

Participatory wetland management in Loktak lake: a road to sustainable development

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ABSTRACT

The study was conducted in order to understand the participatory management of the Loktak lake Manipur by different stakeholders. The study tools used were stakeholder analysis, activity analysis and participation analysis. 30 stakeholders were identified, their relationship was analysed and they were prioritized according to their 'influence on' and 'importance to' the project. The observations of the study were that the capture and culture fishermen need adequate capacity building. NHPC, jhum farmers and athaphum owners were the major threats to the project. Most of the project activities were taken up in association with meira paibies, ngami lups and other CBOs. In most cases, local people in general were just informed about the project activities. Activities were taken up in association with CBOs and LDA who acted as the major decision making body. Participation of stakeholders specially the primary stakeholders in every project activity at different stages justifying its extent and typology should be designed and implemented for project sustainability as well as sustainable development of the natural resource and its users as a whole.

Key words: Management, participatory method, sustainable development and wetland,

Wetlands are areas of land, where the water level remains near or above the surface of the ground for most part of the year. Wetlands include a wide variety of habitats such as marshes, peatlands, floodplains, river and lakes and coastal areas such as salt marshes, mangroves and sea grass beds, but also coral reefs and other marine areas no deeper than six meters at low tide as well as human – made wetlands such as waste – water treatment, ponds and reservoirs (Anonymous, 2006).

Wetlands are among the most productive life support system in the world. They provide a range of interrelated environmental functions and socio-economic benefits, which supports a variety of livelihood strategies for different members of the local community. Wetlands also nurture and provide sustenance to biological diversity and it is evident from the concentration of birds (especially waterfowl), mammals, reptiles, amphibians, fish and invertebrate species, as well as countless plant that they support. Wetlands are common property resources and the ownership is not defined. The increasing demands and pressures on wetlands without understanding their nature and dynamics have often led to their degradation, thereby threatening livelihood of the communities dependent upon these resources.

The loktak lake

Till date, in India 25 wetland sites has been designated as Ramsar sites of International importance. Loktak Lake, a fresh water lake in Manipur, where the study is set, is one of them. Loktak Lake is the largest wetland of north eastern
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region of India. Due to its importance in the socio-economic and cultural life of the people, it is considered as 'The life-line of Manipur'.

The characteristic feature of the Loktak Lake is the presence of floating islands, locally called *phumdis* which are heterogeneous mass of soil, vegetation and organic matter at various stages of decomposition. There are 14 hills appearing as islands in the southern part of the lake. Only four of them – Sendra, Ithing, Karang and Thanga are inhabitat. Keibul Lamjao National Park (KLNP), the only floating wildlife sanctuary in the world is composed of a continuous mass of floating *phumdis* occupying an area of 40 sq. km is the only natural habitat of the most endangered ungulate species of bow-antlered deer Sangai (*Cervus eldi eldi*) (Anonymous, 1998). The lake is rich in biodiversity of aquatic flora and fauna.

Traditionally used for agriculture and fishery, the lake is threatened due to various anthropogenic activities leading to ecosystem degradation and loss of benefits accrued from them through their natural functioning. *Jhum* farming and deforestation, construction of hydraulic structures are some of them.

Participatory management

Involvement of local and indigenous people in resource management falls within the general resource management approach known as participatory management. Terms such as collaborative management, co-management or joint management are more or less synonymous (Anonymous, 2006).

Participatory Management is different from conventional management practice in that it considers all the stakeholders, their interest, their synergistic effect, their level of participation, level of vulnerability in which the stakeholders work to make a sustainable development of natural resource base. For anyone to understand the conservation issues, he must understand the stakeholders' participation and participatory approaches undertaken. Participatory Management in wetland and other natural resource management is one area to be cultured within extension sciences, which has an immense impact in the coming days as functions for restraining global warming and environmental degradation is growing across the globe.

Concept of stakeholders

Overseas Development Administration (ODA,1995) defined stakeholders as 'persons, groups or institutions with interest in a project or programme'. This definition of stakeholders includes both winners and losers and those involved or excluded from decision – making process. There are two types of stakeholders.

