake. Some of the produces of the present park area include aquatic foods, fuel needs, building materials, fishing materials, and animals for meat.

depending on the lake are interested in 'conserving' the ecosystem but for a reason very different from those trying to harness the water or those with only the agenda of maintaining the pristine natural beauty of the lake. Further discussion on the people's movement related to the Ithai Barrage is presented below. This is done with the recognition that such conflicts will highlight the kind of concerns and the effect the Barrage has created on to the people of Loktak and the different stakeholders.

Living perpetually or at least most of the year on water evolves waste disposal system very different from what is practiced on land. There is no space provided for toilet or for bath, and other waste from the kitchen. The lake acts both as a vast space for waste that comes from different sources and as well as the source of drinking water. Before the construction of the dam the natural movement of water took care of water quality. Even the waste brought down by rivers from the city were largely taken care by the same process. But with the dam, stagnant water, which accumulates the waste, both from the Loktak based people and of the city dwellers, become hazardous for consumption. Recent analysis of the water quality at four different spots revealed that at Keibul Lamjao area the microbial pollution has crossed the permissible limit of drinking water. More often than not, drinking water is directly obtained and consumed from the lake. At times if needed water is boiled for use by the sick. But because of the deteriorating condition of the lake water, residents are more cautious of consuming it directly.

Under normal circumstances Khangpok family consumes three meals a day comprising mostly rice. The main ingredients used are rice, potato, vegetables (mostly from the lake),

sugar, onion and salt. Vegetables vary with the season and availability in the market. Breakfast or the first meal, taken at dawn before sailing out for fishing, is usually the left over meal from the previous night. Rice constitute more than fifty percent of a normal meal. Before the dam, aquatic vegetation from the lake used to be one of the main ingredients of food items. For e.g., Heikrak and thangjing used to substitute rice and sometimes mid day meal comprise only of heikrak. With no sign of those familiar vegetation the diet pattern have changed to what is only available in the market.

2.5 PEOPLE'S MOVEMENTS:

In July 1985 elected MLAs of the fifteen affected constituencies in the 3 districts of Imphal, Bishnupur, and Thoubal formed the *'Loktak Flood Control Demand Committee (LFCDC)"* to protest against the inundation of the cultivable land. As a response to this development, and also with the initiative of LFCDC the Government of Manipur constituted the *'Loktak Development Authority (LDA)'* in 1986 (Singh, N. L., 1993). Efforts of de-silting and de-weeding by LDA did not satisfy the affected people. And on 5th December 1990 representatives of some of the voluntary organizations from the three districts submitted a memorandum to the then Governor of Manipur to look into the problems created by the inundation of paddy fields and to take corrective measures (ibid.). Response from the social scientists and activists and the local people was the formation of *' Action Committee- Loktak project affected areas, Manipur'* in 1991. The fishing community of Thanga village also formed an association called the *'Loktak Khangpok Fisherman Association"* in 1992 to protect the social, economic, and cultural life of the inhabitants at Thanga Island (ibid.). In the same year, in view of the increasing

deterioration of the socio-economic problems of the affected people, various organizations and academicians of the state constituted the *'All Manipur Ithai Barrage Peoples Organization' (AMIBPO).* The main aim stated was 'mobilizing the people to pressurize the Government for formulating means to mitigate the hardships of the affected people'. Recent developments include demand for compensation for inundated patta land by the Loktak Project Affected Peoples Organization. This was seventeen years after commissioning of the Barrage! The Gauhati High Court ordered for instituting an expert team to submit details of the affected people and their land. At the time of this fieldwork the assessment work was just instituted.

Following the discussion from the previous section, it is clear that the various voices against the project are not merely about the survival of the lake but the survival of their own lives. The Chipko Movement of 1973 in the Gharwal Himalayas is considered to be 'the forerunner of, and in some cases the direct inspiration for a series of popular movements in defense of community rights to natural resources'. According to Guha (1997) such an 'empty-belly' environmentalism of the south can perhaps ' be seen as the manifestation of a new kind of class conflict where traditional class conflicts were fought in the cultivated field or in the factory' and 'these new struggles are waged over gifts of nature such as forest and water, gifts that are coveted by all but increasingly monopolized by a few' (Guha, R & Martinez-Alier, J.'97).

The conservation of Loktak Lake system by different interested groups can be classified or understood in terms of the efforts of both the Anglo-American and the pot filled

environmentalism and the empty-belly environmentalism of the southern countries. Loktak Development Authority (LDA) locally represents the first group. Other organizations and individuals working primarily for the conservation of the lake, park or the fauna and flora also constitute this group. On the other hand the southern 'environmentalism' is represented by organizations like the All Manipur Ithai Barrage Affected Peoples Organization (AMIBAPO) and Loktak Fisherman Association; other than this there are other voices not heard but definitely present among those affected by the destruction of the ecosystem of the lake. The elite, the local counterparts of those in other countries, leads the first one, and they are the stronger voice with better media power, presently. The grassroots movements are much weaker both politically and economically and their voice tends to be marginalized and not heard.

Chapter 4

Loktak Khangpok People- A Case Study

"Well, come and search
About Loktak,
About the civilization of Loktak,
Of Loktak's endless,
About several romantic episodes.
Will be becoming another country
Another country, another land,
But where is Loktak? "

(Loktak Project)[1]

4.1 Identifying the Problem

A local from the fishing community of Thanga Island remarked, *"we prefer to use kerosene lamp than suffer like this"*. Another from Ningthoukhong added, *"please find a way to destroy the Ithai dam, Loktak Lairembi*[2] *is angry"*. These reactions highlight the disenchantment of the locals as a result of the promises of this dam not having been fulfilled, and also illustrates their fear and concern for the destruction of the ecosystem of the lake, on which their whole life system depends. The ecological crisis is not some doomsday scenario, but an everyday experience of those who depend on it directly. The first chapter introduces the subject and also dealt with the methodological issues pertaining the study. The second chapter laid down the framework through which the

[1] Quoted from a poem titled, 'Loktak Project' by Laishram Samarendra.
[2] 'Lairembi' means goddess. The lake is considered sacred, and it is believed that any irreverence brings the wrath of the Loktak goddess.

narrative of sufferings of Loktak-Khangpok people has been constructed. The third chapter described the life of the people, their economy, social system, and the physical changes that is taking place in the lake.

In this chapter, which can be described as the final 'analysis 'of this research, the experiences of Loktak-Khangpok people has been narrated within the framework laid down in the preceding chapters.

As observed in the second chapter, the dominant development model has been questioned, first, because of its impact on environment, and second, because of its effect on people and communities as a result of destruction to the environment. The issue of indigenous/tribal peoples has been especially brought into the framework because of the fact that they are most affected in any developmental activity, and also because the study population of this research comes under the category of indigenous peoples.[3] In addition to looking at indigenous/tribal peoples affected due to development projects, this research has also looked into the political economy of Manipur in relation to the Loktak Hydroelectric Project.

[3] For the purpose of this study, the term "indigenous" is defined as any group of people who inhabit a particular geographical area in a country, and differ from the dominant national community in terms of their social, economic, political and cultural institutions, and have close ties with their ecosystem. The concept of naming a people or group as indigenous/tribal is controversial. In India, no group has been recognized as an indigenous community. It is because of the fact that the Meitei tribe in Manipur has been demanding recognition as an indigenous people, that this term has been adopted here for this research.

What has been attempted here, is an observation at the effect of Ithai Barrage on a small population of fishers who live on floating huts on Loktak Lake. During the late 1970s, there were efforts on the part of the national government to examine the problem of 'underdevelopment' in the state of Manipur, which is supposedly considered as the root cause of insurgency[4] in the state. It was mainly during the 1950s, 60s and 70s that India was engaged in the enterprise of dam building for national development. Development was looked upon as a potion for solving insurgency, poverty, inequity, health and all kinds of problems of 'poor' (read underdeveloped) India.

Ecosystem people learn the basic art of living and extraction of resources from nature's bounty before they are introduced to the modern system of education. For them, learning is about identifying ways to use the natural resources, animals, birds or fish etc. It is about identifying plants as poisonous, consumable, or medicinal. It is about living with nature. In most cases, all extraction is 'replenished' and 'sustainable': at least, more sustainable than other forms of living and learning. From the case studies and other informal interviews it is found that, because of dwindling natural resources, various changes are taking place in the political economy of Loktak-Khangpok people. One of the most adverse changes, though not so apparent, that has occurred as a result of the barrage is that of shifting priority in the notions of learning. As a fishing community they have shifted the precedence from learning in the traditional sense i.e., the art of deriving

[4] It was mainly in the 70s that various underground groups in Manipur started revolting against the Indian Government for restoration of Manipur as an independent kingdom.

livelihood from the lake, to that of learning modern education. This need, juxtaposed with the necessity to increase manpower (sic) in fishing in the post dam period has created dilemma for parents, students, and the fishing community as a whole. Another frequently mentioned reason for dropping out of school is the poverty of the people. In most of the cases taken up for this study it is observed that students dropped out of their school as a result of poverty. Parents whose children are in school also expressed fear that they may not be in a position to support their children for school for long time. Keeping the above in mind, and with the kind of education available in rural Bishnupur district, the fishers do not see any hope of improving their lot. This is not true of everyone though; some leave[5] for the cities to work as manual laborers[6]. And as natural resources become exceedingly difficult to obtain one can expect more displacement of farmers and fishers from their original habitat.

The reality of steady migration of dispossessed rural people because of ecological degradation is a less explored area in ecological research. According to the UNDP, around 750 million of the world's poorest people live in rural areas. Of

[5] In the case of Loktak Project, the phenomenon of ecological refugees takes place in two ways. The first group are those, whose land have been inundated and had to take up fishing as the main profession or shift to nearby towns or cities. This occurred at the earlier stage of the dam. The second ones occurred at a latter stage when fishing activities cannot support families anymore. There are some reports on such migration-taking place to cities, but it is difficult to establish with this research how acute the problem is. Moreover it is expected that if no rehabilitation and resettlement measures are taken up in the near future more of such migration will occur. As long as the lake is more attractive than the cities, in terms of livelihood, the lake will continue to be under pressure from unrecognized displaced people.

