

Special Thematic Report:
Application of the ILBM6 Evaluation Framework to the Lake Bhopal Conservation and Management Project and Beyond

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1. Introduction

This special thematic report is an output of the Ex-Post Evaluation of the JBIC-funded Lake Bhopal Conservation and Management Project (LBCMP). It addresses issues relevant to the Ex-Post Evaluation but which were not easily addressed within the DAC5 framework (Nakamura *et al.*, 2007). It presents a complimentary evaluation (planning) framework called ILBM6 which is based on the emerging concept of Integrated Lake Basin Management (ILBM).

While this is the first application of ILBM6---and the framework is still in the early stages of development---the findings presented here are useful as they expand the scope of analysis to key, but often neglected, issues. It is hoped that this approach of using ILBM6 to make supplementary observations will contribute to improved project design, and ultimately, better lake basin management, not only in the Lake Bhopal Basin but also beyond.

2. The DAC5 Evaluation Framework

2.1 Overview

Evaluation is an important aspect of the project cycle because it provides useful feedback for improving ongoing, completed or future projects. Official Development Assistance (ODA) funding agencies include evaluation as an important component of project design to enhance the quality of development assistance through learning from experience and to ensure accountability to donor countries and citizens (OECD, 1991). Many ODA funding agencies have adopted the Development Assistance Committee's (DAC) recommended five evaluation criteria of Relevance, Efficiency, Effectiveness, Impact and Sustainability for project evaluation (OECD, 1991). These criteria are commonly referred to as DAC5 and are defined in Table 1.

¹ "Lake Bhopal Conservation and Management Project" is jointly evaluated by Masahisa Nakamura, Victor S. Muhandiki and Thomas J. Ballatore, on behalf of International Lake Environment Committee (ILEC) Foundation, the consultant appointed by Japan Bank for International Cooperation (JBIC).

Table 1: DAC5 Criteria and Definitions

Criteria	Definition*
Relevance	The extent to which the aid activity is suited to the priorities and policies of the target group, recipient and donor
Efficiency	A measure of outputs (qualitative and quantitative) in relation to the inputs
Effectiveness	A measure of the extent to which an aid activity attains its objectives
Impact	Positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended
Sustainability	A measure of whether the benefits of an activity are likely to continue after donor funding has been withdrawn

*Source: OECD (2007)

2.2 Advantages

Because the DAC5 framework is the *de facto* international standard, it contributes to a useful level of standardization that allows comparison of diverse intervention projects (those projects externally supported through technical cooperation and/or bilateral and multilateral financial arrangements) both within a single agency as well as among agencies. Additionally, the focus on individual projects is especially valuable for agencies tasked with the detailed implementation of specific projects. In particular, the DAC5 criteria have been well developed and elaborated for structural intervention projects, one of the main types of interventions historically pursued by development agencies.

2.3 Limitations

The “project (particularly intervention project)” focus of DAC5 has advantages, but lake basin management is *process* not a project. It is a process composed of many projects as well as the independent and coordinated actions of stakeholders---citizens and governments combined. When designing or evaluating a single intervention project, it is necessary to take account of the broader process into which it fits. The difficulty of doing this is one of the existing DAC5 framework’s main weaknesses.

In a similar way, the DAC5 strength when it comes to evaluating structural intervention projects is useful when looking at that component of lake basin management. However, structural interventions are only one of the activities that form the whole of lake basin management.

Finally, when dealing with development interventions that are done on lakes and/or their basins, it is crucial to understand the characteristics of lakes that have implications for their management. As detailed in ILEC (2005), lakes in general have a set of three characteristics---long retention time, complex dynamics, and integrating nature---which have profound effects on how they respond to human-induced stresses as well as development and conservation interventions. It is crucial to have an evaluation framework which accommodates the reality that, for example, results of a given intervention (say, the building

of sewage treatment facilities) will not have immediate effects but will depend on the nature of the lake as a long-term, lentic system.

3. Evolving Approaches for Evaluating Lake Basin Management

In recent years there has been a shift from the narrow project perspective to broader perspectives that include programs, sectors, themes and cross-cutting issues (OECD, 1998; JBIC, 2003; JICA, 2004). While evaluation frameworks for projects have been widely developed and tested, development and testing of frameworks for the broader perspectives is still underway. Some of the recent ones with greatest relevance to lake basin management are discussed below.

3.1 Global Environment Facility (GEF)

The GEF has recognized that for evaluation of lake basin related-projects, consideration of appropriate indicators is particularly needed for long-term issues related to the DAC5's "Effectiveness", "Impact" and "Sustainability" criteria. The objective of many lake basin projects is to promote improvement of lake water quality or lake environment in general. Evaluation of Effectiveness and Impact of these projects would therefore require use of Environmental Status Indicators (Duda, 2002) to assess the degree of improvements in lake water quality and lake environment as a result of the projects. However, because of the long retention time and complex response dynamics of lakes, and the long time it takes for many interventions to be implemented, improvements in lake environments are generally only detectable in the long term rather than short term (ILEC, 2005; World Bank, 2005). Therefore, in addition to Environmental Status Indicators, adoption of other indicators such as Stress Reduction Indicators and Process Indicators has been proposed by the GEF for projects carried out in its International Waters Focal Area (Duda, 2002). Examples given by Duda (2002) for each indicator include: "Establishment of country-specific interministerial committees to engage key ministries that may be involved with reducing sectoral stresses on the water body" as a Process Indicator, "Larger mesh fishnet policy enforced" as a Stress Reduction Indicator, and "Measurable improvements in trophic status" as an Environmental Status Indicator.