- i) ***Primary stakeholders:*** They are those who are (will be) ultimately affected either positively (e.g., beneficiaries) or negatively (e.g., those involuntarily resulted). They are immediate communities of interest.
- ii) ***Secondary stakeholders:*** They are the intermediaries in the aid delivery process. They may include government agencies and other institutional bodies. Often these groups do not consider themselves as stakeholders because they felt they own the process.

Röling and Wagemakers (1998), in the context of natural resource management defined stakeholders as 'natural resource users and managers'.

Sustainability issues

A necessary condition for sustainable agriculture is that large numbers of farming households must be motivated to use coordinated resource management. The problem is that, in most places, platforms for collective decision making have not been established to manage such resources (Röling, 1994). It is therefore crucial to focus on more than one system level. At the farm level, there is the farm household. At the above-farm level, there are the collective stakeholders, who might or might not be organized for sustainable use of the whole resource unit.

Sustainability is a quality that emerges when people individually or collectively apply their intelligence to maintain the long-term productivity of the natural resources on which they depend. In other words, Sustainability emerges out of shared human experiences, objectives, knowledge, decisions, technology, and organization (Röling and Pretty, 1997). For achieving sustainability, policy formulation must arise in a new way. Effective policy processes will have to bring together a range of actors and institutions for creative interaction and address multiple realities and unpredictability. What is required is the development of approaches that put participation, negotiation, and mediation at the centre of policy formulation so as to create a much wider common ownership in the practices. This is a central challenge for sustainable agriculture. The management of higher level systems, wetlands, coastal fisheries resources, communal forests, national parks, or watersheds, requires social organization comprising the key stakeholders. But the problem is that platforms for resource use negotiation generally do not exist, and so need to be created and facilitated (Röling, 1994).

Imperative of participatory approaches for sustainable wetland management

As many wetlands have been transformed and deteriorated, research into these wetland systems and their relationship with human activities are required. Integrated and participatory approaches to management of these wetlands are recommended. The best practice implies the participation of community members, research or development term and other stakeholders to jointly identify research and development parameters and contribute to decision making (Bessette, 2006). Herath (2004) opined that a conspicuous problem in wetland management is the paucity of involvement of stakeholders. Another is the threat of worsening conflict between local people and conservation authorities due to differences in perception, need and expectations.

Sultana and Thompson (2004) reported the method of consensus building for management of wetlands recognizing the diversity in livelihood and works through a structured learning and planning process that focuses on common interest. Employing participatory approaches to wetland management is above all, a means of strengthening and empowering local institutional capacity. By bringing stakeholders together and providing an opportunity to draw attention to their different wetland catchment interests and experiences, problems can be identified and information can be shared and acquired by both participants and facilitators. Participation is, therefore, critical in the

planning phase of wetland projects or management initiatives to ensure local sensitivity, a full understanding of wetland issues and the continued participation and feedback of stakeholders.

Sustainable development of loktak lake and participatory mangement

Manipur government constituted LDA (Loktak Development Authority) in 1986 for overall improvement and management of the lake. A project on Sustainable development and Water Resource Management of Loktak Lake (SDWRML) was initiated in 1997 with financial assistance from India Canada Environment facility (ICEF) and was undertaken by LDA and Wetland International – South Asia (WISA). The main objective of the project, which went on for a period of 5 years, was to develop and implement technical knowhow for conservation and management of the lake with the

participation of stakeholders of all levels- local communities, NGOs, research organizations and government agencies.

A study was conducted on the project in order to understand the participatory management of the lake by the different stakeholders. For the study, secondary data and project documents were thoroughly reviewed and analyzed. A first key stage is to identify the range of wetland stakeholders or interest groups, i.e. those involved with wetlands either through their livelihood strategies or through their responsibility in an institutional context. Thirty stakeholders were identified, their relationship was analyzed and they were prioritized according to their ‘influence on’ and ‘importance to’ the project. A stakeholder table was drawn up (Table1) and is followed by relationship analysis.