[6] Displaced population of depesantized farmers and fishers come to urban areas as daily wage laborers. Women usually become vegetable vendors in Imphal market. On the other hand are those who benefited from the project, both in irrigation and electricity. Lokendra Singh (1993) explains that, this results into gradual social differentiation in rural Manipur.

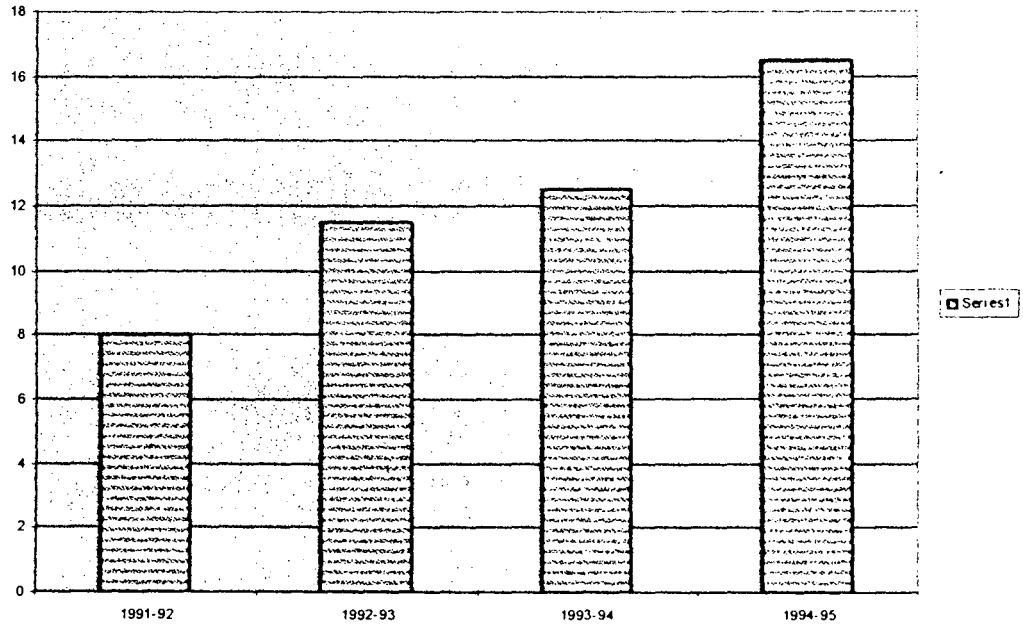
these, around 20 to 30 million moved to towns and cities each year. And an increasing proportion of these migrants are environmental refugees whose land is so eroded or exhausted that it can no longer support them (UNDP 1992: 58. quoted by Baviskar, A.1995).

This is in total absence of any recognition of displaced people (as a result of the barrage), and without any resettlement and rehabilitation package from the government[7] or the project authority. The scope of this research does not cover displacement problem, and requires a separate full-scale investigation. But, in order to speculate on the rising population of Khangpok dwellers on the lake, a rough estimate is presented here. In 1986 the number of floating huts was estimated to be around 207, in 1993 there were 688 huts- a three fold increase, and in1999 the number was put at more than 800 huts. In terms of number of individuals it was about 7000. This phenomenal increase of Khangpok population occurred together with the sharp increase in the number of fish farms[8] in the district of Bishnupur (Graph I). Further, there are no reliable available data on the number of families whose land have been inundated, yet an approximate figure can be arrived at by observing the increase in number of Khangpok population and the people now engaging in fish farms in the inundated areas. One can be sure that many of the new fishers and Khangpok dwellers at Loktak could be many of those displaced by the

[7] Areas that have been inundated include some pata land. During the fieldwork, this researcher encountered individuals whose land (with pata) got submerged but continue to receive orders from the government for clearing rent for their land.

[8] Agricultural lands that were inundated as a result of the dam gradually got converted into small fish farms by those who were cultivating rice in the area.

project. Field interaction too confirms this change in the occupation structure. *From a tiller of the soil to a fisher.* The consequences of this change can be many. *Firstly*, a sudden change in profession can create stress and strain, and may take years for an individual to get acclimatized to the relatively new surrounding. Associated with this are the mental and emotional sufferings they have to endure. *Secondly*, the increasing population of Loktak-Khangpok families may create further demand on the already depleted resources (as a result of the barrage). This does not imply 'blaming the victim' logic, but rather the fact that both depletion of resources and increase in Khangpok population results as a fall out of the project itself.



Graph I. Graph showing increase in the number of fish farms in Bishnupur District, 1995. Government of Manipur. Number of fish farms in Bishnupur District (in 2000 Nos.). From the District Statistical Handbook

There are other reasons that can further deepen displacement of Loktak-Khangpok People. It is already pointed out before that the number of Khangpok on the lake increased more than four times the number of huts before the dam. It is also known from both experiences[9] of fishers and also from previous research, that fish population on the lake decreased tremendously, and also that traditional aquatic vegetation which were once main items of vegetable food and a source of income has largely vanished from the lake. The result is that fishers have to market all the fish they catch in order to buy essential household items, leaving little or nothing for household consumption. Increasing population, dwindling resource base and an increased marketing of fish effect severe consequences on the lake and the people. The first is emigration of more people to towns and cities looking for better options. As long as living on the lake is better than emigrating to cities or towns one will continue to demand more from the lake resources. The lake is not 'free access[10]' for everyone but are 'commons' and is governed by community laws and ethics. But, there are already signs of degeneration of commons and turning into free access, which are partly as a result of government laws[11] on common property and partly as a result of the project. There are various symptoms visible in the present practices of the local people that can be interpreted as erosion of traditional water

[9] It has not been established here how much reduction of fish Ithai Barrage causes. The increase in population may also have contributed to lesser fish catch, as more people are engaged in fishing -from the already depleted lake.

[10] In free access there is no control over resources by any group or individuals. In the case of commons resources are in the hands of the community, and usually unwritten community laws and ethics regulate its use.

[11] A critique of both Land Acquisition Act 1894 and The Manipur Land Revenue and Land Reform Act of 1960 is given in Chapter 2.

use system[12]. One prominent shift is the individual effort to catch and market fish as much as possible. Traditionally, it was an accepted norm that fishers do not catch fingerlings, but, as explained by some of the fishers, nobody cares about other people or about the lake now. Anything and everything that can be consumed or saleable are extracted from the lake using any means. Included in the above change include increased use of better fishing tools like nylon nets which can haul more fish than the older version of cotton nets. With the number of fisher population increasing, particularly as a result of the Barrage, there is an unacknowledged degeneration of the lake ecosystem and social and economic organization of the fishing community. In any commons, when community laws break down, resource use can become unsustainable and destructive. It is not intended here to paint a picture of total breakdown of community life among the fishers. There are still unwritten and commonly accepted laws in managing the lake. Helping each other, which is a must in such a terrain, for laying large nets or for repair of khangpok is still seen everywhere on the lake. The fact of forming a Fisherman Association at Karang can be interpreted as a response to this degeneration, and also an effort to defend themselves from further onslaught by the government or other vested interest.

[12] N. S. Jodha (1994), adds that Common Property Resources(CPR) gets infringed or substituted by private property as resource scarcity increases; the resultant overcrowding and the degeneration of CPR have led to considerable reduction in the overall quality of CPR benefits for the *indigenous people* (my emphasis).

Floating vegetation on the lake is of immense importance to Loktak-Khangpok people. Not only that their huts are built on *phumdi*, but also some of the vegetation are main food items. These floating vegetation or phumdi are also breeding ground for fish. As mentioned before in the third chapter, the eutrophication on the lake has increased to the extent of covering half of the surface area of the lake. And this increase of aquatic vegetation has created tremendous problem for both the lake and the people. It is not that there was no problem of phumdi before the barrage, but the accumulation of phumdi during the monsoon season gets carried down when the water from the lake is drained out by Manipur river through the Khordak Channel. The proliferation of aquatic vegetation has other causes too. The river that runs through burgeoning towns and cities brings in nutrients, which are accumulated on the lake adding to the eutrophication process. A study jointly conducted by the Manipur Remote Sensing Applications Center, Imphal and Space Application Center, Ahmedabad, indicate that the area under phumdi and other aquatic vegetation increased from 10499 ha. in 1990 to 13506 ha. in 1994. Consequently water mass reduced from 15441 ha. in 1990 to 7875 ha. in 1995[13]. Other aftereffects of the dam include deterioration of water quality and decrease of fish production[14]. Implication of this destruction of natural pattern on the lake ecosystem, local people and

[13] According to the SOI map 1970 water mass of pre-dam period was 4882 ha. Since we do not know in which season this area was measured, it is difficult to ascertain the area when the water level of the lake is the highest.

[14] Increase in Phumdi and other aquatic vegetation increases depletion of dissolved oxygen, decreases phytoplankton production and release methane consequent to the anaerobic decay of weeds (De Roy, Rashmi, 1992).

on the hydroelectric project has been reported by various local concern groups. Residents of floating huts report blocking of navigation path by these vegetation, sometimes getting stranded for hours at one area unable to reach their huts. For students, once phumdi blocks their way to school they have to return to their huts unable to reach the school. Sometimes they have to wait for long hours trying to return back home from school. One of the fears of Khangpok residents is waking up in the morning to find their hut surrounded by long stretch of Phumdi. Clearing up could take up much of the morning time, which otherwise could be utilized for productive work. There are other associated problems caused by increased phumdi that are not directly perceptible. More areas covered by phumdi means less breathing water area for fish, depletion of dissolved oxygen, suppression of phytoplankton and the release of methane consequent to the anaerobic decay of weeds resulting into slower growth and decreased fish in the lake, which indirectly affects the fishers. It may be pointed out that eutrophication started already before the construction of the Barrage, but with the damming of the lake eutrophication rate must have increased at a much higher level[15]. Nevertheless, one cannot lay all the blame onto the damming of the lake. The amount of effluents and waste from the city and agricultural residuals[16] that flow into the lake adds to the eutrophication process.

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[15] Rashmi De Roy also reports that water hyacinth control was adopted in 1987-88 by introducing weevils. Neochetina Eichhorniae and N.Bruchi. The result was uncontrolled spread of weevils needing it to be controlled rather than controlling water hyacinth.

[16] Fertilizer consumption in Manipur stands at 94 Kg/hec. as against the national average of 70 Kg/hec.

