

PROJECT-END EVALUATION OF OXBOW LAKES SMALL SCALE FISHERMEN PROJECT - II

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May 1998

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ACKNOWLEDGEMENT

The report is the outcome of a project-end evaluation of the Oxbow Lakes Small Scale Fishermen Project-II (OPL-II) conducted by BRAC's Research and Evaluation Division. The project has been executed by Department of Fisheries (DOF) of the Ministry of Fisheries and Livestock and BRAC, with technical assistance from the Danish International Aid Agency (DANIDA). The International Fund for Agricultural Development (IFAD) and DANIDA provided financial support for implementation of the project.

The author feels happy to acknowledge the contribution of the project implementing staffs, donor agencies and many others who were associated with the study. She likes to extend her heartfelt thanks to :

AMR Chowdhury, Ph.D, Director Research, BRAC for giving the opportunity and extending his overall support to conduct this study.

Mr. MG Sattar, Manager, Research and Evaluation Division, BRAC for his continuous support in carrying out the study, going through the draft and providing useful comments that helped in qualitative improvement of the report.

Dr. M. Rafi, Senior Research Sociologist, RED for reviewing the report and offering useful suggestions at various stages of accomplishing the report.

Dr. Hans A.J. Middendorp, Chief Technical Advisor, DANIDA Technical Assistance (DTA)/OLP-II for his valuable suggestions and contributions in designing the study.

Mr. Neaz Ahmed Apu and Dr. Rezaul Hasan, DTA; Mr. Abdus Sattar, Project Director, PIU of DoF; Mr. Bazlur Rashid, Thana Fisheries Officer (TFO), PIU, DoF; Mr. Timir Barman, TFO, PIU, DoF; Mr. Roy Harshid Kumar, TFO, PIU, DoF; Mr. Nasir Haider RM, BRAC; Mr. Shah Alam, RM BRAC; Mr. RM Farhad, AM, BRAC; Mr. AM Baqui, AM, BRAC; Mr. M Rabiul Islam, AM, BRAC and Mr. AKM Rafiqul Islam, AM, BRAC for providing information on OLP-II.

Mr. Mukarrom Hossain, Sector Specialist, Fisheries, BRAC's RDP for his constant support from the outset in conducting the study and in finalizing the report. The concerned field staff of OLP-II for their co-operation and assistance during field work.

The field interviewers, coders, persons associated with data entry, processing and analysis in computer for their diligent work in their respective areas.

To respondent stakeholders of OLP-II the author extends her special thanks for giving their time for interview and discussion.

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The LFTs from high yield lake area were less interested in receiving training as they were traditional fishermen and felt that they had adequate knowledge about fish cultivation. The LFTs from low yield lake areas were more interested in receiving training as they lacked knowledge on culture-based fisheries and wanted to increase their fish production. However, 96 percent of the respondents from both areas considered the training useful for them. As for use of the knowledge imparted through training it was observed that :

- a. Majority (63%) of the LFT stakeholders weeded out the oxbow lakes in time as recommended, whereas the rest did it at a time not recommended.
- b. Eighty five percent of the LFT stakeholders used Secchi disc³ to determine stocking density of fingerling. Majority of them were from the high yield lake area. The LFT stakeholders of high yield lake stocked lower rate of stocking than that was recommended at low Secchi depth and stocked higher rate than on recommended for the higher Secchi depth. Reverse picture was seen in the low yield lake areas.
- c. A portion (34%) of LFT stakeholders stocked fingerlings whenever they liked regardless of the appropriate timing of stocking. This tendency was found higher in the high yield lake area compared to the low yield lake areas.
- d. Majority of the LFTs stocked 5-inch size carps and this practice was found more common in low yield lakes compared to the high yield lake area.
- e. As for fish harvest. 67 percent respondents from high yield lake area caught fish throughout the year regardless of whether the fishing time was appropriate or not while 92 percent of the respondents from low yield lake areas harvested in the recommended time. It was observed that the FFGs started catching fish usually after 4 months of their stocking.

The study also looked into the utilization of knowledge relating to pond fish culture training, i.e., pond stocking, pond fertilisation and feeding and pond harvesting by the FFG stakeholders.

Due to inundation of ponds by flood water the FFGs stocked *dhani pona* (fry) so that before flood they could sell them out as fingerling. For this reason majority of the FFGs could not stock recommended quantity of fish in their ponds. Besides they could not stock in appropriate time for other reasons also.

About 61 percent of the FFGs applied organic fertilizer while 81 percent applied inorganic fertilizers every week. The amount of fertilizer applied was sometimes above and sometimes below the recommended doses.

Use and repayment of Loan

Sixty eight percent of the LFTs and a far less portion (13 percent) of the FFGs considered BRAC loan sufficient for fish culture in the oxbow lakes and in lake fish ponds, respectively.

³ A tool to determine primary productivity as well as stocking density of fish.