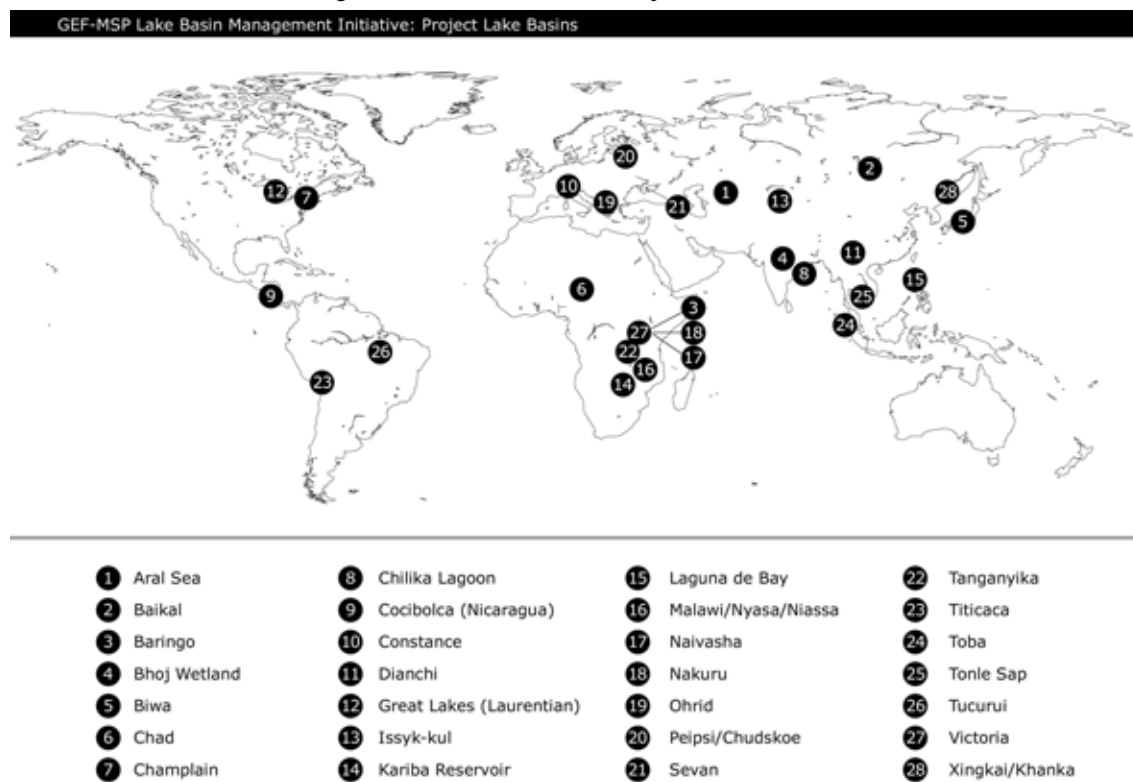
3.2 Lake Basin Management Initiative (GEF-LBMI)

Carried out between 2003-2005, the GEF-LBMI Project was the largest global-scale project to date to look at the comparative lessons learned regarding lake basin management. The project was funded by the GEF, implemented by the World Bank, and executed by the International Lake Environment Committee (ILEC) Foundation (ILEC, 2005).

The project looked at the management experience at 28 lake basins around the world (see Figure 1). A total of 288 participants from 41 countries provided direct input through three

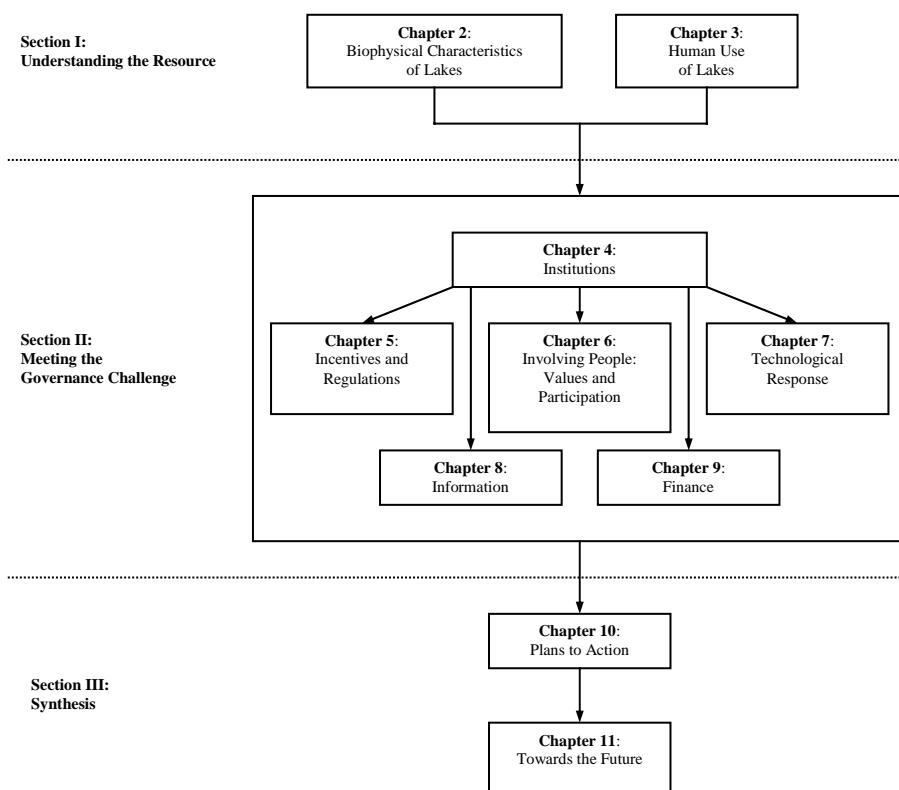
regional workshops. The project’s final report, “Managing Lakes and their Basins for Sustainable Use” (ILEC, 2005) was launched at the 11th World Lake Conference in Nairobi, Kenya in November 2005 and the 4th World Water Forum in Mexico City, Mexico in March 2006.