Stakeholder Relationship Analyses

Table2: Stakeholders having similar interest

Common interests	Stakeholders
<ul style="list-style-type: none"> • Better water quality • Storage and marketing facilities of their fish and plants. • Good quality inputs in terms of seeds, fertilizers and pesticides. • more yield of fish and also increase in fish variety 	<p>All fishermen, <i>phum</i> hut dwellers and collectors of wetland produce.</p> <p>agricultural farmers of valley and hills</p>
<ul style="list-style-type: none"> • Wants <i>phum</i> and weeds to be removed. • Water level of the lake to be reduced • Protection in time of flood. • to improve the lake ecosystem to achieve project targets. • Enhance the water holding capacity of the lake. • providing sanitation and potable water to villagers 	<p>All fishermen, fish vendors, fish processors, State fisheries Department</p> <p>Capture fishermen and <i>phum</i> hut dwellers</p> <p>Fishermen as well as agricultural farmers</p>
<ul style="list-style-type: none"> • Proper management of KLNP. • flood control activities • Undertaking various research activities in various aspects of lake conservation. 	<p>LDA; ICEF and WISA</p> <p>NHPC, IFCD, MoFF</p> <p>. PHED and CBOs</p> <p>MoEF, forest and wildlife department and ESRSPF</p> <p>NHPC and IFCD</p> <p>Manipur University and CAU</p>

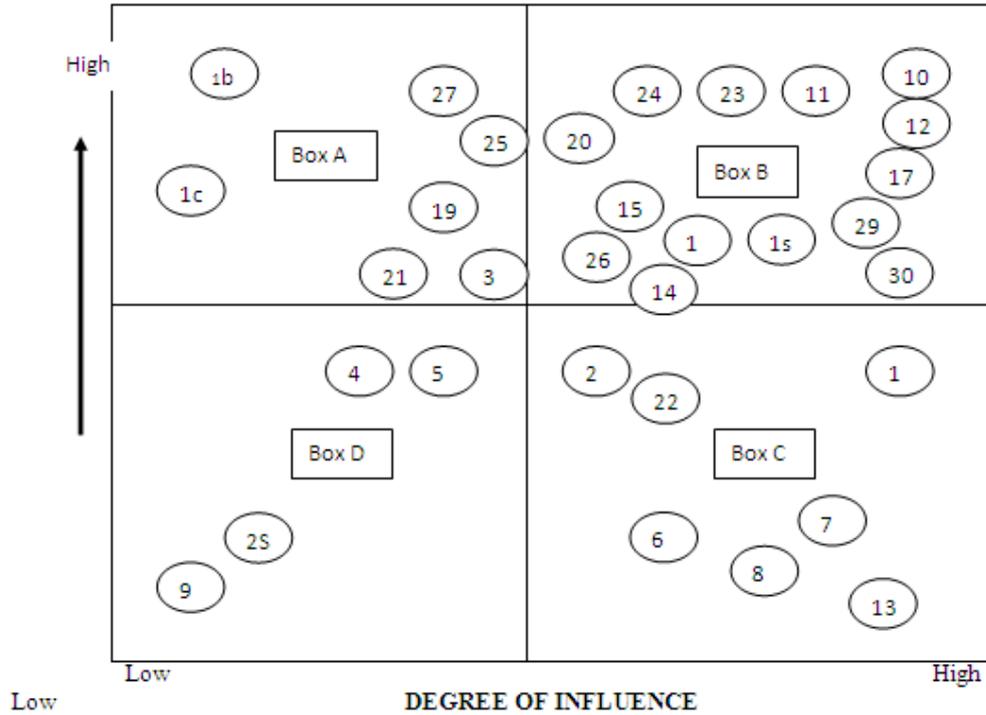
Table 3: Stakeholders having conflicting interests

Stakeholder	Stakeholder
<ul style="list-style-type: none"> • <i>athaphum</i> owners wants to continue with <i>athaphum</i> fishing • Fishermen wants more yield of fish • NHPC wants to maintain the lake water level at 768.5 m 	<ul style="list-style-type: none"> • Capture fishermen wants <i>phumdis</i> to be removed. • Fisheries Department and LDA are against over exploitation of fish resource. • All the primary stakeholders, IFCD, LDA, MoEF and ESRSPF want the water level to reduce, at least during winter months.