The stakeholders deposited the loan received from BRAC for fish culture in a joint account. Whenever they needed money they drew it from the joint account

Some (8%) of the FFG stakeholders were yet to receive loan for fish culture. One of the reasons for this was that the stakeholders could not fulfil the minimum amount of savings that were required for getting loan from BRAC.

About 49 percent of the LFTs were able to repay their loan regularly. The rate was higher among the LFTs of the high yield lake compared to the low yield lake areas. The FFGs lagged far behind in loan repayment. Only 22 percent of the FFGs repaid loan regularly. The FFGs of high yield lake area were, however, in a better position to repay loan regularly compared to their counterparts of low yield lake areas. The LFTs failed to make regular repayment of loan for several reasons:

- a. Low yield of fish in the oxbow lakes;
- b. Repayment of other than BRAC loan; and
- c. Loan repayment decision made by LFT committee.

Majority of the LFT stakeholders of both areas could not save money from their fish sale proceeds after meeting their household expenses. Those few who said that they could save some money, also felt that they were not sufficiently self-dependent, thus they would continue borrowing from BRAC for fish culture.

Relationship between LFT and FFG

About 45 percent of the LFT and FFG respondents reported to have conflicting relationship between the two groups. The reasons for conflicting relationship were : (a) disputed claim by LFTs and FFGs on oxbow lake ponds, (b) dispute over claim of fish in the inundated oxbow lake ponds, and (c) objection of LFTs 'on women's participation in fishing activities.

Problems faced in Fish Culture by LFT and FFG

Both LFTs and FFGs faced some problems in fish cultivation. The problems as mentioned by the LFTs were :

- a. Oxbow lakes are not sufficiently deep for fish cultivation.
- b. Conflict of LFTs with others in the locality due to stealing of fish from oxbow lakes.
- c. Incremental rise of the lease fee for fishing in oxbow lakes.

The problems faced by the FFGs in fish culture in oxbow lake ponds were :

- a. Irregularity in the loan disbursement and small size of BRAC loan.
- b. Inundation of ponds by flood water.

Policy Implications

1. The training provided for increasing fish production did not attract the traditional fishermen. Although the FFG stakeholders received training on fish farming and retained the

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knowledge they could not fully use those in practice. Constraints encountered in using training knowledge should be removed.

2. Both LFTs and FFGs claimed their rights on oxbow lake fish ponds. LFTs' disliking of women's participation in fish farming in lake ponds deteriorated the relationship between the two groups. The reasons are more of cultural and attitudinal than economic. Steps should be taken to ensure a healthy relationship between the two groups.
3. Demarcation of oxbow lakes should be finalized with genuine *dag*, *ijara* and *khatian* (plot, leased out, and record book, respectively) numbers through the Ministry of Land.
4. Separate ponds should be given to the LFTs to avoid conflict between them and the FFGs.
5. There is a need to combine the indigenous and modern technologies for increasing fish production.
6. Remedial measures are needed to address the problems that affected raising fish yield. A combination of strategies including deepening the oxbow lakes, protection of fish lakes from flood water, further technical inputs of fish culture and adequate supply of credit should be adopted. Higher yield resulting in higher return would inspire stakeholders for regular repayment of loan.
7. As suggested by the implementing agencies/organizations, BRAC's representation in the District and Thana Jai Mahal Committees should be ensured.
8. A number of the oxbow lake stakeholders did not get BRAC credit. Some of them said to have received the credit, but not in time. Many of the LFTs could not repay their loan regularly. The LFTs expect a system of flexible savings withdrawal. BRAC's RDP can look into these issues and ensure adequate and timely flow of credit.

1. INTRODUCTION

The First Oxbow Lakes⁴ Project (OLP-I) (1978-1986) comprising six lakes was initiated by the Department of Fisheries (DOF) with the financial assistance of the World Bank to increase fish production in the oxbow lakes. In this phase fishermen obtained 40 percent of the carps sale proceeds in exchange of their labour and money invested.

In line with the experience and success of OLP-I the DOF implemented the Oxbow Lakes Small Scale Fishermen Project-II (OLP-II) in 1992 with the financial and technical assistance of International Fund for Agricultural Development (IFAD) and Danish International Development Assistance (DANIDA). BRAC was invited by the Ministry of Fisheries and Livestock (MOFL) to work with the Project Implementation Unit (PIU) of DOF to help in poverty alleviation of the stakeholders (OLP-II, 1995; IFAD, 1988). The project covered 20⁵ of the oxbow lakes.