Figure 1: The 28 GEF-LBMI Project Lake Basins



The report makes two main contributions. First, it provides a synthesis of the “state-of-the-art” regarding practical lessons on lake basin management. Second, the structure of the report provides an “analytical framework”—a way of thinking about not just a single issue, but about lake basin management in its entirety. This framework is shown as a flowchart in Figure 2.

Figure 2: Analytical Framework of the GEF-LBMI Report



This analytical framework is not an evaluation framework, *per se*, but rather it provides a path for someone thinking about lake basin management. It emerged from the GEF-LBMI project as an agreed way of viewing lake basin management in its entirety. The goal is that if someone uses this approach, then none of the key issues will be left out of the analysis.

The flexibility and comprehensiveness of this approach has been fruitful. It is used as the basis for the curriculum of the JICA Integrated Lake Basin Management Training Course, a two-month program held annually at ILEC to teach mid-level officials from developing countries the essentials of lake basin management. It has also spawned a set of indicators for the World Bank (described in the next section). Finally, it is the foundation for Integrated Lake Basin Management (and hence, the ILBM6 framework developed here).

3.3 World Bank

Based on the GEF-LBMI analytical framework, the World Bank developed a suite of indicators to be used for project managers working on lake basins (World Bank, 2005). The indicators (shown in Table 2) are used as a guide for evaluating how effectively the components of lake basin governance are implemented in a given project or lake basin. World Bank (2005) illustrated the use of these criteria by applying them to the 28 GEF-LBMI

project lake basins.

Table 2: The World Bank's Indicators of Effective Implementation of the Components of Good Lake Basin Governance*

	Policy	Institutions	Rules	Public Participation	Information	Finances
Criteria for Effective Implementation	Clarity of direction	Technical and administrative capacity	Recognized and respected source	All affected groups involved	Reliable understanding	Charge for resource use
	Cross-sectoral consistency	Pathway to decision makers and stakeholders	Inherently fair	Allow sufficient time	Long-term monitoring	Linkage to representation and local use of funds
	Assignment of powers	Use existing structures	Community involvement	Use existing representative structures	Pathway to management	Legal authorization
	Role of community, local government and NGOs	Flexibility	Mix of approaches	Clearly defined roles	Availability to stakeholders	Multiple sources of funds
		Resources for enforcement	Access to resources	Sustainable knowledge and capacity		

*Source: World Bank (2005)

Note that the six components are similar to the six chapters in the second section of the GEF-LBMI framework, but with World Bank (2005) classifying Policy and Rules as two distinct categories and with Technology being excluded. It is likely that this format was decided upon to best serve the specific needs of the World Bank.

In many ways, this approach is similar to the DAC5 approach: the six components (Policy, etc.) can be thought of as analogous to the DAC5 Evaluation Criteria (Relevance, etc.), but with the "Criteria for Effective Implementation" in Table 2 being detailed indicators not present in DAC5. While the difficulty lies in making indicators such as "inherently fair" operational, this approach provides a useful starting point for thinking about detailed indicators for lake basin management and associated projects.

3.4 Summary

Overall, there are at least four different approaches which are currently available for evaluating either specific intervention projects or lake basin management as a whole: DAC5, the GEF indicators, the World Bank indicators/criteria and the GEF-LBMI analytical framework. Each has its strengths and limitations which are mainly determined by the scope (is the focus on a given project like DAC5, GEF or World Bank, or is it broad in scope like GEF-LBMI?) and the degree to which specific indicators for implementing criteria have been established (detailed for World Bank and partially GEF but not DAC5 or GEF-LBMI).

In fact, it may impossible to develop a fully scalable (from individual project to whole lake basin), detailed evaluation framework for application in lake basin management. The way in

which DAC5 leaves the assignment of individual ranking for each criterion up to the given agency preserves a valuable degree of flexibility. The remainder of this paper focuses on an alternative approach which attempts to maintain flexibility while providing key insights on the evaluation of specific lake basin projects: the ILBM6 framework.