Prioritization of Stakeholders Based on Their ‘Importance to’ and ‘Influence on’ the Project

The degree of importance and influence of the stakeholders as depicted in Table 1 are plotted on a two by two matrix. The stakeholders are represented by their respective serial number of the stakeholder table. The matrix thus prepared appears as below (Fig. 1)

Fig. 1: Stakeholders’ prioritization matrix of the SDWRML project



From the above matrix, the following details can be comprehended.

Table 4: interpretations of the stakeholders’ prioritization matrix

Box	Status	Recommendations
Box A	High importance to the project but low influence.	Need special initiative, by project authorities to guard their interest
Box B	Degree of influence on the project and are also of high important for its success	A good working relationship need to be constructed with there stakeholders.
Box C	High influence hence can affect the project outcome but their targets are not the targets of the project.	These stakeholders need careful monitoring and evaluation.
Box D	Low influence on or importance to project objectives	Require limited monitoring or evaluation but are of low priority.

Activity analysis

Seven activities undertaken under the project were selected for study and analysis. Details of the activities are described and presented in the activity analysis table (Table 5) and followings can be comprehended.

1) *Meira paibies* and *Ngami lups* are very important institutions as far as community mobilization is concerned.

- 2) For most of the activities LDA forms a village level committee for implementation of the activities.
- 3) There is also mention of signing of MoUs between LDA and CBOs regarding various terms and conditions of implementation of activities.
- 4) The hilly terrain of the village was a major constrain to the activities.
- 5) Law and order situation of the area was another major problem faced by the stakeholders during project activities.

Participation analysis

To understand the level of participation of the relevant stakeholders in the different project activities, a participation matrix (Table 6) is prepared and the following observations are made,

1. LDA was the main decision making body in the project activities.
2. The primary stakeholders (community members) were either consulted of just given information about the activities.
3. COBs find participation in the activities to various levels.
4. In case of installation of chulhas and community owned hatchery, the full charge for implementation was given to the village level committees formed (LLECC and hatchery committee respectively).
5. For construction of sanitary latrines, LDA provided the construction materials and mason while community had to provide unskilled labour for material transportation to construction sites.
6. In *phumdi* flushing activity, LDA provided technical and financial support and the work were carried out by a field team of experienced fisherman.
7. *Meira paibies*, *Ngami lups* and Village Panchayat were consulted for most of the activities.

The observations made in this study will serve as valuable guidelines to future development endeavors in the lake in particular and other wetlands in general. Participatory management practice, need to be efficient and sensitive enough to work with different types of stakeholders and to ensure their adequate participation. Then only sustainable and long-lasting development will come about.

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**Table 1 : Stakeholder relationship analysis.
PRIMARY STAKEHOLDERS**

Sl. No.	Stakeholder	Role	Interest in the initiative	Likely impact of initiative on interest	Importance for initiative success	Influence over initiative
1.	Fishermen					
a)	Athaphum fishermen	<ul style="list-style-type: none"> Owns athaphum inside the lake for catching fish 	<ul style="list-style-type: none"> Increased fish yield Better quality water Storage and marketing facilities Phum fishing 	<ul style="list-style-type: none"> (+/-) (+) (?) (-) 	M	H
b)	Capture fishermen	<ul style="list-style-type: none"> Practice open water fishing inside the lake using boats and other fishing craft and gears 	<ul style="list-style-type: none"> Increased fish yield and variety Removal of weeds and phums. Improved fishing gears, net etc. Better quality water Reduction in water level 	<ul style="list-style-type: none"> (+/-) (+) (? / -) (+) (+) 	H	L
c)	Culture fishermen	<ul style="list-style-type: none"> Practice capture fishery in lakeshore villages by constructing ring bunds, fish ponds etc in and around the lake. 	<ul style="list-style-type: none"> Protection from flood More fish spawns Technical and market support Improved fish farms 	<ul style="list-style-type: none"> (?) (+) (+) (+) 	H	L
2.	Phum hut dwellers	<ul style="list-style-type: none"> Live on the floating phumhuts to make a living by fishing 	<ul style="list-style-type: none"> Removal of weeds / phums Health and medical facilities improved navigation Loan and credit facilities place in electoral record Access to electricity 	<ul style="list-style-type: none"> (+) (?) (+) (?/+) (?/-) ? 	M	H
3.	Collectors of wetland produce	<ul style="list-style-type: none"> Collect vegetables, folder, fuel wood, medicinal plants etc. from the wetland and sell them to nearby market. 	<ul style="list-style-type: none"> Enhanced lake resource Storage and marketing facilities Reduction in water level 	<ul style="list-style-type: none"> (+/-) (?) (+) 	M	L
4.	Fish processors	<ul style="list-style-type: none"> Process fish caught from the lake to produce smoked and fermented fish. 	<ul style="list-style-type: none"> Better fish smoking yards More fish yield Better market Less number of middlemen 	<ul style="list-style-type: none"> (?) (+/-) ? ? 	L	L