The OLP-II was funded through a loan to the Government of Bangladesh from IFAD and through a grant from DANIDA. The implementing agencies i.e., PIU of DOF, BRAC and DANIDA played distinct roles in OLP-II. The DOF coordinated the OLP-II through PIU, headed by the Project Director, with support from the DOF regular staff, i.e., District Fisheries Officers (DFO) and Thana Fisheries Officers (TFO). BRAC staff under OLP-II were supervised by the Regional Manager, Baor, under the BRAC Rural Development Programme (RDP) (DOF, BRAC, DANIDA and IFAD, 1997). The PIU and BRAC primarily prepared the list of fishermen and finally PIU gave them their fishing licenses. BRAC organized the poor fishermen, trained them and gave them credit support on behalf of the project (OLP-II). DANIDA Technical Assistance was implemented through a Danish consultancy firm, and by the Chief Technical Advisor. The DANIDA gave technical assistance to PIU of DOF and BRAC for implementation of the project.

⁴ Oxbow lake is locally known as baor.

⁵ Twenty three oxbow lakes in five districts of the South-western part of Bangladesh have been handed over to the OLP-II. Out of 23 Jhapa baor in Jessore district is under litigation, Chaitarkol and Hariharnagar baor in Faridput district are under open water fisheries management, not cultured-based fisheries. So these three baors are not under the production plan of OLP-II as of the decision of UNOPS Supervision Mission of 1996.

Although the OLP-II was initiated in 1988, the project activities started in July 1992. First four years (1988-92) were spent in finalization of agreements and mobilization of concerned agencies, planning and designing and organizing the target group⁶ in OLP-II whose socio-economic uplift was rolled through project activities. The project was over in December 1997 (DOF, DTA and BRAC, 1996a).

Under the auspices of OLP-II the fishermen cultured fish through their own management. They invested money and labour. In this phase the stakeholders of OLP-II equally shared the returns from fish sale under the project. In exchange they paid lease fee to the DOF every year. The objectives of OLP-II were to :

- a. Increase overall productivity of the lakes under the project and to construct fish ponds in the silted area of those lakes for enhancing general economy and providing nutritional benefits to the population at large.
- b. Provide assistance to the poorest users of the oxbow lakes so that they may attain a higher level of income and social status.
- c. Increase fish production and marketing of fish from project water bodies.

1.1 Stakeholders of OLP-II

The stakeholders of the project were grouped into three : (1) Lake Fishing Teams (LFT), (2) Fish Farming Groups (FFG) and (3) Fisheries Related Activities. In order to become stakeholders of the project it was necessary for one to be involved with fishing activities, his/her income should not exceed Tk. 10,000 annually and should possess less than 0.5 acre of land, including homestead.

Lake Fishing Teams (LFT): Traditional Hindu fishermen and land-less Muslim farmers together comprised LFT group. They culture fish in the oxbow lakes which involves stocking of fingerlings, fish harvesting and fish marketing. All LFT participants are male.

⁶ To target the stakeholders of OLP-II three criteria are considered: (1) persons with less than 0.50 acres of land, (2) who earn less than Tk. 10,000 (ten thousand) per year, and, (3) reside adjacent to the lake.

Fish Farming Groups (FFG): FFGs culture fish in the oxbow lake fish ponds which are constructed in silted parts or dried-out areas of the oxbow lakes. The participants of FFG also cultivate vegetables on the bank of fish ponds. Ninety-six percent of the FFG participants are women.

Fisheries Related Activities (FRA): FRA include the activities like fish trading, fingerling production, carp culture, duck rearing, net making and other allied activities supported by BRAC under the project. FRA are similar to the activities of Rural Development Programme (RDP) of BRAC. Most of the FRA participants are women (DOF, DTA and BRAC 1996a).

The organisations associated with the project made a provision for evaluating the project at its end, thus this study had been planned. The study aimed to concentrate on the groups directly involved with the fish farming i.e., LFT and FFG.

1.2 Rationalisation for Considering and not Considering Issues for Investigation

A number of studies have been conducted on oxbow lakes. One of those (DOF, DTA & BRAC, 1996a) indicated the main objectives of OLP-II, i.e., "increase in overall fisheries production" and "assistance to poorest users of oxbow lakes," had been successfully met. The fisheries production had increased by 3 to 5 times compared to the levels prior to OLP-II intervention (DOF, DTA, and BRAC 1996a). The economic profitability of fisheries production had been fully documented. Economic condition and nutritional status of OLP-II stakeholders had been reported in 1997 (Ahmed et al). Since, past studies had covered these aspects it was decided not to focus on these aspects once again in this study.

For achieving the objective "assistance to poorest users of Baor", the stakeholders of OLP-II were organised into groups, and were given training and credit. The implementing agencies of the project had successfully organised their training programme for the beneficiaries. The major emphasis was given to the training for FFGs because the FFGs were mostly women and fishing was not their traditional job. Training was expected to develop the awareness in them and provide them the technical knowledge for fish culture. The study would like to know the extent stakeholders used their training knowledge to perform the project related activities. It

was assumed that the success of a stakeholder depended on the proper implementation of the training.