4. Development of ILBM and the ILBM6 Framework

4.1 Integrated Lake Basin Management (ILBM)

One of the main follow-up activities of the GEF-LBMI project has been the development of the concept of Integrated Lake Basin Management (ILBM). While most of the ideas behind ILBM were present in the GEF-LBMI report, a recent project funded by the Ministry of Environment, Japan, has contributed the formalization of the concept of ILBM (ILEC and MOE, 2007). In essence, ILBM is the GEF-LBMI analytical framework but with an applied planning perspective.

ILBM is still a young concept which needs further elaboration and testing but it is already being widely applied in diverse settings. For example, it is being used as the basic framework for planning the 2nd Phase of the World Bank's Lake Victoria Environmental Management Programme and it was one of the core themes of the 12th World Lake Conference in Jaipur, India.

4.2 ILBM6

Operationalizing the ILBM concept to function as an evaluation framework is still in the early stages. In fact, the work done here as part of the JBIC Ex-Post Evaluation is the first step along that road. It was decided by JBIC and the external evaluators that for this evaluation, it would be most valuable to use some appropriate concepts from ILBM to make supplemental observations to the DAC5 evaluation. This approach has been dubbed ILBM6 because it focuses on six main criteria (Institutions, Policy and Rules, Public Participation, Technology, Information, and Finances). The approach also looks at several other key issues not easily dealt with in DAC5 (such as Setting the Agenda and the Geographic Scope of the Project), so the term ILBM6 should not be seen as indicating the absolute number of criteria that are examined but rather as a rough indication that the analysis is focused on lakes and lake basins and that it goes beyond the formal limits specified in DAC5.

An expanded list of topics and possible questions to be examined as part of the ILBM6 evaluation is shown below. The reader will note that the list is essentially the GEF-LBMI analytical framework but put forth as a set of key, exploratory questions.

- Topic 1: Setting the Agenda
 - How did the project as whole come about?
 - How did the individual project components get decided on?
 - What should have been different, in terms of “process of deciding” and “individual components”?
- Topic 2: Geographic Scope of the Project
 - The project seems to focus mostly on in-lake and littoral projects. What about upstream issues such as runoff from fields?
 - What about the project’s effects on the downstream?
- Topic 3: Institutions
 - How did creation of LCA change the institutional landscape? What were the advantages/disadvantages of creation of this institution?
- Topic 4: Policies and Rules
 - What were the key behaviors that got changed through the project? Which desirable behaviors were reinforced?
- Topic 5: Public Participation
 - Were the people affected by the project effectively part of the project design and decision-making?
- Topic 6: Technology
 - How well have the project’s technical interventions been effective/maintained? To what degree were the root causes of problems addressed?
- Topic 7: Information
 - How well understood is the situation of the lake regarding problems, causes and effects?
- Topic 8: Financing
 - What are the key financing needs right now?
- Topic 9: Planning
 - How did the LBCMP fit in to pre-existing programs/projects?
 - How do present projects (ADB, etc.?) build upon the LBCMP?
 - What, ultimately, are the greatest needs now?

5. Application of ILBM6 to the Lake Bhopal Case

5.1 Methods

Various methods were employed to address these questions as part of the ILBM6 evaluation. The main event was a Workshop held in Bhopal in August 2007 in which the above topics were discussed with a large group of stakeholders ranging from government officials to local NGOs. Additionally, comments from a Workshop held in May 2007 (as part of the DAC5 evaluation), as well as information gathered from consultant site visits and a stakeholder questionnaire (as described in Nakamura, et al. 2007) were used to elaborate the ILBM6 topics.

5.2 Results

It was agreed that the most useful approach would be to highlight areas that would assist the decision makers and stakeholders in the Lake Bhopal basin to make practical improvements to current approaches rather than dwell on specific project implementation issues in the past. Additionally, many of the issues that are addressed in the ILBM framework above have been adequately covered in the DAC5 evaluation. Therefore, for this report, we have selected six of the questions from the above group that we feel can make the greatest supplementary contribution to the DAC5 evaluation. Recommendations follow each question.

Question 1. *How were the individual components of the project decided on?* (ILBM Topic 1: Setting the Agenda and Topic 5: Participation)

What development projects to undertake and *how* to undertake each project are complex questions that are dealt with at the highest levels between donor agencies and recipient countries. Decisions made at this early stage are especially important because they go on to steer the course of many individuals over the coming years. There is a tremendous power in setting the agenda. Therefore, one of the first and most important questions that ILBM asks is “Who decides what?”

Within DAC5, there is a related criterion, “Relevance”, which asks whether or not the project as a whole is consistent with needs and policies. As the DAC5 Evaluation (Nakamura *et al.*, 2007) shows, the JBIC Lake Bhopal Project was highly relevant, receiving a rating of “a”. There is no doubt that the general objective of the project, “to promote improvement of overall environmental conditions of Bhoj Wetland and improvement of water quality of the Upper and Lower Lakes...”, is highly relevant and a critical step in improving the lives of the people in the area.