The economic consequence of destruction of the lake ecosystem is already visible in the state, particularly among the local people. The fish output has reduced tremendously; the local requirement cannot be met anymore. It is true that import of fish was essential even before the dam, but the post-dam scenario has accentuated external requirement of fish. In the case of rice, areas around the lake were once known for its quality and quantity. But with the submergence of some 50,000 to 80,000 ha. as a result of converting the lake into an artificial reservoir, the major rice producing areas of the state have been submerged completely. As a consequence the people are more dependent on inferior quality of rice brought from outside the state. More often than not, residents on the mainland talked of how rice from submerged areas were enough to feed the whole of Manipur. They even claim that Manipur was once prosperous and a good place to live in, but with the dam every thing has changed. "We have become dependent on others" retorts a resident. For the people who have been relying on these professions directly the implication is much more acute, and may not be shared by city and town dwellers farther away. The gravity of the problem is such that in a community of fishing families, where fish is the main source of animal protein, children were found to be suffering from protein malnutrition. According to a research done by Yaima (1989) it was found that children below the age of 12 years were suffering from moderate to severe malnutrition.

The income of each family before the dam and at present as reported by them is given in 6^{th} and 7^{th} columns of Appendix III. It is difficult to establish an income differential by taking into account the inflation over time i.e., of pre 1979 and the present, as these are

reports of perceived income in the past by individuals/families. Nevertheless, the average of all the income of pre 1979 compared to the average of the present income status reveals that the earning capacity of the Loktak-Khagpok people has reduced to a considerable extent. The average earning in a day of a family before the construction of the dam is estimated to be Rs. 903 while the present average income of the families comes out to Rs. 355 a day. This marked difference in earning capacity is reflected by various indicators such as reduction in food intake (discussed below) and school dropout. These incomes do not represent the earning of these families for all the days of the year but of the lean season only, which is during the month of December to March/April. The rest of the months, and particularly during the monsoon, the catch is relatively reduced compared to the lean season. The income during these seasons is difficult to estimate, as the respondents did not specify the catch. Another aspect of these pre 1979 income is that it comprises not only the income from selling fish but also from edible aquatic vegetation grown on the lake. In the post-dam scenario, income from the second is absent as the vegetation on the lake has been taken over by alien vegetation, introduced as a result of the altered ecosystem.

The knowledge of the Loktak-Khangpok people about the lake is vast. They have an intricate knowledge of the fish life cycle, how different species from the river migrate to the lake, what kind of food they consume, and in what season they grow up to the right sizes for catch. They can also identify the presence of fish just by observing the color of water. The dwellers can predict the wind direction, which helps in their navigation. It is a

must for them that they do not venture against wind, particularly when it is strong, for it is possible that their canoe may get overturned. They believe that the lake is ruled by Loktak Lairembi and every morning before they venture out for the vast water they worship her and ask for protection and good luck for the day. Any disregard, they believe, can bring disaster for the family. They have also identified each of the vegetation Loktak supports, and the names of birds that feed on the lake. Any changes or any new external introduction, whether vegetation or waterfowl is easily identified. After the barrage was constructed the face of the lake has transformed so much that many of the fishers reckon it as an alien, a lake not the one they once knew. The familiar fauna and flora has now been slowly taken over by new varieties either introduced or evolved as a result of the new ecosystem. Some of the vegetation has completely vanished from the lake. Experiences from dams in India and around the world prove that it creates a crisis situation, not only of the flora and fauna but also for man, in the given ecological setting. The change that happened to the ecosystem directly affects the economic, social, political and the mental stability of the community. One may conceive it as a 'whole' working together, and when a part of the system is disturbed the whole tends to get disarranged.

4.2 Health Implications

Though a complete assessment of health implications for Loktak-Khangpok people need a more thorough investigation, perceived ill health requires attention, as they are real

experiences of the residents. For this study the health complaints of Khangpok residents have been corroborated with available data. Like many of the rural villages in India the difficulty to obtain data proves a major hindrance to go to a definite conclusion. The observation here is intended to highlight some of the major health problems facing the study population. The picture constructed here is based mainly on the case studies and other interactions on the field.

Table A. Physico-chemical and microbiological characteristics of the Loktak Lake. April 1999. Adapted from the Strategic Options Study, Government of Manipur, 1999

SL. No.	Characteristics	Sites of Sampling			
		Huibidak	Takmu	Loktak proper	Keibul lamjao
A. Physico-Chemical Characteristics					
1.	Ph.	6.3	6.3	7.6	6.5
2.	Dissolved oxygen	7.04	6.02	6.28	6.57
3.	Acidity	10	10	7.5	10
4.	Alkalinity	85	45	15	45
5.	Biological Oxygen Demand	5.67	4.49	5.26	5.21
6.	Chemical Oxygen Demand	13.02	12.64	13.04	13.64
7.	Lead	Nil	Nil	Nil	Nil
8.	Nitrate	4.56	1.38	0.92	4.44
9.	Phosphate	0.009	0.001	0.001	0.003
10.	Sulfate	0.125	0.06	0.09	0.12
B. Microbiological Characteristics					
1.	Coliform Bacteria/100 ml Sample	2	4	4	70
2.	Faecal Coliform/100 ml Sample	2	2	4	56

Table B. Incidence of principal diseases treated in Bisnupur district, Manipur. District Statistical Handbook of Bishnupur District, Manipur, 1995. Government Of Manipur.

SL. No.	Diseases	1985	1993-94	1994-95
1.	Enteric Fever	743 (typhoid fever)	826	321
2.	Gastroenteritis, Infectious Colitis	3501	6606	4520
3.	Infected hepatitis	Not available	149	143
4.	Measles	936	48	73

As described in the second chapter, the huts do not have any ventilation, and smoke tends to suffocate the only room in the hut. A rational reason given by the residents is that this helps in keeping the hut warm during winter, but it is possible that respiratory problems like measles, common cold, diphtheria etc could be related to this housing practice. Nevertheless, one cannot reach an immediate conclusion, as it is difficult to establish a relation between them. In case of their use of lake-water, both for drinking and waste disposal, health consequences can be myriad, particularly in the post dam scenario where the water is stalled. The post-barrage water quality measured in 1999 is shown in Table A. It shows that chemically, at least in the sample sites, the lake is in its unpolluted state. But microbial analysis reveals pollution by *coliform bacteria* and *faecal coliform* in all sample sites, particularly at Keibul Lamjao area where it has exceeded beyond the permissible limits of drinking water (Strategic Option Study, 1999). There are no available pre-barrage data on the quality of water making it difficult to arrive at a definite

conclusion on the deterioration of water quality and the diseases associated with it. However, faecal pollution of water can cause various diseases among the residents. Complaints by residents on getting sick after drinking water or skin rashes by mere touching of the water in some parts of the lake confirm pollution of the lake. Residents fear that their only source of water is getting contaminated and they will not have anything to drink soon. For example, Tomba commenting on the deteriorating water quality said, " I do not see any hope for our children on the lake, it is dying". Another concern raised by the residents is that of the waste materials like used bottles, polythene bags etc brought in by rivers form the cities and towns. Their anger is captured by what Jadumani said, "It is the Imphal people who use all the power and it is also they who dirty the lake through their bottles and plastic bags". For a community where life is centered on water, the degeneration of quality and quantity of water could mean an end point. Available data (Table B) on the incidence rate of the major diseases (Enteric fever, Gastroenteritis, Infected hepatitis, and measles) in the district of Bishnupur also shows increase in the number of water related diseases. Although these data do not indicate separately for the Loktak-Khangpok people one may take it as representative of their major health problems as they attend government health centers in Bishnupur District. According to a research conducted by Singh, N. Y. (1994) on the health status of Thanga island, 90% of the study sample was found to be suffering from some degree of malnutrition, 64% of which were mildly malnourished[17]. Taking into account the

[17] The study was conducted in 1989, 10 years after the dam was constructed. Health profile of Bishnupur district before the dam is not available.

deteriorating water quality and increase in water related diseases in the area; and if we are to believe the experiences of the Loktak-Khangpok Residents one may conclude that increasing health problems among Loktak-Khangpok residents is a direct consequence of damming the lake.

With the reduction of fish population in Loktak, it is known from the residents that they have to spend more time and resources to eke out their living. The health consequences of this is that, because of spending more human resources on fishing they have less and less time to attend to health needs (including those of social need). The major complaints from women are muscle pull on their thighs and back pain. Women use a kind of fishing net in which the thigh muscle acts as fulcrum for the whole net. They explained that as result of reduction of fish the frequency of using the net has increased to a considerable amount. As a result, they have frequent muscle pull and lower back pain. Out of the fifteen families taken up for case studies at least ten of the female heads of the families complained of both muscle pull and low back pain. For men, the problem is more restricted to back pain and has similar causal factor i.e., more time spent on fishing. Spending more time in fishing also has other consequences. Parents have little time to attend to their children and to other community life. In fact, everyone is more engrossed trying to earn enough to maintain their livelihood so that they do have less spare time to visit their relatives frequently or even attend social functions on the mainland. The resultant effect is that children are neglected and not taken care of by their parents. What can be observed from the case studies is that community support is still strong. Children

stay with their relatives on the mainland and are taken care of, which at least mitigates some of the hardships caused by long hours of work on the lake.

Sl.	Services	1993-94	1994-95
1	Hospital	3	3
2	PHC	5	5
3	PHSC	32	32
4	Beds	98	98
5	Nurse/ANM	62	62
6	Dais	30	30

Table C. Health services available in Bishnupur district. District Statistical Handbook of Bishnupur District, Manipur, 1995. Government of Manipur.

Health services at Bishnupur are also of major concern as it lacks capability to cater to the population. For instance for a population of 1,80,773 (1991 Census) there were 5 PHC and 32 PHSC in 1993 –1995 (Table C). What is important here is the perception and experiences of the people on the health services available. The Sub-Centers and Primary Health Centers near the lake were in such tattered condition that some of them do not have walls. For instance, just one doctor (without any attendant) who comes only on Thursdays mans the SPHC at Karang Island. The residents explained that the doctor runs a private clinic during the other days of the week. Residents do visit the district hospital in case the local Maiba cannot handle it, but the experiences at the district hospital too are disheartening. Commenting on such an experience Salam Ongbi Yaima said, "Going to the hospital is a major task, humiliating and we have to leave our floating hut for more than a week leaving

us penniless for days together". Considering the cost of going to hospital, ill treatment at the hospital, non-availability of doctors and medicine etc., it is rational enough when Khangpok dwellers keep away from the health centers or the hospital. Home treatment and service from traditional healers seem to play a greater role for the health problems. But new disease pattern, arising out of impounding the lake water, may not be part of the repertoire of disease knowledge and treatment evolved by the traditional health practitioners. This may requires external input and better facilities.