Credit assistance helped the stakeholders to procure inputs required for fish culture. It was observed that by June 1996 a credit of Tk. 38.13 million was disbursed and Tk. 22.17 (i.e.,58% of the amount disbursed) million was repaid. Though the oxbow lake fisheries were mostly profitable it might be mentioned that during fishing season the LFTs and FFGs were not in need of any new credit (DOF ,DTA and BRAC 1996b). But in reality the credits were extended to them. It was also observed that most of the oxbow lakes stakeholders received credit in excess of their operating costs (DOF, DTA & BRAC 1996a). These scenarios raised two obvious questions. First, why excess loans were taken by the stakeholders. Second, inspite of the success of the project why stakeholders were slow in repaying their loans. The study would like to address these questions.

One of the objectives of the project was to make its stakeholders financially self-sufficient. Thus it was important to know the extent to which they had become self-sufficient.

Fish farming was not a traditional job for women, but all of the FFGs were found to be doing well in that. On the other hand LFTs were comprised of male members. It was observed that an unfriendly relationship prevailed between the LFTs and FFGs. The FFGs could be easily overpowered by their strong male counterparts in a disputed claim. The FFGs apprehended that in future the influentials in the lake areas would take over their ponds (Middendorp-Kolenbrander,K. and N.S.Hasan,1995). For smooth operation of oxbow lake pond fisheries it was important to investigate the reasons for in-congenial relationship between LFT and FFG groups. It would assume that answering such questions would be useful to the project.

1.3 Objectives of the Study

- a. To know the extent the training received by the stakeholders of OLP-II on fish production was implemented by them and investigate the constraints faced in the implementation of the training;
- b. To explore how the loan was utilized by the stakeholders of OLP-II and procedure followed in repayment;
- c. To examine the relationship between the Lake Fishing Team (LFT) and Fish Farming Group (FFG), in relation to their rights of fish culture in the oxbow lake fish ponds; and
- d. To know the advantages and disadvantages in the implementation of the project by the parties involved with the project.

2. METHODOLOGY

2.1 Study Area

Data for this study were collected from four oxbow lakes having both LFTs and FFGs in them. The mean carp fish production of 20 oxbow lakes under the project in 1996-97 was 267 kgs per hectare. Oxbow lakes producing carps above the mean were considered high yielding lakes and those produced below the mean were considered low yielding lakes. The oxbow lakes selected for this study represented both high yielding and low yielding lakes. The four lakes were Nasti, Bukhbhara, Bahadurpur and Ujjalpur (Table 1). Due to less activities of the FFGs in the high yield lakes only one such lake could be selected for this study.

Table 2-1. Location of the Study Areas

Name of oxbow lakes	District	LFT Production* Carp (Kg/ha)
Nasti	Jhenaidah	1024
Bukhbhara	Jessore	155
Bahadurpur	Jessore	92
Ujjalpur	Chuadanga	37

*Source : Progress Report No. 10. 1996. p.20.

2.2 Study Samples

The leaders of LFT and FFG were selected purposively whereas the members from the same were selected randomly. A number of staff from DANIDA, PIU of DOF and BRAC associated with implementing the programme were also interviewed.

Ten and 30 percent of the stakeholders from LFT and FFG each were included as sample, constituting 68 LFTs and 64 FFGs. From the implementing agencies 12 resource persons were purposively selected for interview.

2.3 Methods of Data Gathering

Data were collected from the stakeholders through structured questionnaires. Besides focus group discussion were conducted to gather qualitative information from them. The focus groups were formed from among the respondents randomly selected for structured questionnaire interviews.

3. UTILIZATION OF TRAINING KNOWLEDGE BY OLP-II STAKEHOLDERS

The project organized training on culture-based fisheries for the stakeholders associated with both LFT and FFG. This chapter discusses the practices and utilization of knowledge learnt from training of culture-based fisheries of LFTs and FFGs in two section.

3.1 Lake Fishing Team (LFT)

As recommended by OLP-II, both LFT and FFG stakeholders cultured three species of Indian major carps (Rohu, *Labeo rohita*; Catla, *Catla catla* and Mrigal, *Cirrhinus mrigala*) and three species of Chinese carps (Silver carp, *Hypophthalmichthys molitrix*; Grass carp, *Cteropharyngodon idellus* and Common carp, *Cyprinus carpio*) in oxbow lakes and in ponds. The LFTs cultivated all six species of carps recommended. Along with these recommended species they also cultivated two more species i.e., Big head carp, (*Aristechthys nobilis*) and Thai Sarpunti, (*Puntius sarana*) as these were more profitable to culture than Indian carps in terms of fish growth and market price of fish.