Sl. No.	Stakeholder	Role	Interest in the initiative	Likely impact of initiative on interest	Importance for initiative success	Influence over initiative
5.	Fish vendors	<ul style="list-style-type: none"> Collect fish catch of local fishermen and sell to nearby market. 	<ul style="list-style-type: none"> Better returns improved transportation More yield and variety of fish 	<ul style="list-style-type: none"> ? ? (+/-) 	L	L
6.	Agricultural farmers of lakeshore villages	<ul style="list-style-type: none"> Cultivate the flood plains of lakeshore villages 	<ul style="list-style-type: none"> Flood control More yield per unit area Better quality inputs. Additional source of income 	<ul style="list-style-type: none"> (+) (+/-) (?) (+) 	L	M
7.	Agricultural farmers of hills villages	<ul style="list-style-type: none"> Practice shifting cultivation in catchment areas of the lake 	<ul style="list-style-type: none"> Settled form of farming Irrigation facilities Good soil health More yield per unit area Additional source of income 	<ul style="list-style-type: none"> (+) (+) (?) (-) (+) 	M	H
8.	Livestock farmers	<ul style="list-style-type: none"> Inhabitant of catchment area owning cows, buffaloes, goats etc. 	<ul style="list-style-type: none"> Better grazing grounds Better feed Storage for feed / fodder Improved animal breed 	<ul style="list-style-type: none"> (-) (-) (?) (?) 	L	H
9.	People originally displaced by reservoir flooding	<ul style="list-style-type: none"> Inhabitant of lakeshore villages whose lands are inundated by reservoir flooding 	<ul style="list-style-type: none"> Alternative source of livelihood Adequate compensation 	<ul style="list-style-type: none"> (? / +) (?) 	L	L

SECONDARY STAKEHOLDERS

Sl. No.	Stakeholder	Role	Interest in the initiative	Likely impact of initiative on interest	Importance for initiative success	Influence over initiative
10.	Loktak Development Authority (LDA)	<ul style="list-style-type: none"> Site implementation Project management 	<ul style="list-style-type: none"> Sustainable lake resource development and management Cross-sectoral lake management Capacity building Infrastructure development Achievement of targets 	<ul style="list-style-type: none"> (+) (+) (+) (+) (+) 	H	H
11.	India-Canada Environment Facility (ICEF)	<ul style="list-style-type: none"> Funding agency Consultation and advisory 	<ul style="list-style-type: none"> Improved environmental condition Better international relation Achievement of targets 	<ul style="list-style-type: none"> (+) (+ / ?) (+) 	H	H