Living on a terrain of water also entails certain risk factor like death due to drowning. In as many as seven families of the families interviewed for this study, there are reports of child deaths due to drowning. Drowning in the lake can take place mainly in two ways. One is capsizing of canoe due to strong wind or due to negligence. Another is, when people step onto thin phum unknowingly and go inside without being able to come out of it and eventually die. This happens, particularly to children, when phum where people live gets thinner as a result of living on it or other natural factors. Residents complained that, as a result of destruction of natural cycle of phum, the thickness of vegetation recedes at a fast pace, making it difficult for residents to repair it often[18]. At times when children step onto such portion of the phum, they usually die inside. Out of the 15 families taken up for this study 3 families have a history of child death due to such

[18] When phumdi where huts stand get thinned, to repair them one puts new patches of phumdi underneath the existing ones. It takes six or seven fishers to accomplish this task. Whenever a fisher needs to repair his phumdi where his hut stands, he will request some fishers to help. In return he is expected to render help to others who ask for help.

accidents. It is possible that because of unexpected deaths that can happen in a family, parents may decide to have more children. This research has not established how many deaths occurred as a result the above reason, nor has it attempted to establish any correlation between increased population and child deaths due to drowning.

Malnutrition, overexertion, deterioration of water quality, water-borne diseases, unavailability of medicine, bad government health services and most importantly the acute reduction of earning capacity are the immediate cause of health problems among the residents. Other than these there are other indicators of psychological stress associated with increased insecurity of future and present impoverishment. The fear expressed by our respondents in the various case studies, added by their helplessness and immobility, can have serious consequences in terms of the mental health of the community. Increased alcoholism among residents and at the islands and high dropout rates from schools point to some of the psychosocial impact of the conditions created by the dam. Follow up research should include measure of psychological stress that may be associated with the changes on the lake. It should include personality disorders, violence, identity change as a result of social and cultural disruptions of the community etc.

4.3 Class Differentiation

While it is true that tribal/indigenous peoples are the worst affected from developmental projects, this matter also demands a closer look at both the internal and external material basis of these communities. It is an idealization of traditional societies, which mellows

the internal conflicts within these societies and denies any serious analysis of its internal dynamics, which fundamentally shapes community responses. Agriculture and irrigation have always been an area of contention between internal groups. "It was control over land and water and the subsequent division of labor that led to innumerable conflicts in the formation of state in India" (Singh, S. 1997). In our present study, the conflict is seen as a struggle for water rights and the notions of its use, between landowners, higher-class people who mostly dwell in the city and those who live in and around the Loktak Lake. The benefits of power and irrigation[19] from the project go to the privileged sections of Manipur society. Those who are marginalised are those who have been the 'guardians' of the lake and it's resources.

Category	1976-77	1980-81	1985-86	1990-91
Marginal	24.02	21.00	21.05	21.61
Small	38.56	38.28	38. 13	38.37
Semi Medium	30.84	31.52	31.37	31.37
Medium	6.28	8.88	8.94	8.30
Large	0.30	0.22	0.50	0.30

Table D. Size distribution of Agricultural area operated (percentages). From the agricultural censuses, Government of Manipur

[19] The paradox of producing irrigation and energy together from a multi-purpose project has been highlighted in various studies (Singh, S. 1998; Baviskar, A. 1995). In similar mode of ignorance, the NHPC planned to include irrigation as one of the benefits of the project, which definitely must have attracted large landowners in Manipur. The fact remains that, till date irrigation facilities from Loktak remains incomplete. When the project authorities are worried all throughout the year for enough water on the lake, water for irrigation cannot be an addition to production of power. According to an unofficial source, the irrigation part of the project is really not functioning. In fact, some of the canals for carrying the water have not been dug.

A closer look at the internal dynamics of the agrarian Meitei society is a must here. Government data from 1976-77 to 1990-91 on agricultural land holding shows a gradual alienation of the marginal farmers and an increase consolidation of land by the semi-medium and medium farmers or landowners (Table D). A closer look at the table reveals that major differentiation in land holding pattern occurred between 1976-77 and 1980-81. The above-mentioned data about land holding pattern given by the government could lead us to an interesting conclusion. As the data shows, the period preceding the dam i.e., 1976-71 and period following the dam i.e.1980-81 shows that the area operated by marginal farmers decline from 24.02% to 21.61% which translates into a loss of 2.41%. Considering the impact of the dam it would not be difficult and far-fetched to observe the trend of marginalization aggravating in the post dam era. As this study does not cover the effect on people whose agricultural land were inundated the process of marginalization can be explored separately. But what is related to our present study, and as mentioned in the beginning of this chapter, is the number of primarily agricultural farmers who have adopted fishing either by still living on the mainland or shifting to khangpok. The consequences are more population on the lake and further demand on the already depleted resources of the lake. According to the residents of Thanga and Karang, which is now composed of population of mainly fishing families. Permanent inundation of agricultural lands has resulted in reduction of their earning capacity and their main source of food i.e. rice. As a result, many of the agricultural farmers now have taken up fishing as the main activity. Taking up fishing as the main source of income entails making or buying a floating hut, as the profession requires spending more time on the lake. If the

number of people who were depending on agriculture, whether as full time or as income supplement shift to fishing the resultant consequences of population pressure on the lake's resources would be heavy. This requires a more thorough research for better understanding of the overall impact of inundation of lands and also the impact on the lake's ecosystem. Assessment of infringement by privatization of land, both de jure and de facto and its resultant effect on the lake also need to be part of the research.

Conservation enthusiasts too cannot be seen apart from the present crisis created by the dam. If the dam is a symbol of victory over land and water by the powerful, then conservation strategies are also a product of the same group for similar end results. The people who are already torn apart by the dam are asked to move further away from the land and water they 'own'. At present, 40 Sq.km. phum land of the lake is demarcated as Keibul Lamjao National Park in order to protect an endangered deer Cervus eldi eldi, locally known as Sangai. The problem associated with this strategy is that, the area demarcated has always been a source of various items required for the livelihood of Loktak people. It is no more possible for locals to venture into the demarcated zone anymore as the authorities consider them a threat to the animal and their habitat. Residents feel insulted because they have been termed as encroachers or poachers at the place where they belong and on which they depend. One old man from Thanga compared this to snatching away the foundation from one's life. The resources they have been 'extracting' from Keibul Lamjao area also is cut off now after the ongoing destruction of Loktak Lake. It does not end here. Now the lake is identified by International Union for

Conservation of Natural Resources as a Ramsar site; as a wetland system fit to be conserved. The Government of India, which is among the contracting parties hasn't yet put any effort for conservation. It can be expected that further marginalization of this indigenous group will take place as a result of it. The point here raises an important question on the power of the government to displace people at its will.

4.4 Women's position- A Contextual Look

Issues of gender assumes significance as, in any developmental activities women tend to suffer more because of their nurturing role. The importance of a son in the context of this fishing community is explained by the fact that the parents need someone to take care of them when they are not capable of fishing. All females when they are married go to their husband's place. A son is considered the only security left for the parents when they grow old. This also partly explains why a son is given preference in terms of being sent to the school. As in all patriarchal society, this phenomenon of giving priority to sons is not a new one that happened after the dam. Considering the post-dam condition that has befallen on the Loktak-Khangpok people, it is possible that women and the girl child can further be marginalised. As seen from the case studies, we find that the women's regulated role of taking care of the household, fishing and marketing has heightened as a result of decreasing resource base of the common property. This means that, the role of women has increased in the post-dam scenario. The burden of managing the household and yet at the same time increased need to be on the lake for fishing, and market the fish is a much greater task than men whose role revolves more around fishing. Another

implication for women relates to their productive capacity. The traditional fishing equipment used by women has not seen much change despite the fact that the gears used by men has changed in order to adjust to the new environment. The result is that women cannot contribute much to catching fish as compared to their pre-dam contribution. With their 'unsuited' technology they use more of time and energy on the lake, while taking care of the household at the same time. The visible consequence is that, out of the fourteen women in the case studies ten of them were suffering from either back pain or from muscle pull or both.

If modern education is a criterion for measuring the gender difference, then definitely women are at a disadvantage as the literacy rate of women at Bishnupur is only 37 percent while that of men is 62 percent. It is pertinent to ask here, when the importance of having modern education is emphasized by the residents as a result of dwindling resource base on the lake, whether emphasis is given only to the male child or equal treatment is given to the girl child. The study conducted by Singh, N. Y. (1994) on the health status of Thanga island children reveals that, unlike in other parts of India where girls have nutritional disadvantage, girls child among the residents of Thanga Island were more better in mineral, vitamin, and some anthropometric indices than the boys. Yaima explained that this is because, in Manipur once the girl is born into a family they are given equal treatment in terms of food, and health care. It will be required in future research to keenly study the changes that has taken place with reference to women.

4.5 Rehabilitation and Resettlement

A study on the effects of the dam will not be completed without a discussion on resettlement and rehabilitation (R&R). If 'dams are temples' some were definitely laid at the altar as sacrificial lamb. In the case of Loktak Multi-Purpose Project, because the government does not recognize affected people, one cannot talk of any known R&R. However, there are reports of the government handing out rice to some of those who are affected by the dam in order to appease the locals. It's a pity that, fields or lake that serve generations of people can be exchanged for some kilograms of rice. The residents did accept the rice because they are powerless. As the lake gradually deteriorated the effect became alarming, even to many who supported the dam before. Various organizations and groups have been formed in order to look into the problem. The government fearing people's anger, was also not far behind; a semi-government group named Loktak Development Authority (LDA) was initiated 'to solve the problems of the affected people' (Singh, N. L. 1993). LDA's main task, despite its recognition of some of the ill effects of Ithai dam, is to conserve the lake by engineering[20] means. They never gave emphasis on how the dam converted a wetland into an artificial reservoir and inundated large amount of agricultural land, nor took into account the people who have been devastated as a result of the dam. Contrary to the perspective of LDA, Loktak based organization 'The Loktak Khangpok Fishermen Association' has the main agenda of

[20] A Newsletter of LDA published in October, 1999 mentions that the main activities carried out by LDA include removal of silt, removal of phumdi, control of water hyacinth by releasing weevils, construction of silt detention structures, afforestation of catchment area, and soil conservation through engineering means.