Seventy five percent of LFTs were given training on baor biology, baor deweeding, baor stocking, baor harvesting, baor infrastructure maintenance and baor records keeping. This study gathered data from LFT respondents on their practice and knowledge regarding baor deweeding, stocking and harvesting. The LFTs of low yield lakes participated more in training compared to their counterparts of high yield lake. It is evident from Table 3-1 that the stakeholders of high yield lake were less interested in training as they were traditional fishermen and felt that they had sound knowledge on fish cultivation. For this reason they needed training on more improved fishing technology compared to one offered to them in order to attract their interest. On the other hand the LFTs of low yield lakes were interested in receiving training due to their lack of knowledge of culture-based fisheries and they wanted to increase fish production. In this context, all of the LFTs of low yield lakes and the vast majority of high yield lake considered that the training had benefited them. According to the vast majority (96%) of both high and low yielding lakes the LFTs learnt cultivation of quick growing fish which they did not know before receiving training. Usually they did not cultivate fish in

oxbow lakes before intervention of OLP-II. Now they earn much more than what they did before participating in the project.

The LFT stakeholders of low yield lakes mentioned some of the specific items of training on baor fisheries which have benefited them.

- Detecting harmful and useful aquatic weeds,
- Learning about stocking and harvesting period of fish,
- Learning about limnological aspects (Secchi depth and water colour) and on the basis of those determining the density of fingerling stocking,
- Learning about feeding habit of different species of fish,
- Learning about fingerlings production,
- Learning about planning; and
- Developing awareness, guarding baor, checking unfair activities of group leaders.

In contrast the LFT respondents of high yield lake did not consider training beneficial to them as they felt that the training knowledge did not bring any benefit to them.

Table 3-1. Participation in Training by LFT Stakeholders (in percentage)

Training received	Oxbow lakes		
	High yield n=18	Low yield n=50	All n=68
Yes	55.6	82.0	75.0
No	44.4	18.0	25.0

3.1.1 Type of Aquatic Weeds in Oxbow Lakes

The project identified four types of harmful aquatic weeds and another four types of useful aquatic weeds in lakes and introduced them to the LFT stakeholders through training. The harmful aquatic weeds recommended by OLP-II were *Kachuripana* (water-hyacinth, *Eichhornia crassipes*), *Kachuri* (*Monochoria hastata*), *Shapla/lotus* (*Nelumbo nucifera*) and *Pata Shyaola* (eel grass-*Vallisneria spiralis*). On the other hand the useful aquatic weeds were *Kata Shyaola* (hornwort-*Ceratophyllum* spp.), *Tatua/Jhajhi Dam*, *Kalmi* and *Khudi Pana*.

Majority (75%) of the LFTs did not know about the harmful and useful weeds in oxbow lakes before receiving training. It is observed that the stakeholders of low yield lakes were more ignorant compared to their counterparts from high yield lake.

Some of the respondents who had idea about the harmful and useful weeds before receiving the training as because fishing in oxbow lakes was their family occupation. Their forefathers had introduced those weeds to them. Other respondents learnt about these from their peers.

The LFT respondents recognised some harmful weeds like *Kachuripana*, *Pata Shyaola*, *Chamta* (Lichen, one kind of filamentous algae, Ahmed et al., 1997), *Shapla* or *Padmo* (lotus), *Lata Ghas*, *Leirko Shyaola*, *Kata Shyaola* (hornwort), etc. (Table A1). It may be mentioning that *Kata Shyaola* was introduced to the LFTs as useful aquatic weed in training. Albeit a few LFT respondents identified *Kata Shyaola* as harmful aquatic weed.

On the contrary, *Kalmi* followed by *Pata Shyaola*, *Chuna/Teto/Koyla Shyaola*, *Jhahi Dam*, *Khudi Pana* and *Kachuripana* were recognised as useful aquatic weeds in lakes by the LFT respondents (Table A2). *Kachuripana* and *Pata Shyaola* were harmful weeds according to OLP-II, but some LFTs thought them as useful weeds. This observation was supported by another study report (Ahmed et al., 1997) indicated that when there was *Kachuripana* there was no *Chamta* (filamentous algae). The fishermen faced problem when increase in *Chamta* adversely affected fish growth and mortality due to the dewatering of *Kachuripana*. The fishermen reseeded *Kachuripana* in the oxbow lakes as a remedial measure. According to some LFTs, however, in high yield lake all aquatic weeds were useful in oxbow lake if that was in optimum quantity. Excess of any weed was harmful even if it was considered to be useful to the oxbow lake fisheries.

In the study area the LFTs were asked whether their lakes were considered free from harmful aquatic weeds. In this context only 25 percent of LFTs thought that their lakes were free from harmful aquatic weeds. In comparison between high and low yield lakes 77.8 percent of LFTs of high yield lake considered their lake was free from harmful weeds while in low yield lakes only 6.0 percent felt alike (Table 3-2). Another study (PIU, DTA & BRAC, 1996) found that

Kachuripana (water-hyacinth), an harmful weed, covered high percentage of water surface area in Ujjalpur baor⁷ (30%), another harmful weed, *Pata shyaola* (eel grass) covered high percentage of water area in Bukbhara baor (70%), and in Bahadurpur baor (45%). It was important to mention that some LFTs claimed that there was no other harmful weeds except *Pata shyaola* in Bukbhara baor. However, in Bahadurpur baor highest filamentous algae was found which covered 15 percent of water surface. In general high percentage of water area was covered by macrophytes in Bahadurpur (97%), Ujjalpur (92%) and Bukbhara baor (79%). The high density of submerged macrophytes in vegetation area was found in Bukbhara baor (7.15 kg/sqm) while Nasti⁸ baor was void of submerged macrophytes.