Sl. No.	Stakeholder	Role	Interest in the initiative	Likely impact of initiative on interest	Importance for initiative success	Influence over initiative
12.	Wetland International – South Asia (WISA)	<ul style="list-style-type: none"> Project implementation and management Advisory Activity assessment 	<ul style="list-style-type: none"> Conservation of wetland ecosystem Achievement of targets 	<ul style="list-style-type: none"> (+) (+) 	H	H
13.	National Hydro electric Power Commission (NHPC)	<ul style="list-style-type: none"> Generation of electricity Provision of irrigation 	<ul style="list-style-type: none"> Maintain lake water level at 768.5m Enhance water holding capacity of the lake 	<ul style="list-style-type: none"> (-) (+) 	L	M
14.	Irrigation and flood control Department (IFCD)	<ul style="list-style-type: none"> Catering irrigation requirement through a lift irrigation project. Flood mitigation 	<ul style="list-style-type: none"> Ensuring irrigation water to fields in and around the lake Reduced siltation Reduction in water level of lake 	<ul style="list-style-type: none"> (+) (+) (+) 	M	M
15.	State Fisheries Department	<ul style="list-style-type: none"> Collection of information and fisheries extension Undertake fisheries development programmes 	<ul style="list-style-type: none"> Better water quality Removal of weeds / <i>phums</i> Enhance fishery resource Ensure migration of riverine fishes Revenue collection by issuing fishing licence 	<ul style="list-style-type: none"> (+) (+) (+) (?/+) (?) 	M	M
16.	Public Health and Engineering Department (PHED)	<ul style="list-style-type: none"> Provision of health and sanitation facilities 	<ul style="list-style-type: none"> Extraction of water for domestic purpose from the lake Improved public health Sanitation facilities 	<ul style="list-style-type: none"> (+/-) (?) (+) 	M	M
17.	Ministry of Environment and Forestry (MoEF)	<ul style="list-style-type: none"> Provision of fund for catchment area treatment and water management Management of KLNP 	<ul style="list-style-type: none"> Afforestation Horticultural plantation Reduced Siltation Improved habitat of sangai Equitable distribution of forest products 	<ul style="list-style-type: none"> (+) (+) (+) (+) (?) 	H	M

Sl. No.	Stakeholder	Role	Interest in the initiative	Likely impact of initiative on interest	Importance for initiative success	Influence over initiative
18.	Forest and wildlife Department, Mobile Life wing	<ul style="list-style-type: none"> • Management of KLNP • Forest conservation and development • Monitor condition of the lake 	<ul style="list-style-type: none"> • Better water quality around KLNP • Prevention of poaching and land encroachment • Increase in Sangai population 	<ul style="list-style-type: none"> (+) (? / +) (?/+) 	M	M
19.	Department of Rural Development	<ul style="list-style-type: none"> • Implementation of Rural Development Programmes 	<ul style="list-style-type: none"> • Reduced pressure on forest • Poverty reduction • Employment generation • Enhanced access to rural infrastructure • Improved livelihood 	<ul style="list-style-type: none"> (+) (?) (?) (+) (+) 	M	L
20.	Manipur University (MU)	<ul style="list-style-type: none"> • Undertake studies, research in scientific and ecological aspects of the lake 	<ul style="list-style-type: none"> • Institutional learning • Ecosystem conservation 	<ul style="list-style-type: none"> (+) (+) 	M	M
21.	Central Agricultural University (CAU)	<ul style="list-style-type: none"> • Study on Economic Utilization of <i>Phumdis</i> 	<ul style="list-style-type: none"> • Institutional learning • Promoting <i>phumdi</i> compost 	<ul style="list-style-type: none"> (+) (+) 	L	L
22.	Tourism Department	<ul style="list-style-type: none"> • Promotion of tourism and eco-tourism 	<ul style="list-style-type: none"> • Provision of boating and other recreational facilities • More tourist / more income 	<ul style="list-style-type: none"> (+/-) (+/-) 	M	L
23.	<i>Ngami lups</i>	<ul style="list-style-type: none"> • Fishermen organizations highlighting the plight of fisher population, their aspirations and interest 	<ul style="list-style-type: none"> • Development of technical and managerial skill for resource management • Enhanced lake resource • Improved condition of fishermen • Transparent management policies • Capacity building • Institutional development 	<ul style="list-style-type: none"> (+) (+) (?/+) (?) (+) (+) 	H	H
24.	Meira paibis	<ul style="list-style-type: none"> • Promoting women's participation in economic, social and political spheres of daily life. 	<ul style="list-style-type: none"> • Food security • Societal peace • Improved livelihood • Capacity building • Institutional development 	<ul style="list-style-type: none"> (?/+) ? (+) (+) (+) 	H	H