'protecting social, economic, and cultural life of the inhabitants of Thanga'. Another organization 'Action Committee-Loktak Khangpok Fishermen Association' called for compensation for the affected farmers. Rehabilitation and resettlement requires listening to people who are affected, in every sense of the term.

Following the above discussion on people's movement, an effort is made here to theorize on the kinds of 'environmentalism' in Manipur. The dominant environmental group has their local counterpart, like that of businessman, academician, and the politician. What is interesting about them is that they think and act alike. Since we have talked much about this group in previous chapters, our focus will be on the Loktak-Khangpok people and their protest against being marginalized. The residents often talked about the 'dying lake' and how it affects their life. To them Loktak is not only an indispensable part of life, but also a sacred being (Loktak Lairembi) worthy of worshiping. Without being romantic about such indigenous societies one may say that their use of lake's resources is highly sustainable compared to other forms of use. An indicator of sustainable use is that fishers in the past did not catch fingerling form the lake in order to wait for the fish to grow. It is only now in the post-dam period that they are forced to catch whatever is possible. But, will this qualify as being environmentally conscious? Environmentalism or the consciousness of it grew out from a particular milieu of socio-economic and technological development. In the case of Loktak people in general the milieu is very different from the kind of environmentalism that grew out from the west. When new technology is introduced into such societies, which destroys the ecology, one can expect

social upheavals. One may recall that Loktak-Khangpok Fishermen Association's main concern was to restore their social, economic and cultural life rather than the lake directly. To them the survival of the lake is similar to their survival. And it is not surprising when Mangolei remarked that the dam has to be destroyed. Nor is it surprising when underground groups tried to bomb the dam. The contrast between the form of environmentalism they understand and the one *preached* by the dominant environmentalism could be seen when men and women mainly from Thanga attacked wild life patrolling party and destroyed the wild life check post in 1979. This happened when residents were asked to move out of the park area while they were collecting reeds. It was a fight between pot-filled environmentalism, represented by the state and the educated upper-class people, and the empty-belly environmentalism of Loktak people. 'A third kind of class conflict, so to speak, but one with deep ecological implications' (Guha, R. and Martinez-Alier, J. 1998). The dominant environmentalism supported by global hegemonic interests of the west and locally represented by the state and local elite takes the center stage, while the voice of the poor and marginalised are continually subjugated. What remains to be seen is a more concerted effort on the part of the affected people and concerned individuals and interest groups to collectively fight the devastation of a wetland ecosystem.

4.6 Concluding Remarks

Some final observations that can be offered or arrived at through the discussions carried out in above chapters are listed below[1]:

Firstly, as a result of damming the lake by Ithai-Barrage the migration of fish from the Manipur river has completely stopped. This has resulted in massive reduction in fish population in the lake, as they do not get replenished any more. This study shows that the income of the fishing population has been reduced to more than half from the pre-dam income, leading to pauperization of the Loktak-Khangpok people.

The conversion of this wetland into a reservoir for Hydroelectric cum Irrigation Project also has led to the extinction of various indigenous aquatic plant varieties from the lake. Many of these varieties were edible ones which the residents used as food, or marketed it to supplement their income. This also compounds the reduction in income. The primary effect of this is that much of their vegetables and other foodstuff has now to be bought from the mainland or the market.

Lack of outflow of phumdi from the lake, with the increase in nutrients that adds to the proliferation of phumdi on the lake also has added of the woes of the floating dwellers. Navigation on the lake, both for fishing and other social activities, has been hindered.

[1] Also see Appendix III for a summary of perceptual changes of the Loktak Khangpok people.

Loss of time in clearing them, students unable to reach schools or go back home are some of the problems associated with the congestion of the lake as a direct effect of the Ithai Barrage on the natural balance of flora or vegetation.

Another major change that has taken place on the lake is the massive increase in population. The number of floating huts has risen more than three times than that of the number in the early phase of the dam. Majority of these huts could very well be those displaced from the inundated agricultural lands. This change in profession or occupational structure, i.e., from agriculture to fishery, is psychologically a stressful rapture. What concerns us here in this study is the massive rise in population, which puts further pressure on the already depleted lake. The 'original' resident has to share the meager resources with the new ones. It is significant to note here that changes have occurred in the production tools used i.e., fishing gears, and the production process. Traditionally, fishing tools were smaller and made of cotton. In order to cope with the market and increased resource struggle in the new environment, these gears have been changed and are now aimed to extract the maximum, and often exploitatively, from the lake. The long-term consequence of the so-called scientific, modern, and 'better' means of extraction from nature implies shorter life span and un-sustainability of the natural resource.

Ecological refugees are not just restricted to the lake. Though this research did not measure the acuteness of this problem it is reported that many have migrated to towns

and cities as laborers. A more thorough study on this issue has to be incorporated in future research.

On the aspect of health, it has been observed that because of stagnation of lake, the water borne diseases have invariably increased. Lack of data makes it difficult to ascertain the trend in the rise of water related diseases in statistical terms, but experience of the residents have shown an increase in the cases gastroenteritis, enteric fever, skin diseases, diarrhea etc. Other health problems include general body ache and muscle pull, which are explained as caused by long hours on the lake.

Psychological implications associated with these are reflected in the words of many of the residents who talked of the uncertain future that lies ahead of them, the loss of hope on the lake and the fear of the lake drying up. The feeling of alienation from one's own 'land' can be the most debilitating factor to a community whose only life source is rooted in the 'land' itself.

Lastly, the influence of the official/ mainstream environmentalism in Manipur in the form of Keibul Lamjao National Park and the declaration of Loktak as Ramsar site has fended the residents from using parts of the lake. It may be recalled here that the present park area of 40sq km is part of the lake and was traditionally a major source of livelihood for the people. The fencing of common resource and supersession of the customary laws and

practices by codified legal regimes has also added to the adverse effect resulting from Ithai Barrage.

In the process of addressing the more immediate questions relating to the socio-economic impact of Ithai Barrage one has invariable engaged in some general discussion and observations about the larger questions confronting the ideas on environmentalism and the perspective of both the civil society and the governmental interventions. The NGOs functioning within the dominant paradigm often fail in their prognosis of the subjective realities of the affected people due to the problems of political or other limitations while governmental responses are largely governed by the group interest of their capitalist and industrial control. The study also looked into the concept of development, which counter poses the people's interest against some distant and almost illusionary concept of large scale centrally controlled and pre judged idea of 'Growth'. The state in 'postcolonial' nations has acquired for itself the unquestionable power to invoke supreme sacrifices in the name of development and the irony of it all is that the sacrificed turns out to be the very subject on whose behalf the sacrifices are invoked. The Ithai barrage which, as officially stated will provide electricity and irrigation which will never ultimately benefit the Loktak Khangpok people and their plight is perhaps to go down at the altar of the 'greater common good', but for whose sake? Or such debates will orient the idea of development into a less oppressive exercise with a greater sensitivity towards the silent victims of development. As for the researcher the task at hand is perhaps to look more

deeply into the whole set of issues of study highlighting the need for a more extensive understanding of environment and health.

APPENDICES

Appendix I

INTERVIEW GUIDE: used for the research

Basic background information

Name-

Age-

Sex-

Education-

Type of Family-

Number of Family Members-

Number of years on the lake-

Sources Of Income-

Current Average Monthly Income-

Health Complaints-

- Skin Infections.
- STI
- Malaria
- Gastro-Infections
- Others Health Problems

Health Services Available-

National Health Programs-

Check List

Detailed information was gathered on

1. What are the changes you observe in your fishing activities after the construction of the Ithai Barrage?

- Changes observed on fish catch.
- Changes on equipment and cost of equipment and why?
- Changes in the number of months/days/hours spent on fishing.
- Increase/decrease in the number of family members participating in fishing.
- Income changes.

2. What are the post-barrage perceptual environmental changes?

- Water quality.
- Fish species.
- Aquatic vegetation.
- Phumdi.

3. How have these changes affected community activities and systems: economic, social?
4. How have these changes affected the individual prospects for his/her growth/ improvement in status/ children's future?
5. How have social organization for support been affected?
6. Response of the local people to the above changes?
7. Response of the Government to the above changes?
8. How has social and physical space for work and leisure activities been affected?

9. How have peoples perception of the lake as an entity been affected? Has this affected their use of the lake and how?
10. How has people's attitude to the authorities that impact on their lives been affected: State/ community and kinship group authorities?

Appendix II

Stories of 15 Families: Cases of the 15 families are narrated here in brief. Most of these narratives are so similar that one finds redundant listening to all of them. Nevertheless, each of them has tales of their own. This makes it worthwhile to go deeper for a comprehensive understanding of the impact of the Ithai-Barrage on the Loktak Khangpok people. For security reasons the names have been changed in most cases.

Family A. *Salam Onbi Yaima* and *Ibomcha* have been living on their little floating hut for many years now, depending on the lake's natural resources for almost everything they require for their sustenance. They have had witnessed how the lake transformed from it's 'natural' pre-dam state to this present unfriendly water, where everything works against the people who depend on it. Ibomcha grew up on the lake itself, studied till the fourth class in the local government school, but left it, as his parents finds no hope for studying further. For girls it is much more difficult to get to school because of the low priority given to them as compared to boys. But they explained that, now, the only hope is to send their children to school as the lake has become increasingly

unproductive. Yaima grew up in one of the islands, and after marriage joined her husband in his floating hut. They first had two daughters, but wanted a son to inherit their property and look after them when they grow old. With the blessing of Loktak Lairenbi, they got a son. All this happened before the dam came up. They never could imagine before that the water level will forever be kept at the highest level possible, and that it'll affect their life. Latter, after the dam was constructed, the fish population grew thinner, the familiar vegetation slowly dwindled, and as a result they finds it difficult to even subsist. Like all families, they began to invest more time, resources, and manpower (sic) to cope up with the unfriendly environment. In the process their children had to quit their studies to join the fishing profession. This of course is not the only reason for quitting the school. " But where is the school and where is the teacher". Schools are not proper, teachers are not good, irregular, and with increasing corruption in getting jobs, the best option was to be with the familiar, i.e., fishing.