Table3-2. Oxbow Lakes Considered Free from Harmful Weeds by the Respondents (In percentage).

Free from weeds	Oxbow lakes		
	High yield n=18	Low yield n=50	All n=68
Yes	77.8	6.0	25.0
No	22.2	94.0	75.0

3.1.2 Period of De-weeding

The best time of de-weeding in oxbow lake as of OLP-II was the Bengali months of Falgun⁹ and Chaitra¹⁰. Majority (63%) of the LFTs had weeded out the baors in time while others in the period of Kartik to Magh¹¹. No significant difference was found between the high and low yield lakes in this respect. Further the LFTs were asked whether they weed out the lake before intervention of OLP-II. It was found that the vast majority (85%) did not weed out the lakes before getting their affiliation in the OLP-II. Half of the LFT respondents of high yield lake did not weed out their lake before getting affiliation in the OLP-II whereas almost all of the LFTs of low yield lakes did not do it.

⁷ Ujjalpur, Bahadurpur and Bukbhara baors were low yield lakes

⁸ High yield oxbow lake

⁹ Falgun=13 February to 14 March

¹⁰ Chaitra=15 March to 13 April

¹¹ Kartik to Magh=16 October to 12 February

3.1.3 Fingerling Stocking in Oxbow Lakes

The lake fisheries management training had given lessons to the stakeholders of OLP-I on fingerling stocking . "Since an oxbow lake fishery is essentially a carp culture-based fishery, appropriate stocking and regular harvesting are the key management factors in maximizing the yield" (Hasan et. al. 1997). In this regard Secchi disc was used as a tool to determine stocking density in culture-based fisheries.

The LFT stakeholders were asked whether they used Secchi disc to determine the stocking density of fingerling. In the oxbow lake areas 84.6 percent of LFTs used Secchi disc. It is evident from Table 3-3 that in the high yield area majority did not use Secchi disc. On the contrary, all of the LFTs of low yield areas used Secchi disc to determine the stocking density. It was due to the intention of stakeholders from low yield areas to enhance the carp yield in their lakes. However, it is important to mention that none in the study areas used Secchi disc before joining OLP-II.

Table3-3 .Use of Secchi Disc in Oxbow Lakes (in percentage)

Use of Secchi Disc	Oxbow lakes		
	High yield n=15	Low yield n=50	All n=65
Yes	33.3	100.0	84.6
No	66.7	-	15.4

The information was collected on the rate of latest stocking in the lakes at low and at high Secchi depths (centimeter). At low Secchi depth (100 cm) the appropriate rate is 5000 fingerlings per hectare and at high Secchi depth it is 3000 per hectare¹².

In this respect half of the LFT respondents irrespective of areas did not report since they could not recall the rate of their last fish stocking in the lakes. Among those who reported it was understood that the LFTs of high yield lake on average stocked 3537 fingerlings per hectare

¹² According to the Baor poster booklet No. 4 used in oxbow lakes fisheries management training of OLP-II.

and the LFTs of low yield lakes¹³ stocked 11,192/ha at low Secchi depth. It was evident from the findings that the LFTs of high yield lake area stocked in lower rate of fish than that of the rate recommended (5000/ha at low Secchi depth). But their counterparts in low yield lake areas stocked in higher rate compared to the recommended rate. The reverse trend was observed in the case of stocking at higher Secchi depth. At higher Secchi depth the LFTs of high yield area and of low yield lake areas stocked on average 3698/ha and 2859/ha in the oxbow lakes respectively. In this case the respondents of high yield area stocked in higher rate and of low yield areas stocked in lower rate in the oxbow lakes compared to the recommended rate (3000/ha). The respondents of both areas reported the reasons for higher and lower rate of fish stocking in the oxbow lakes than that of the rate recommended.

According to the LFT stakeholders, the reasons for lower rate of stocking were:

- a. Inadequate fish feed in the oxbow lakes.
- b. Intensive stocking and harvest of fish. The stakeholders did not precisely calculate the rate of stocking since they stocked three times whenever they liked in a year.
- c. Stocking in dry season. There are five inlets and outlets with ordinary screens in Bukbhara baor. During flood the screen made of bamboo of outlets were damaged due to rush of flood water for several years in the past and fish went to the river from the lakes. As this the stakeholders of Bukbhara became tremendously loser. For this, they stocked fish in low rate only in dry season.
- d. Investment of capital by stakeholder. Due to failure in repaying the loan, BRAC did not re-disburse loan to the stakeholders, thus they invested their own capital. Low amount of capital investment resulted in low rate of fish stocking.