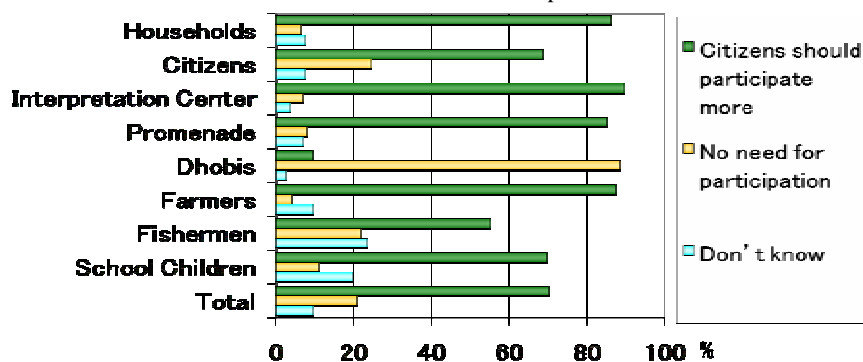
The difficulty with using only the DAC5 criterion of Relevance is two-fold: first, it is hard to imagine a project that could reach the approval stage but is not relevant; and therefore, second, a key issue is the relevance not just of the whole project but also of the individual components.

For the first point, it is interesting to examine the results of Ex-Post Evaluations for other JBIC projects. According to JBIC (2006), of the 56 project evaluations that were released in Fiscal Year 2006, 98% were rated “a” for relevance (55 rated “a”, 1 rated “b”). However, for overall ratings based on all five criteria, only 37% of the projects were rated “a”. Therefore, it seems that “relevance”, as applied by DAC5, is somewhat irrelevant. This is not surprising, though, because it would be difficult for a project to pass the approval stage unless it was seen as being highly relevant.

If we assume that the general relevance of the project is beyond doubt, then the issue becomes: Were each of the project components relevant? How were they decided on? Was participation of stakeholders adequate when setting the agenda?

Overall, there seems to be a general consensus among stakeholders that their level of participation in the project was lower than they would have liked. Results from the questionnaire survey of over 700 stakeholders in response to a question on participation are shown in Figure 3.

Figure 3: Questionnaire Response to “What is your opinion about citizen participation in future projects for conservation of Lake Bhopal?”



The only group not in favor of more participation is the Dhobis. This striking result may be due to the fact that the relocation of the Dhobis was a major issue which *did* require extensive consultations between the government and the Dhobis, but the Dhobis are currently dissatisfied with what they perceive as a lack of government follow-up on promises made during that process (Documented in Nakamura *et al.*, 2007).

As for the question of “who decided what components should be included in the project?”, it was clear in the stakeholder’s workshop that consultation was not extensively held during the

project development phase. One participant remarked, to the general agreement of the audience, that the May 2007 Stakeholder's Workshop was the first time he ever had a chance to discuss the project with the government and other stakeholders. The point was not "that was wrong and I am bitter" but rather "this is something we need to continue into the future". In the various site visits and other consultations, we found quite a bit of evidence of the project attempting to inform and get the approval of the affected stakeholders; however, evidence of stakeholder participation in the planning stages was not abundant.

Recommendation 1. Continue the dialogue between stakeholders and government which has been started in the two Ex-Post Evaluation Workshops.

Question 2. *To what extent did the project focus on the upstream areas?* (ILBM Topic 2, Geographic Scope of the Project)

Perhaps the most fundamental point of ILBM is that the focus of management should be the lake *and its basin*. Historically, around the world, lake management has been just that---management activities focused on a lake itself, sometimes extending to the land, but overall, a strong focus has traditionally been on the water and not the land. The work done in the GEF-LBMI project showed that, for the 28 study cases, the vast majority of the problems originate from human activities in the basin, not from activities in the lake itself (except of course notable exceptions like over-fishing) (ILEC, 2005). Therefore, if one wishes to sustainably manage a lake, chances are that most of the management activities will need to take place on land, often far from the lake itself.

Given this background, it is interesting to compare the scope of the LBCMP (figure 3) relative to the whole lake basin (figure 4). Clearly, most of the project's components took place either within the lake itself (desilting, dewatering, floating fountains, etc.) or very near the shoreline (afforestation, VIP road, bridge and promenade, etc.). The gabion structures appear to be the "farthest upstream" component, but even these are usually placed within a few kilometers of the lake itself.

Figure 3: Map of project site



Figure 4: Drainage basin of Lake Bhopal



Naturally, this in-lake and near-lake focus of the LBCMP does not necessarily mean that the project's components were improperly allocated. The sewerage and sewage treatment component is a good example of how untreated sewage from large urban areas adjacent to the lake was one of the critical issues that needed to be addressed. The DAC5 evaluation discusses how that was addressed and how the lake water quality has improved. However, when considering the issue of siltation, it is difficult to imagine how the problem can sustainably be dealt with unless there are major actions to prevent soil erosion in the upstream. The organic farming component, which was a mid-project add on, may to some extent address this problem.

The field surveys and the workshops confirmed the strong "lake" focus of the project. For example, during the May 2007 field survey, when we reached the area of where the Kolans River enters the lake (in the far western tip of the lake, see figure 4), we asked the local consultant if it would be possible to journey upstream because no field survey was conducted in the upstream during the first survey in November 2006 and because the river (at the inflow site) was extremely silty and we wanted to see the origin of the silt. We were told that, although it might be possible to go, we would have to take a long detour on a different road because there are no serviceable roads leading directly there. It was interesting to see how a lack of infrastructure (roads) meant that an area within 10-15 km was essentially "off the radar".