Previously they used to earn about five hundred to one thousand rupees a day, during the lean season, by fishing for about seven to ten hours a day. But now they have to invest about double the amount of time, energy, including the grown up children, in order to catch similar amount of fish or even less. In addition to this, they had to adopt bigger and 'better' nets made of nylon to be more effective. Aquatic vegetation like heikrak, thangjing, pullei etc., used to be another main source of food for self consumption as well as for selling in the market, but with all these vanishing from the lake, they have no alternative secondary supplement for either their own consumption or for earning extra income.

On the health front, Yaima explained that, because of the extra work, she suffers from frequent muscle pull on her thigh. This incapacitated her many a time from using the nupi ill (ladies net). Ibomcha used to suffer from mild to severe stomach pain, and later on was diagnosed and

operated upon for stone case by a doctor of the district hospital. "Going to the hospital is a major task, humiliating and also had to leave our floating hut for more than a week leaving us penny less for days together". It is not the scope of this research to establish a causal link of many stone cases reported by residents with the change in the lake eco-system. They also reported the deteriorating water quality, which sometimes causes severe stomach pain. But for such mild problems the local *Maibi*[1] who lives in the surrounding areas takes care of it. It was only after the problems become severe that the family take the person to the nearby state health center.

Family B. *Heisnam Onbi Ibethoi (47) and Sanatomba (50)* married late in life and parented three children. One died at the age of six when he accidentally slipped under a thinned portion of the phumdi just outside their hut. Two of their daughters are married. The son studied till eight class in the nearby government school but dropped out to join his parents. The remaining daughter lives with their relatives on one of the islets. Both of the parents never went to school, but learnt the art of living of the lake from their parents. Modern education was not the priority at that time. But now times have changed. They prefer to send their children to school, as they do not see much hope in fishing. At the same time they do not see much hope in studying, as their children will get the worst form of education. Sanatomba explained "*lairik tamdunabu kari taudoino*", which nearly interpreted means, "what will you do by studying".

Like all women, Ibethoi gets up as early as three in the morning. After finishing the morning chores of cooking and an early lunch she takes the boat to the nearest bus stop to Imphal. She would sell the catch to vendors, who are women and with the money thus obtained she buys other household items required to survive on their little floating hut. By afternoon she would return

[1] *Maibi are traditional Meitei healers. They adopt spiritual, medicinal plants, and other locally developed techniques as a method of treating various diseases. In Manipur, like in all parts of India, one finds the co-existence of both modern and traditional healing practices.*

once again for more work, including that of fishing. This was an almost everyday affair, but now things have changed. It takes time accumulating fish that will make worthwhile going to the main market. In most cases she ends up going only to the local market which fetches lesser amount than that of Imphal. Previously before the dam was built she could earn some 600- 700 rupees a day during the lean season but things have changed. During those time one can save money enough to last the monsoon season and enough to send the children to school. The post-dam scene has been most unfavorable to the residents. She explains that it is even difficult to earn even 150-300m a day. Sometimes the pot is empty, as one is unable to catch anything.

Family C. *Salam Ongbi Sanahanbi and her husband Salam Tomba* both grew up at Thanga. After their marriage they started living on a floating hut. Tomba explained that because his parental family home was too congested to accommodate all the family members the only option left for him was to shift to the lake. He inherited a small plot of agricultural land from his parents but it got submerged after the construction of the dam. Since then, he and his family have been eking out from their floating hut. He recalled that his parents used to earn at least 1000 to 1500 rupees a day during the lean season, with variation in between. In his time, after the dam, the amount of money he can earn from fishing has reduced more than half in the same season.

Out of the six, three of their daughters are married to nearby villages. Two of them live with their relatives on the island. Presently the Khangpok is shared with one daughter and the son who is the youngest. They both attend the school at Ningthoukhong. Everyday they, with other children from the nearby huts, take the canoe to reach Ningthoukhong shore. From here they walk about three kilometers to reach the government school. Many a times the canoe's path gets blocked by floating vegetation and had to get back without being able to reach the shore. According to the

parents the menace of proliferating phumdi have played havoc not only to their children's education but also to their daily activities. Tomba added, that it was only after the construction of the barrage that the problem of navigation on the lake became acute.

"Because over working" Sanahanbi says, " I suffer from constant pain on the back portion of my body". The water also has become so bad that they cannot consume from some parts of the lake any more. Some times their children get diarrhea and stomachache. They explained that before the dam came up water from the lake was very clear and clean, but now nothing is moving, everything has stalled and is rotting. " I do not see any hope for our children on the lake, it is dying". Tomba emphasized, " only better schools can save our life".

Family D. *Haojam Ongbi Ibeton* grew up in a village nearby the lake. Unlike many of her friends she was privileged to attend school till her 5th class. Her parents used to own a floating hut, and it was from here that she learnt the art of surviving of the lake. Since the time she got married to *Ibomcha*, who grew up on a Khangpok, she has been living permanently on their little hut. Ibomcha studied till his 8th class and latter took up his father's profession. They bore no children and have adopted two school going kids from their relatives.

Complaining about the barrage Ibeton says, "Unless we destroy the dam Manipur will be no more". She explained that fish production that was once abundant has become scarce resources, and that rice production has totally ceased from this area. Instead everything is imported from outside the state. Before the dam came up they used to earn about 1000 rupees in a day during lean season. What now happens is that they could hardly earn Rs.300 in a day during the same season? This was even after upgrading their fishing gears. Even the aquatic vegetation, which was their secondary source of food and income, has vanished. "This lake is not the one we know

of many years ago" Ibomcha said pointing to the alien grasses that now grows abundantly on the lake.

For the children they have decided to educate them at all cost. They believe that the only hope for their children and they is to get into government jobs after their education, and not struggle like them on the lake. Schools at Karang where their children attend the government primary school. Both Ibeton and Ibomcha are concerned that the school doesn't function well, nor do the teachers attend the class well.

Family E. *Heisnam Purnima and Heisnam Chaoba.* Purnima grew up in Thanga Island and since her marriage to Chaoba she has been staying on the lake. Both her parents are fishers and Purnima learnt the art of fishing. Studying was an option and she never went to school. The effort to get a son resulted into giving birth to six daughters at first. Fortunately the seventh one turn out to be a son. The parent explained that son is primary to them because only a son can take care of them when they grow old. The eldest daughter (nine years old) and the youngest son live with them on the lake. The other lives with their relatives on the mainland. All the seven children study in government schools. As in other families, fishing is the main task of both Purnima and Chaoba. The eldest daughter helps her parents in preparation of smoked fish and in other household chores. Purnima markets the fish and looks after the household need of the family.

Major health complaints of the children include diarrhea and stomach pain. Two of the daughters suffered from some unknown disease with symptoms of high fever and vomit. They were taken to the primary health sub-center at Karang. They complained that whenever they have some health problem they have to go to this health center, but because the doctor comes only on Thursdays

they sometimes have to traverse longer. Usually the local healer or the *Maiba* are the ones they consult first, and only when he cannot deal with the problem the patient is taken to the doctor. Getting medicine is also another major problem. Even the chemist or the district hospital at the main market of Bishnupur cannot supply the basic medical requirements. Both Purnima and Chaoba suffer from back pain frequently. Chaoba sometimes develop pain on the right side of stomach, for which he has not consulted anyone.

Purnima studied till her fourth class at Karang Island. Recalling of the pre-dam scenario she explained that her parents were mainly agricultural farmers. During lean season when the water recedes to the minimum level, they will sow seeds. When the water rises during the rainy season the rice will grow with the rise of the water. One could see excitement merged with sadness when she recalled how tasty the rice was. "See we have to buy rice from the market now". Fishing was to supplement the income from rice cultivation. Later when after the dam, the water level never receded and they had to stop agriculture altogether, and completely depend on fishing. The land was available during the dry season did not belong to them but they were using it as their forefathers have been using it for many years. She also further explained that some of families somehow got pata land from the government but despite this the families never got compensation for the inundated land. In fact, the families continue to get bills for land tax for the land, which are underneath the water. Before the construction of the dam the total earning of both Purnima and Chaoba used to be around rupees 500-1000 a day during the lean season. Thought the catch during the monsoon season is unpredictable, the earning during the lean season used to be enough to sustain the family well enough. Now the amount they earn is reduced to some 300-400 rupees a day during the lean season. In most cases they could not catch anything. Previously, vegetation from the lake was also a source of income but all the familiar vegetables are not seen anymore on the lake.

The main problem they face now is taking care of the children, and fear that they will not be able to send them to schools long enough to get a job elsewhere. Their only hope for the children is to get out of the lake and do the earning elsewhere. They know that the lake cannot sustain for long.

Family F. *Haobijam Ongbi Mema and her husband Haobijam Sanamatum* both grew up on the lake itself. They took pride in explaining in how they have all throughout lived on their present hut. Before the dam they used to earn about rupees 600 a day during the lean season, but now they couldn't predict anything. Sometimes they will be able to catch fish enough to sustain for couple of days but at other time nets will be empty. In such case they end up borrowing from the local moneylender. The rent is cheap but when they are not able to catch fish for days and even months the amount becomes large making it difficult for them to pay back. The money they borrowed is usually paid back in kind i.e., fish. Usually the moneylenders are themselves fish sellers at the local market. It is difficult to catch fish during the rainy season as the water level is very high, and the project authorities do not let water out from the reservoir, as they have to store water for the lean season.

Both Mema and Sanamatum spoke with anger about the dam and its effect on them. None of the benefits of the dam, i.e., power and irrigation are of any use to them. Nobody cares about the effect on the Khangpok residents, instead some people who are concerned about the effect of the dam on the lake talk only of the lake and not the people. Sanamatum acutely concerned about their future said "where will we go and live when the lake dries up?" While commenting on their effort to mitigate their present problem, both of them are of the opinion that they do not see much hope except wait for time to take its own course.