It is worth mentioning here that these reasons except reason 'b' for lower rate of stocking resulted in a low yield of fish in the lakes.

¹³ *In the respect of stocking at low Secchi depth only the LFTs of Bahadurpur, one of the low yield oxbow lakes, responded. According to the respondents of Bukbhara and Ujjalpur, two low yield lake, the Secchi depth was higher in their lake.*

According to the LFT stakeholders the reasons for higher rate of stocking than that recommended by OLP-II were:

- a. Majority of the LFTs who stocked at higher rate in the recent past reported that they became loser because of following the rate recommended during their training. As a result they were losers. They could not maintain their family more than two months with the earning from fish production. They had to borrow from others. Therefore they stocked in higher rate. It gave them harvesting of fish and employment through out the year.
- b. They needed more money since they had to repay OLP-II loan. Moreover they were indebted to others for meeting the expenses of litigation in the court.
- c. According to others they had a big fishing team. If they cultivated the recommended fish stock they get much less return from fish sale proceeds.

It is important to mention that the study attempted to know about the LFT stakeholders' preference on selecting the proportion of fingerling of the recommended species of carps during stocking in the oxbow lakes. This was done through focus group discussion. The availability of fish feed in the oxbow lakes, growth of fish in terms of rearing period and market price influenced the stakeholders in their decision on the proportion of recommended species of carps. The LFT stakeholders ranked the name of carps according to the degree of their preference (Table 3-4). It is evident from Table 3-4 that silver carp was the top in the list in every oxbow lake of the study areas. According to the LFTs they liked Rohu and Catla most for their taste. But they were slow growing and their market price were much higher. In rural areas most of the people can not buy Rohu and Catla as their prices are higher. The silver carp was not so tasty as Rohu and Catla but Silver carp was fast growing and cheaper in the market. Rural people liked Silver carp the most among the cheaper fishes.

Table 3-4. Rank-wise Preference of Fingerling Stocking in the Oxbow Lakes

Rank	Nasti	Bukbhara	Bahadurpur	Ujjalpur
1	Silver Carp	Silver Carp	Silver Carp	Silver Carp
2	Thai Sarpunti	Rohu	Common Carp	Common Carp
3	Common Carp	Catla	Grass Carp	Rohu
4	Rohu	Mrigal	Rohu and Catla	Grass Carp
5	-	-	Mrigal	Mrigal
6	-	-	-	Catla

3.1.4 Time Period of Stocking

There are two periods recommended by OLP-II for fish stocking in the oxbow lakes : (i) Magh to Falgun (14 January to 14 March) and (ii) Ashar to Ashwin (15 June to 15 October).

Seventy two percent of the LFTs had knowledge about this period for stocking in the lakes. But only 31.3 percent of the LFTs stocked fingerlings in time and 34.4 percent not in time (Table 3-5). The species were found higher in the low yield lakes compared to the high yield lakes. Further 34.3 percent LFTs stocked both in appropriate and inappropriate time. In this respect the percentage of LFTs of high yield oxbow lake was higher than that of their counterparts from low yield lakes. It may be noted that majority of the LFTs had knowledge about appropriate timing of stocking in the oxbow lakes but practically some of them could not stock in appropriate time. The reasons for not being able to do that were:

- a. Intensive fish cultivation. Due to the intensive fish cultivation the LFTs stocked fingerlings just after catching fish.
- b. Inundation of oxbow lakes in monsoon. During monsoon (June to October) the oxbow lakes usually gets inundated by flood water. The stakeholders avoided stocking at the first suggested period (Magh -- Falgun), 3 months before starting of the monsoon. Within this short period the fish did not grow to a size approved for maximum profit, on the other hand, if the stakeholders let the fish stay in the ponds through out the monsoon so that they might grow to such a size there was a risk that fish would scape due to over flood of the lake. The second recommended stocking period is in monsoon. Therefore, the stakeholders preferred the period Kartik to Poush (16 October to 13 January) for stocking as it allowed them to harvest fish just before monsoon.
- c. Spawn/hatchling and fry rearing to get fingerling (5 to 6 inches in length). Usually the stakeholders stocked 5 to 6 inches fingerlings. Therefore, spawn and/or fry rearing up to fingerling resulted in late stocking in the lakes. Besides according to some of the LFTs, if they stocked in the month of Magh (winter) fish suffered from cancer. Some others thought that the fingerlings were available more at a period inappropriate for stocking which

ultimately decreased the price of fingerling. Hence they could procure a larger amount of fingerlings in cheaper price in this period.