A further illustration of the disconnection between the lake and its upstream was apparent at the Stakeholder Workshop in May 2007. We asked the question, "By a show of hands, how many people came from Sehore district today?" The Sehore district makes up approximately 30-35% of the total lake basin area, occupying approximately half of the upstream area (see figure 4), but out of the approximately 100 people in the room, no one raised a hand. This is actually not surprising because the meeting was to gather stakeholders of the LBCMP and most of them simply live near the lake in the Bhopal District.

Recommendation 2: Study further the sources of silt and nutrients from the upstream. Consider possible "win-win" situations with farmers to control soil erosion and nutrient loss. Ensure that the management of the lake basin includes the relevant parts of the Sehore District.

Question 3. *Were the effects of the project on the downstream areas considered?* (ILBM Topic 2, Geographic Scope of the Project)

When considering the geographic scope of the project, it is necessary to look not only upstream but also downstream and ask the question, "What effects, if any, did the project have

on areas downstream of Lake Bhopal?” There were two project components in particular which triggered this question: re-location of the dhobis and outflows from the sewage treatment plants.

First, as reported in the DAC5 Evaluation, “Washermen (dhobis) who were previously residing on the lakeshore of the Lower Lake and washing clothes directly in the lake have been relocated downstream of the lake and the lakeshore developed into parks. Input of pollution load to the lake from washing activities has thus been prevented.” The ILBM perspective would say “has been shifted” rather than “has been prevented” unless of course in addition to moving the dhobis there was an effort made to treat the water they are discharging. This does not appear to be the case.

Second, it is without a doubt that (despite any shortcomings) the construction of the sewage treatment plants along with the sewerage system has led to a decrease in the flow of raw sewage to the lake. However, similar to the dhobi issue, the ILBM perspective asks “How has the total load of pollution from sewage to the environment been decreased? Has it shifted?” There seem to be a number of competing factors at work: the total amount of sewage generated has increased as the population has gone up; but the amount of sewage treated has increased by a greater rate (see Table 2 of the DAC5 Evaluation); and the outflow of the sewage treatment plants is downstream of the lake. From this, it is clear that the lake itself has been helped by the sewerage component but it is unclear how the downstream has fared. During our site visits in November 2006 and May 2007 and interviews with officials from PHED, we were assured that even if a given sewage treatment plant was not being operated up to design levels, the sewage was no longer reaching the lake, i.e. it was being diverted downstream.

Regarding both of these issues, we asked the LCA (in May 2007) for their opinion on possible negative effects the LBCMP might have had on the downstream. We were told that while indeed there might be a shifting of some pollution from the lake basin to the downstream river system, those rivers and the reservoir (Hahali Reservoir; a little over 20 km downstream on the Hahali River from Lake Bhopal) are used only for agricultural purposes; therefore, even if the water quality there were to degrade a bit, there would not be much concern. There is no reason to doubt this analysis; indeed, it seems obvious that the value of preventing raw sewage from flowing into the intensely used Lake Bhopal is much greater than the possible negative effects on the downstream. However, it is interesting to note that in the water supply schemes proposed under the Master Plan for Year 2021, there is a proposed scheme to divert water from the Hahali Reservoir to Bhopal. The ILBM perspective of looking both upstream and downstream may yet become quite useful.

Recommendation 3: Include in the post project activities a water quality monitoring program that would help assess the impact to downstream rivers and lakes. Ensure that discharge of

sewage treatment effluents would avoid damaging the downstream needs today as well as in future.

Question 4. *How did the creation of LCA change the institutional landscape?* (ILBM Topic 3, Institutions and Topic 8, Finance)

In the ILBM perspective, institutions are the “who” of lake basin management. They are the engines of governance---the organizations that are given authority to induce changes in behavior that have been agreed on by the society as a whole. In the Lake Bhopal case, we found that the institutions enjoy a high degree of legitimacy in the eyes of the citizens. Although there were naturally complaints from various stakeholders about decisions, there was no one who challenged the legitimacy of the existence of the Lake Conservation Authority (LCA) or the Bhopal Municipal Corporation (BMC) or any of the other relevant institutions. Perhaps this is a feature of India’s unique system of governance and perhaps it is due in part to the relative accessibility of judicial recourse to challenge administrative decisions. Nevertheless, it is rare to see this in developing countries, and the existence of this general sense of legitimacy is an intangible but valuable benefit for lake basin management.

On first inspection, the institutional arrangements for the LBCMP may seem overly complex. As the DAC5 Evaluation explains, implementation of the project involved “multiple state government departments and agencies as implementing agencies, with the Housing and Environment Department (MPHED) as the executing agency and Environmental Planning and Coordination Organization (EPCO) as the coordinating agency.” If anything, the situation became more complex after the project ended with no less than five agencies (Public Health Engineering Department (PHED), Capital Project Administration (CPA) Forest Division, Van Vihar National Park (VVNP), BMC and LCA) with various operations and maintenance responsibilities on top of their other institutional mandates (Nakamura *et al.*, 2007, especially figure 10).

Although this might seem overwhelming and unnecessarily complex, it is not unusual in the lake basin management context. It is almost impossible to think of a case where a single institution is responsible for all management activities in a given lake basin. The usual reason is that the sectoral nature of agencies at the national level has long-reaching effects. For lake basins that cross international borders, there is an even greater level of complexity. Nevertheless, it is quite common for even such a relatively small lake basin such as the Lake Bhopal basin to have such a complex institutional structure.