Like all residents, they suffer from frequent body ache and muscle pain, which they say, is because of long hours on the lake. Other complains include diarrhea, skin infection when they used water from some areas of the lake, and sometimes suffers from breathing difficulty. One of their sons died when he stepped on a thinned patch of phum. Their two children attend the high school at Thanga island. In order to go to school they share their boat with other kids from the nearby huts The problem of increasing proliferation of phumdi on the lake has been of major hindrance to children and as well as to everyday navigation. At times the children return without reaching the school, or get stranded on the lake for long in order to order to reach the school or while coming back.

Family G. *Ningthoujam Ongbi Mangolei and her husband Ningthoujam Manisana,* both have seen the transformation of the lake from its pre-dam state to this present where the lake has become inimical to the residents. They find their only water source undrinkable, the fish population decreased, and familiar vegetation vanishing from the lake. All these affected their life, their family and the community. Articulating the problems and its future consequences, Mangolei said " If the dam is not destroyed the lake will no longer be a lake, nor will we have a place to live, our survival is on stake". There was some effort in the past by some underground activist to destroy by hand -grenade, but since the dam is heavily guarded they couldn't affect it. They have three daughters who all live with their relatives on the mainland. Both the sons live with them and help the parents in fishing. They used to attend school at Ningthoukhong, but have left as they find it difficult to study because of their parents' poverty. The parents also find it extremely difficult to look after all the children, including the girls. Both Mangolei and Manisana believe that they could have easily sent their children to school or even to college if the dam had not been constructed. During the pre-dam period, fish was in plenty and they used to get enough money for other activities including schooling. Now after construction of the dam, in order to

increase their earning enough to sustain their livelihood, even the children had to join their profession of fishing. For Mangolei the nupi ill cannot catch fish as it used to in the past. She spends longer hours with little production. The total earning of both the husband and the wife used to be some 600-1000 rupees a day during the lean season, but now things have become unpredictable. Even 300 rupees a day is has become a lot of money.

Some of the health problems they are facing include frequent headache, loose motion, and muscle cramp. Mangolei suffers from frequent muscle pull on her thigh. Mosquito has increased on the lake but malaria is not heard of among the residents. They feel that most of their health problems are because of the deteriorating water quality of Loktak lake. They also complained of the dirt, polythene bags, and used bottles that are brought in by rivers that run through Imphal.

Family H. *Manileima and her husband Sanasaba* both are brought up on the lake. At the time when this researcher met them at their tiny khangpok they were still mourning the death of their two years old son who died five months back when he went out of the hut and fell on a thinned portion of the phumdi on where their hut stands. They talked in length on how phumdi cannot grow in thickness, as the water level is kept constantly high, and how this has increased the number of children who died a result of drowning.

Sanasaba is the only one who is working in the family, as Manileima is busy looking after their only son. This time they cannot risk another death. Sanasaba's parents lives on a different hut and they help each other when large nets are to be laid. He studied till eight standards but lost interest in studies and joined his parents in fishing. In fact he wanted to study but he thought that it was of no importance as it would have been difficult to find a job latter on. Fishing was something he knew from his childhood. "But where is the fish, we are born in a bad time"

Sanasaba described how the lake has changed from a friendly environment to a lake where it has become difficult to live and unfriendly to them. When the Ithai dam was about to be constructed, the people who live on the lake was aware of it, but they did not realized that it would be so destructive to the lake and to them. The government only promised them that it would be good for them as well as to the state of Manipur as a whole. Nothing more than these were revealed to the people. Now, the waters have become undrinkable, traditional fish are no more found, and vegetation which are the staple food are also no more grown on the lake. An approximate amount of rupees 500-1000 could be earned a day during the pre-dam era, but now a meager amount of rupees 500 is a difficult task. Trying to eke out a living when the cost of all the household items has grown up has been of tremendous burden to the both Manileima and Sanasaba.

Health problems faced by the family include diarrhea, body ache, jaundice and other common problems related to stomach. Childcare is mostly the common food they consume everyday. Two days before this field visits there was a polio vaccination team who visited their hut. They feel that the sub-health at Karang is not equipped to handle most of the health problem of the residents. Most of the time they have to go to the district hospital where there are more doctors and facilities. Local practitioners at the mainland also take care of various mild health problems.

Family I. *Kunjarani and her husband Joykumar.* Joykumar grew up on his father's floating hut, and after his marriage to Kunjarani four years ago they shifted to a new hut. Kunjarani from her childhood lived with her parents of and on shifting between mainland and their khangpok. They have 3 daughters. Two of them live with Kunjarani's parents at Thanga, the youngest one live with them on the hut. Kunjarani stays most of the time at the hut in order to take care of their little daughter.

They were still young when the dam was built and could not comprehend the effect of the dam at that time, but they learnt from their parents the condition of the lake system before the construction of the dam. The income of their parents used to be enough to maintain the family. Kunjarani could attend school by staying at their residence at Thanga, and there was enough to eat, and enough time for other activities. Their parents could earn as much as 500-1000 rupees in a day during the lean season. But their earning has reduced to such an extent that they are not able to feed their three daughters properly. The lake gradually deteriorated after the dam. After some twenty years the lake water has become bad, in some areas one even cannot touch as it causes skin infection, a very itchy sensation.

Joykumar has to use bigger nets made of nylon leaving the old one, which are smaller and made of cotton. Nupi Ill used by women cannot catch fish much as the water level has been kept at always high. Phumdi that has proliferated on the lake is also a major impediment to navigation on the lake hindering both fishing and other day to day activities.

Other complaints include very regular stomach problem for both Kunjarani and Joykumar. Body ache is also another common problem. Mosquito are in plenty now, though they do not give rise to malaria. They hope that the government realized that the lake is dying, and also the effect on them. They even hold the view that the dam need to be demolished as it is the cause of all the problems they are facing.

Family J. *Petesory and her husband Jadumani* have been living on the lake for the last twenty-five years. They have one daughter and two sons. Petesory studied till her fourth class while Jadumani studied till his ninth class. Jadumani has his parental home on one of the islands, where

their children live, though the two sons joins their parents in fishing necessitating them to stay on the lake most of the time. In fact, Jadumani quit his study in order to help his father in fishing. He felt that studying will not help him anymore, and it was better to follow his father. Moreover, fishing was becoming gradually unproductive and his father needed help in order to aid their livelihood. He has to take care of his father and mother who now lives on land and the burden on him has been enormous, as the lake has been inimical to fishers. He remembers the time when they used to get adequate money for the family from selling fish and other aquatic vegetation. They used to earn around one thousand rupees a day during the lean season, but now he and his wife and also with the help of his sons can some three to five hundred rupees a day during the same season.

Despite having a house at Thanga, both Petesory and Jadumani are not able to spend time as they are most of the time are into fishing. They are not even able to spend time with their children. Petesory increasingly finds it difficult to manage time between household needs and fishing. Nupi Ill used by women has been of not much value now a days as the lake water is maintained high all the time. More effort and more time on the lake have also resulted into muscle pull on the thigh of Petesory. Jadumani associate his regular back pain and body ache to over exerting on the lake everyday.

Some of the problems they have identified as associated with the new ecosystem include decrease of fish population in the lake as a result of blocking the path of fish at Manipur River. Phumdi which used to flow out of the same river cannot flow out resulting into extensive accumulation on the lake blocking their normal life and reducing fishing area on the lake. Jadumani also identified that much of the waste from Imphal City and towns are accumulated on the lake, as a result of which the lake water gets polluted. He said, "it is the Imphal people who uses all the power from

the hydroelectric project and it is also they who dirties the lake through their bottles and plastic bags".

Family K. *Heisnam Ongbi Memcha and her husband Heisnam Mushuk* married early and bore two daughters and three sons. Other than their hut, they also have their land on the island where their school going children lives. The youngest two stays with them, while Mushuk's parents live with the other children. Looking after the kids has been the most difficult thing for the parents. Both Memcha and Mushuk have been witnessed to the changing face of the lake. For Memcha, she has been on the lake for twenty-five years now, and for Mushuk, though he has been on the lake for fifteen years, he has always been on the lake with his parents since his childhood. Memcha never went to school, while her husband studied till his ninth class.

Mushuk remembers the time when they used to catch fish that sometimes fill their canoe. After the dam was built the fish population has reduced so much that, now it has been difficult to keep for the family to consume. All of the catch has to be sold in order that the money they receive buys enough for their household needs. It is not just fish that has reduced but the traditional vegetable which are staple food for the Meitei have vanished from the lake. The income from selling them also is totally cut off. The income before the dam was around rupees 1000 to 1500 in a day when the lake water is low, but now they are able to harvest only about rupees 500 a day in similar season. 'Pat Chaba' or literally 'eating from the lake' means depending on the lake for almost all their need, is severely undermined by the destruction of the lake, and tyrannical restricted by Keibul Lamjao National Park, which has restricted locals to enter the park area. Mushuk feels that the government is unresponsive to the problem of fishing families who live on the lake. With anger on his face he added, "The only thing they do is release some foreign fish on Loktak Day celebration to fool the people".

Some of the health problems include the general body ache, weight loss, frequent stomach problem, and skin rashes. The local Maiba form Thanga usually takes care of minor problems, but when the problem is severe they usually take the person to the district hospital skipping the sub-health center.

Family L. *Salam Ongbi Ashangbi and her husband Ningthou.* Ashangbi grew up on the mainland, but after her marriage to Ningthou has been living on the lake for the last six years. They gave birth to a son who is now three years old. In the beginning she found it difficult living on the floating hut, but now she has adjusted and learnt the art of surviving on the lake. Her husband Ningthou is now sixty years old, but still capable of doing the normal business of laying nets and trapping fish. He has seen both twenty years before and twenty years after the dam; and he was most unsatisfied with the way the lake is slowly rotting to death with nobody daring to stop it. When the lake dies 'we are dead too'.

Ningthou studied till her 10^{th} class at the government school. He wanted to study further but at that time he had to shift to another school much further from the Island where he stays. After he stopped his studies, joined his parents on the lake for fishing. By the time the dam was built he was already living on their floating hut. He is well versed with the terrain and the ecosystem of the lake. Describing the change that has occurred, Ningthou gave a long list of aquatic vegetation that is no more found or rarely found on the lake. He described how fish used to migrate from Manipur River to the lake, and what type of food they eat. He knows what are the fish species that has vanished from the lake and now substituted by foreign and cheaper varieties.