Sl. No.	Stakeholder	Role	Interest in the initiative	Likely impact of initiative on interest	Importance for initiative success	Influence over initiative
25.	LLECC (Loktak Lake Environment Conservation Centre)	<ul style="list-style-type: none"> Organizing Awareness Programmes Community development activities Promoting Pond Based Filters 	<ul style="list-style-type: none"> Ecosystem conservation Improved livelihood Capacity building 	<ul style="list-style-type: none"> (+) (+) (+) 	H	M
26.	Environment, Social Reformation and Sangai Protection Forum (ESRSPF)	<ul style="list-style-type: none"> Voluntary service in KLNP survey work Promoting smokeless chulhas KLNP management 	<ul style="list-style-type: none"> Check poaching and other illegal activities. Reduction in water level of the lake Capacity building 	<ul style="list-style-type: none"> (?) (?) (+) 	M	M
27.	Loumi Sinmi Apunba Lup (LOUSAL)	<ul style="list-style-type: none"> Farmers' association working for their welfare Promoting <i>phum</i> compost 	<ul style="list-style-type: none"> Increase yield Profit from selling <i>phum</i> compost Capacity building 	<ul style="list-style-type: none"> (+) (?/+) (+) 	M	L
28.	Loktak Project Affected Areas Action Committee (LPAAAC)	<ul style="list-style-type: none"> Petition for compensation in matter of multi-purpose dam project 	<ul style="list-style-type: none"> Redressal of their grievances Rehabilitation Adequate compensation 	<ul style="list-style-type: none"> (?) (?) (?) 	L	L
29.	Village Panchayat	<ul style="list-style-type: none"> Elected representatives of people of valley villages Administration Community mobilization 	<ul style="list-style-type: none"> Community livelihood improvement Public image Capacity building 	<ul style="list-style-type: none"> (+) (?) (+) 	H	H
30.	Village Authority	<ul style="list-style-type: none"> nodal body for administration in hill villages of catchment areas 	<ul style="list-style-type: none"> control over forest village livelihood improvement 	<ul style="list-style-type: none"> (?) (+) 	H	H

Legend : (+) = positive; (-) = negative; (?) = not known; (+/-) = positive but can be negative; (?/+) = not known but will be positive if implemented; (?/-) = not known but will be negative if implemented; H = High; M = Medium; L = Low

Table 5 : Activity analysis table

Sl. No.	Activities	Stakeholders	Steps	Achievements	Problems
1.	PRA exercise	<ul style="list-style-type: none"> • Primary stakeholders • Panchayat • <i>Meira paibies</i> 	<ul style="list-style-type: none"> • Community mobilization • Pilot survey • Preparation of checklist • Implementation of PRA tools • Data analysis • Development of baseline information 	<ul style="list-style-type: none"> • Active participation of people and CBOs in the project • Generation of maps and baseline information of the village • Identification of needs, priorities and preferences of primary stakeholders • Vision for a better future 	<ul style="list-style-type: none"> • Community mobilization • Law and order problems
2.	Construction of low cost sanitary latrines	<ul style="list-style-type: none"> • TISC • <i>Meira paibies</i> • beneficiaries 	<ul style="list-style-type: none"> • Community consultation • Formation of village level implementation committee • Selection of beneficiaries • Site selection • Signing of MoUs regarding roles and responsibilities • Construction 	<ul style="list-style-type: none"> • 200 sanitary latrines constructed to the benefit of 504 households • Better water quality of the lake 	<ul style="list-style-type: none"> • Site selection was a problem due to hilly terrain of the island • Disputes regarding resource sharing between LDA and beneficiaries
3.	Installation of smokeless chulhas	<ul style="list-style-type: none"> • LLECC • Meria Paibies • <i>Ngami lups</i> • NHPC 	<ul style="list-style-type: none"> • Community consultation (esp. CBOs, Panchayats etc.) • Trainer's training • Construction of chulhas • Selection of beneficiaries • Signing of MoUs regarding roles and responsibilities • Distribution 	<ul style="list-style-type: none"> • Around 600 chulhas distributed to selected beneficiaries. • Reduced fuel consumption of families • Reduced pressure on forest • Reduced drudgeries on women 	<ul style="list-style-type: none"> • Damage during transportation