Therefore, taking a certain level of institutional complexity as a given, the key question when evaluating an institutional set-up is to consider how well the existing institutions coordinate their work to meet the agreed societal goals. A related question is, “Do institutional conflicts impede effective management?”

The key institutional change that resulted from the LBCMP was the creation of the LCA. The LCA was created to be the lead organization responsible for conservation and management of Lake Bhopal. Importantly, it is also responsible for coordinating the activities of the other various agencies. It is still too early to judge whether or not this will prove to be a successful initiative. In theory, it is a very good idea to ensure that coordination is carried out, preferably by a single agency. Also, giving LCA a mandate for conservation and management seems to be a reasonable decision.

However, in practice, things have not gone as optimally as planned. LCA still does not have the proper statutory authority to carry out its mandate; hence, it is not yet functioning as a truly coordinating agency. From the ILBM point of view, one of the dangers of prolonged institutional uncertainty is that there may be a general decrease in the effectiveness of all institutions caused by a “blurring of authority”. For example, it is possible to speculate that one of the reasons for the generally poor maintenance of the CAT structures (under responsibility of BMC), or for the problems with O&M at the sewage treatment plants (under PHED), or for the lack of adequate follow-up afforestation measures (under CPA) is because the nominally responsible agencies---due to the creation of LCA---now have a less clear mandate. The mandate might still be there, but it is our impression from interviews with the various agencies, that the current degree of uncertainty in contributing to the condition that led the DAC5 evaluation to cite concerns regarding sustainability.

One final issue that concerns the effectiveness of LCA is the fact that LCA is responsible not just for Lake Bhopal but for all lakes in Madhya Pradesh. This is implicit in the name itself: it is not the LBCA (Lake Bhopal Conservation Authority), but rather the LCA---a much broader scope, and a scope which is almost unknown among the stakeholders in the Lake Bhopal basin, most of whom see the LCA as a body that is responsible for Lake Bhopal only. And not only is LCA’s mandate extremely broad, it is supposed to fund most of its activities through consulting work performed by its staff. This is the first case we have seen in which such a relatively small agency has been given such a broad mandate but without clear substantial and sustainable funding.

Recommendation 4: Make the mandate of each agency clear---both among the agencies as well as between the agencies and the general public. The ability to fulfill the mandates is closely related to the political commitment and institutional capacity in the allocation of the needed level of human and financial resources.

Question 5. *To what extent were the root causes of the problems addressed by the technical interventions? (ILBM Topic 6, Technology)*

Technological interventions have a long and successful history in lake basin management. According to ILBM principles, however, one of the key dangers of otherwise valuable technological interventions is that they will be used to treat symptoms of the problems and not the root causes. If that is the case, then short-term gains may be seen but in the long-term, the problems may remain and the funding may have been partly or wholly inappropriate.

The LBCMP was a highly technical project with the largest component being the sewerage and sewage treatment systems, but with major work also done on aeration, desilting, dredging and dewatering in the lake, afforestation and garland drains in the shoreline zones, and check dams and silt traps in the inflowing rivers. The project also included the construction of a link road which was designed, in part, to function as a barrier to shoreline encroachment (and we can testify from trying to cross that heavily trafficked road by foot to get to the lake shore during the May 2007 Field Survey, it is indeed a formidable barrier).

The sewerage and sewage treatment component is clearly focused on treating the root cause of some of the lake's most serious problems: pathogenic contamination and eutrophication. Anything that can be done to lessen the inflow of raw sewage to a lake that is used for contact recreation and as a drinking water source is going to improve the overall conditions. Therefore, despite the various implementation challenges highlighted in the DAC5 Evaluation Report, this component clearly dealt with root cause and when fully functional will make a major contribution to the long-term sustainability of the lake.

Afforestation has also received a very positive response in the stakeholder questionnaire with more people recognizing it as a project component than any other component (78% had knowledge of it) and with almost 3/4 of the people rating it as having a positive effect on the lake's aesthetic value. While not diminishing the value of this clearly successful component, one must wonder about the overall effect it has on stopping silt and nutrients from entering the lake if the silt inflows from the entering rivers in the upper watershed areas (Sehore district). In that regard, it falls somewhere between the "treating the symptom" and "treating the root cause".

In a similar way, the gabion structures also must be questioned as an effective means of dealing with the root causes. Simply put, silt trapped in a gabion structure is not just mass that needs to be removed (requiring operations and maintenance which unfortunately is not being done on the silt traps at the moment), but it is also valuable soil and nutrients that have been lost from a field somewhere upstream. While well-maintained silt traps may have significant

impact on keeping silt (and nutrients) out of the lake, if installed in sufficient numbers and well operated and maintained. It was our general impression from the Field Surveys that trying to keep the soil from leaving the individual farms would be a more sustainable approach.

The in-lake activities such as aeration, desilting, dredging and dewatering fall furthest along the line of “treating the symptoms”. At best they are stop-gap measures that may alleviate some of the problems such as impeded transportation due to excessive weed growth, but in the long-term such activities on their own cannot lead to sustainable management of the lake and its basin.

Overall, these may seem like criticisms of some of the project’s technological components, but it must be recognized that at this stage of Lake Bhopal’s development, it may be that some measures that treat symptoms (but not root causes) are also needed.