"We used to be very rich, but things have changed". Before the dam we could earn at least 500 to 1500 rupees a day when the water level of the lake is low, but now during the same season we

cannot earn more than 300 to 400 a day. "Sometimes even after a hard day we go back with nothing" Ningthou added, "it is highly erratic". They are both worried that they will not be able to send their son to some good school at Imphal.

Mosquito has increased tremendously but there is no known case of malaria in the region. They both agree that the water quality has degenerated that at some part it has become undrinkable. Some of the health problems they encountered include general weakness, diarrhea and skin infection. Once, Ningthou had to go to the district hospital because of severe stomach pain, but after seeing the needle, which are injected onto other patients he ran away from the hospital never to return. The local Maiba, who used his local hand pressing technique, cured him.

Family M. *Radhamani and her husband Megha* both in their mid-twenties married very early and got five daughters in five consecutive years. Radhamni is new to living on the hut, otherwise she was living at Megha's residence at Karang. She joined her husband on the hut as Megha found it extremely difficult to do the fishing all alone. Four of their daughters live at Karang with Megha's relatives, while the youngest is constantly with her mother on the hut. Radhamni frequently visit their daughters to look after their needs, but during the lean season, which was the time when this researcher visited them, she was most of the time at the hut to help her husband in drying or smoke the fish caught by her husband. When going for marketing the fish she takes her young daughter along as it is not possible to leave the kid alone at the hut. With an emaciated look, she said, " I still would like to have a son who could help us in the future".

Both of them never experienced the condition of the lake before the construction of the dam, but they got to know about the pre-dam condition of the lake from their parents and other elders from their community. What is certain for them is that they have harder time in comparison with their

childhood, and form the time of their parents. For Megha it is a much more real experience as he has been with his parents since his childhood on the lake. Even though he has his own floating hut now, he still has his responsibility to take care of his parents who lives at a nearby hut. Fishing is usually done together with his parents. He need the help of others as laying nets generally require co-operation. It is at the time of crisis in the family, like having a sick member, which makes the family difficult to decide whether to fish or to attend to the sick member. Attending to the sick can cost a day's or more earning for the family. The experience of missing out the day's earning is real for them as they have to take care of their daughters. At the time when the earning form fishing is unpredictable every day effort of uncertainty on the lake is worth than doing nothing. At times, sitting idle or wait for the lean season to come is a regular feature for many fishers. Like in any settled colony, one can find huts which sells local alcoholic drinks on the lake itself, a profession usually taken up by some women.

Some of their daughters have had suffered from diarrhea in the past, but presently they did not suffer from any kind of known health problem. When one of their daughters was taken to the main hospital at Imphal, both the parents had to suffer so much scolding from the doctor that they had to go back from the hospital without giving any notice to the hospital. Since then they have been avoiding the hospital or the local primary health center, depending either on their knowledge of diseases or on the local medicine man.

N. Tampha and Ibomcha have lived on the lake since their birth. They married very young and has four sons. Two of them live with Ibomcha's parents on another hut. They also have a small house at Karang where they sometimes go, but at most of the time they spend their time on the lake for fishing. Since the time Tampha and Ibomcha decided to shift to a new hut for themselves they have been maintaining their account separately from the parents. They have a faint memory of the lake before the dam, but they both are aware of the condition of the lake from their elders. Tampha studied till her 8th class, but latter she quit as she found it meaningless to study anymore. The parents of Ibomcha wanted him to study but after some visit to the school he stopped.

Their present income from fishing is not sufficient to feed the children. They believe that they could easily earn about a thousand rupees if the dam was not there. Their present income, i.e., the income of both husband and wife together constitute about rupees 500 to 1000 a day when Ibomcha with his father, but now it has been difficult to earn even 500 rupees a day. This is during the fishing season. Some days back before this researcher met them, two of their sons suffered from constant dehydration because of loose motion. It ceased after the doctor from the health center gave some medicine. Boiled water was always given to the children since that day. The main problem with the health center at Karang is that the doctor hardly comes to attend the patients. In most cases they have to go the doctor's place and pay some price for the treatment they receive.

Ibomcha explained regarding their concern for the lake that there has been some effort on the part of some fishers in raising their issue to the state level. But nothing much has happened till now. He further added that it is a costly affair to be engaged in raising the issue as one not only has to go to meetings or some times to Imphal but one has to pay money to some of the individuals who work for them. One thing is sure for the parents that they have to send their kids to school as the future on the lake has become uncertain and unpredictable. It is has been very difficult for the family to sustain at present as they have not been able to catch enough. The canoe they own has become old and they needed a bigger and new one. The cost of one large canoe which can accommodate four to five person at a time is priced at least ten thousand to twenty thousand rupees. Since they do not have the money they were planning to postpone till the next season or ultimately borrow it. They explained that a proper equipment including the canoe is a must to survive on the lake. The better the instrument one possesses, the better one can fight for the meager resources.

Family O. *Salam Biramni* is the only one among the residents chosen for our case studies who is not married. He lives all alone at his floating hut. He is 35 years old and has been living on the lake for the same number of years. He is also involved in conservation activities on the lake. Biramni was eager to talk of the changes and the effect of the dam on the lake and the people. He believed that the lake need to be conserved for the very fact reason that without the lake the Loktak Khangpok people and all those who depend

on the lake will starve to death. He also believed that Loktak is important for the whole of Manipur. It not only provides fish for the Meitei, but all the water that runs through Imphal gets accumulated at Loktak thus saving it from getting flooded. If the lake gets dried up as result of *leinang* (silt), both the people of Loktak and the valley will die a natural death. Biramni was also concerned with the dwindling number of birds that migrate to the lake during late winter. He used to participate in the annual bird counting where local and state level organizations and individuals gather for the purpose.

For Biramni, all the activities ranging from fishing, marketing, and household chores are taken care all alone. Managing everything all alone is a difficult task for him, finding little time to distribute time for social interaction. This is particularly true during the post-dam scenario when he has to invest more time and energy to fishing activities. His present hut is nearly crumbled down, and the phumdi where his hut stands is fast thinning but he has not been able to afford time to repair it. Before the dam came up he could earn at least a thousand rupees in a day, but now, twenty years down the line, he hardly can catch enough to sustain his life on the lake. Vegetation like Heikrak, Thangjing, Pullei etc used to be sold on the market and consumed. All these have vanished slowly, which have reduced their earning capacity. The only thing that can be extracted from the lake is the fish, the population of which has also reduced a result of the dam. He said, "it is slow death" and, one day "we all have to live on the land".

He suffers from severe back pain sometimes, and at other time he has mild pain all over the body. This he says is because of overworking without any kind of rest. He wonders whether there is any kind of remedy for the dying lake. The government has not done much, nor can the residents contribute time for conserving the lake. Only the government has to take action to keep it alive.

Appendix III.

Loktak Khangpok Residents*

Sl	Families	Age	Sex	No. of Years on the lake	Siblings	Pre-dam income** (In Rs)	Post-dam income** (In Rs)	Education	Major Health Complaints***
A	Salam Ongbi Yaima Salam Ibomcha	60 62	F M	40 62	2 daughter 1 son	500-1000	300	4th class	Stone case Back pain
B	Heisnam Ongbi Ibethoi Heisnam Sanatomba	47 50	F M	30 45	3 daughter 1 son 1 drowned	600-700	150-300		Breathing difficulty, Jaundice, Low back pain.
C	Salam Ongbi Sanahanbi Salam Tomba	52 58	F M	32 35	6 daughter 1 son	1000-1500	300-500	7th class	Muscle pull, low back pain
D	Haojam Ongbi Ibeton Haojam Ibomcha	35 40	F M	20 40	No children, looking after 2 children	1000-1500	300	5th class 8th class	Frequent stomach ache.
E	Heisnam Purnima Heisnam Chaoba	30 34	F M	10 34	6 daughters 1 son 1 married	500-1000	300-400	4th class	Body ache, cholera, stomach pain.
F	Haobijam Ongbi Mema Haobijam Sanamatum	35 40	F M	35 40	1 daughter 1 Son 1 drowned	600	200	7th class	Muscle pull, and back pain.
G	Ningthoujam Ongbi Mangolei Ningthoujam Manisana	30 35	F M	35 30	3 daughter 2 son	600-1000	300	9th class	Headache, loose motion, muscle pull.
H	Manileima Sanasaba	19 25	F M	19 25	1 son 1 drowned	500-1000	500	7th class	Diarrhea body ache, jaundice.
I	Salam Ongbi Kunjarani Salam Joykumar	20 25	F M	20 20	3 daughter	500-1000	300		
J	Petesory Jadumani	30 40	F M	25 25	1 daughter 2 son	1000	300-500	4th class 9th class	Stomach pain and body ache.
K	Heisnam Ongbi Memcha Heisnam Mushuk	25 30	F M	25 15	2 daughter 3 son	1000-1500	500	9th class	Body ache, weight loss, stomach problem, skin rashes.
L	Ashangbi Ningthou	30 60	F M	6 40	1 son	500-1500	300-400	10th class 7th class	General weakness, diarrhea, skin infection.
M	Radhamni Megha	22 25	F M	2 25	5 daughter	1000	400	8th class	Diarrhea.
N	Tampha Ibomcha	20 25	F M	20 25	4 son	500-1000	500	8th class	Loose motion
O	Salam Biramni	35	M	35	Unmarried	1000	300		Back pain, other body uneasiness.

** A more detailed information of the cases is given in Appendix II.*

*** This represents only the approximate amount they could earn in a day during the lean season.*

**** This is representative of the family as a whole.*

Appendix IV.

Summary of perceived problems of Loktak Khangpok Residents

Dimensions	Perceived problems
Environment	• Increased phum on the lake • Reduced fish population • Loss of traditional vegetation • Deterioration of water quality • Thinning of Phumdi • Agricultural fields submerged • Increased mosquito
Livelihood	• Reduction of income • Increased cost of fishing equipment including canoe
Health	• Jaundice, Gastroenteritis, Diarrhea, breathing difficulty • Back pain, Muscle pull • Skin infections • Malnutrition • Alcoholism • Death due to drowning • Bad health service, non-availability of medicine • Fear of future
Other Problems	• Increased population on lake • Gradual interference on traditional system • Increased school dropouts • Change in fishing gears • Migration to towns and cities • Navigation disturbance by phumdi

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