Sl. No.	Activities	Stakeholders	Steps	Achievements	Problems
4.	Phumdi flushing through Khordak channel	<ul style="list-style-type: none"> • LLECC • <i>Ngami lup</i> • Athaphum owners 	<ul style="list-style-type: none"> • Community mobilization and awareness generation • Consultancy meetings • Selection of field team • Technical support by LDA • Signing of MOUs • Implementation 	<ul style="list-style-type: none"> • <i>Phumdis</i> and <i>Athaphums</i> from Manungpat area removed • Better water quality • Improved navigation 	<ul style="list-style-type: none"> • Dismantling of the kachcha bridge along khordak channel affecting normal life • Convincing <i>Athaphum</i> owners • Poor rainfall during flushing
5.	Setting up of community owned fish hatchery	<ul style="list-style-type: none"> • Fishermen • <i>Ngami lup</i> 	<ul style="list-style-type: none"> • Survey • Identification of suitable sites • Community consultation meetings • Site visit (with local people) • Finalization of site • Formation of hatchery committee • Training of committee members • Signing of MoUs regarding roles and responsibilities • Construction and operationalization 	<ul style="list-style-type: none"> • Effective restocking of the lake • Reduced indiscriminate fishing • Capacity building of members in production of fingerlings 	<ul style="list-style-type: none"> • Site selection was not easy due to topographical constraints •
6.	Hydrological and ecological survey of Keibul Lamjao National Park (KLNP)	<ul style="list-style-type: none"> • ESRSPF, • Wildlife department 	<ul style="list-style-type: none"> • Identification of CBOs, NGOs working in conservation activities • Joint meeting • Logistic support provided by ESRSPF • Field work • Data collection 	<ul style="list-style-type: none"> • Hydrographic and ecological data of the lake generated. • Identification of composition of <i>phumdis</i> and their economic utility • Increased awareness towards protection of Sangai and water fowls. • Identification of breeding and spawning areas of fishes 	<ul style="list-style-type: none"> • Law and order problems affecting smooth survey • Natural calamities like heavy rain and flash flood during survey
7.	Organizing Awareness programmes like 'World Wetland Day' and 'Loktak Day'	<ul style="list-style-type: none"> • ESRSPF, • LLECC, 	<ul style="list-style-type: none"> • Communication through formal letters • Consultation and finalization of programme • Financial transaction • Programme facilitation 	<ul style="list-style-type: none"> • Increased awareness towards lake conservation • Opportunity for stakeholders to discuss conservation issues 	<ul style="list-style-type: none"> • Lack of proper financial support • Conflict among organizing CBOs.

Table 6: Participation matrix

TOP	Informing	Consultation	Consensus building	Decision making	Risk sharing	Partnership	Resource sharing	Self management
	Activities							
PRA exercise	Community	Panchayat, CBOs	Community	LDA				
Construction of latrines	Community	Ngami lups, Meira paibies		LDA, TISC	TISC, beneficiaries	LDA, TISC	LDA, Beneficiaries	
Installation of smokeless chulhas	Community	Ngami lups, LLECC	LDA, Ngami lup, LLECC	LDA	LLEC, LDA	LLEC, LDA		LLECC, Beneficiaries
<i>Phumdi</i> flushing		Meria paibies, Ngami lup, NHPC	LDA, Athaphum owners, NHPC	LDA, Ngami lups	Meira paibies, Nagmi lups, LDA	LLECC	LDA, Community, Ngami lups	
Community owned hatchery		Ngami lup, Fishery dept.		LDA, Ngami lup		Hatchery committee		Hatchery committee
Survey of KLNP			CBOs and NGOs	LDA, ESRSPF		LDA, ESRSPF, Wildlife dept.	LDA, MoEF	
Awareness programmes			LDA, CBOs	LDA, CBOs		LDA, CBOs		