Recommendation 5. Ensure that the focus of technological interventions is biased towards ones that treat the root causes of the lake’s problems. Similar to Recommendation 2, this will probably entail more work in the upstream areas to prevent soil erosion.

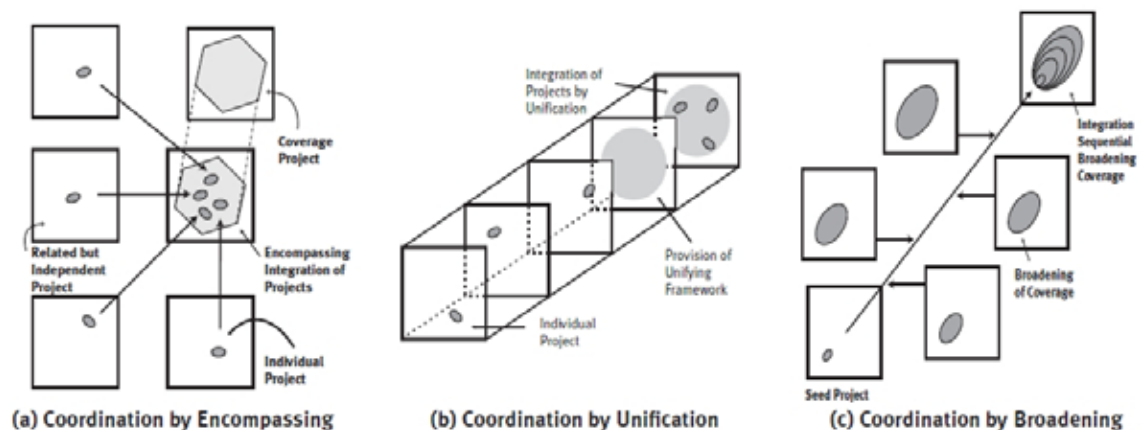
Question 6. *How did the LBCMP fit into the pre-existing lake basin management and how does it affect projects that follow it? (ILBM Topic 9, Planning)*

One of the limitations of the DAC5 framework is that, by taking a “project” viewpoint, it has difficulty making observations about important management issues that are either spatially or temporally beyond the project. This ability to look at how a given activity (for example, an ODA project) fits into the larger scheme of a given lake basin’s management one of the greatest strengths of the ILBM approach.

The sheer scale of the LBCMP relative to the size of the basin along with the fact that there was no comprehensive, preexisting management plan in place before the project, means that the LBCMP dominated the lake basin’s management while the project was active and that the project has naturally continued to exert its influence even after completion.

As discussed extensively in the Planning section of the GEF-LBMI report (ILEC, 2005), individual projects are usually integrated into the entire basin management scheme (as per figure 5) by either: “integration by encompassing” in which integration occurs when a specific project or program is instituted to coordinate independently developed sectoral or regional programs and projects that are being implemented at the same time; “integration by unification” in which a post-hoc unifying project is implemented after several independent projects have already been operating; or by “integration by broadening” in which a single project, based on successes, expands through time and space.

Figure 5: Three forms of integration (Source: ILEC, 2005)



It would appear that the LBCMP is closest in form to the seed project at the beginning of “Integration by Broadening”, but calling a project of such large relative magnitude a “seed” project is somewhat misleading. Nevertheless, in the sense that the LBCMP was more-or-less the first major step in Lake Bhopal’s management, it does have qualities of a seed because from it has sprouted a structure on which a full lake basin management program can be based. Like a growing tree, it needs water and nutrients to grow and survive; there are areas which need to be pruned, areas which require extra support and other areas the simply need room to be left alone and grow.

In short, given this temporal position as “first on the block”, one must evaluate the LBCMP not by what it did relative to other projects, but rather on how the projects that are now developing fit into the framework which the LBCMP has created. The most major follow-up project to date has been the Asian Development Bank’s project which will deal with sewerage by improving the connections of individual sources of wastewater with the treatment plants. It would be difficult to find a more appropriate activity at this time.

Recommendation 6: When designing future projects, make sure they fit into the framework which has been created by the LBCMP. Avoid “reinventing the wheel”.

6. Recommendations

Communication between stakeholders and decision makers is crucial for achieving ILBM. A common way of fostering this communication is to have an external facilitator engage the concerned parties in periodic discussions. Two suggested approaches are, 1) to enhance communication between the project implementation agencies and the project beneficiaries and stakeholders (the citizen and stakeholder groups with involvement of NGOs and academic institutions) through the lake forum of a sort, and 2) to infuse the lake basin management experience and lessons learned that are external to the Lake Bhopal case with

involvement of experts from within and outside the Lake Bhopal region, including those from overseas.

The former will help broaden the scope of the project ownership from just the implementing government agencies and direct beneficiaries to the Bhopal citizen community at large, so that those formerly dissociated from or indifferent to the project (including politicians and high-ranking government officials) may be most meaningfully brought in as key role players to contribute to the sustainability of the project. The latter will help enlighten both the implementing agencies and the potential project beneficiaries with regard to the prospective challenge and the potential benefits in achieving the long-term sustainability of LBCMP. In addition, an agency like LCA may in future be able to play a key role in sharing their own experience and lessons learned for others to benefit as well. With small post-project financial commitments coming from the funding agencies as well as the state government, experienced international expertise with regional and global perspectives may also be usefully engaged.

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