Table 3-5. Stocking of Fingerling by LFT Stakeholders in and Not in Time (in percent)

Fingerling stocking	High production n=17	Low production n=50	All n=67
In time	29.4	32.0	31.3
Both in and not in time	41.2	32.0	34.3
Not in time	29.4	36.0	34.4

3.1.5 Size of Fingerlings Stocked in the Oxbow Lakes

Sixty four, 21 and 15 percent of the LFT stakeholders thought that 5, 6 and 4 inches carps, respectively, should be stocked in the oxbow lakes. Whereas in practice 77 percent of the LFTs stocked 5 inches carps. This practice was more prevalent in the low carp yield lakes compared to the high carp yield lake. LFTs of high yield lake could not follow the recommendation properly due to their intensive fish culture and for their reluctance to follow the same. They felt that they knew well the technique of fish cultivation as they were traditional fishermen. However, irrespective of lakes LFT stakeholders stocked 4 to 6 inches carps. The LFTs of high carp yield lake harvested fish just after one month of stocking whereas those in low carp yield lakes harvested after three to four months of stocking.

3.1.6 Fish Harvest by LFTs

The months recommended for not to harvest fish from lakes are from Shrabon to Kartik, (June to September). Vast majority of the LFTs caught fish in time. This picture was found much higher in the low carp production areas compared to high carp production area. In the high carp production area majority of the LFTs caught fish both in and not in time (Table 3-6). The reasons for catching fish not in time were :

- a. Fingerling is the costliest item for fish production, the LFTs needed money to purchase fingerling and to repay loan.

b. They were reluctant in catching fish in the recommended time since the lakes were inundated in monsoon. If they did not catch fish at that time they became loser as the fish went out of lakes. Besides they caught fish any time as was needed.

Table 3-6. Harvesting of Fish by LFT Respondents in and not in Time by Oxbow Lakes (in percentage)

Fish harvest	Oxbow lakes		
	High yield n=18	Low yield n=50	All n=68
In time	22.2	92.0	73.5
Both in and not in time	66.7	8.0	23.5
Do not know	11.1	-	2.9

3.2 Fish Farming Group (FFG)

Almost all FFG stakeholders had no experience of fish farming in the pond before joining OLP-II. The FFGs also cultivated the same six species of carps i.e., Rohu, Catla, Mrigal, Silver carp, Grass carp and Common carp, recommended by OLP-II like LFTs in the oxbow lake fish ponds. Some of the FFGs cultivated Thai sarpunti along with their six recommended species. In this context, to develop skill for fish farming, FFGs also were given training on pond fish farming by project. Ninety five percent of them received training while 4.7 percent did not (Table 3-7). All of the FFGs of high yield oxbow lake participated in training whereas 93.7 percent of low yield lakes did the same. They received training on pond biology, pond preparation, pond stocking, pond fertilization and feeding, pond management and harvesting for fish farming in the pond. Besides they took training on vegetable cultivation, sapling plantation, etc.

Table 3-7. Receipt of Training by FFG Respondents by Their Attachment to Oxbow Lakes (in percentage)

Training received	Oxbow lakes		
	High yield n=16	Low yield n=48	All n=64
Yes	100.0	93.7	95.3
No	-	6.3	4.7

This study investigated the implementation of the training on (a) pond stocking, (b) pond fertilization and feeding, and (c) pond harvesting by the FFG stakeholders.

3.2.1 Fingerling Stocking in the Oxbow Lake Pond

The FFGs of high yield lake stocked fingerling in their ponds twice in a year as their ponds did not get inundated year before the observation was made. On the contrary, the FFGs of low yield lakes stocked once only since their ponds got inundated during monsoon. They stocked fingerling mainly in the months of Sraban and Bhadra (August and September). It was found that majority of the FFGs stocked fingerling much higher in number per decimal, and smaller in size than recommended. They stocked *dhani pona* (fry) up to one inch in length instead of 5 to 6 inches fingerling as recommended due to inundation of ponds by flood water. In the years before the study was conducted they stocked 5 to 6 inches long fingerling but fishes went out of the ponds during flood. As a result they became loser. This bitter experience taught them to change their strategies. Hence they stocked *dhani pona* so that before flood when *dhani pona* became 5 to 6 inches in length they could sell them out as fingerling. This was the main reason for which majority of the FFGs could not stock recommended quantity per decimal in their ponds. Another reason was their desire to earn more. However, about the number of fingerling stocked they reported that they followed the advice of fingerling seller since they did not know about *dhani pona* stocking.

On the other hand some FFGs who stocked lower number of fingerling per decimal than the recommended one also mentioned about the inundation of their ponds during flood. Due to inundation of ponds they stocked lesser number of fingerlings since the fish went out from the ponds in the past when the ponds were inundated. Besides, the loan size of BRAC was also low considered not sufficient to release more than the amount they stocked.

It was worth mentioning that 79 and 31 percent of the FFGs from low and high yield lakes, respectively, knew the recommended number or quantity per decimal of each species of fingerlings needed to be stocked. Though they knew the number need to be stocked per decimal for different species but many of the FFG stakeholders could not mention the actual number they already stocked in their ponds. It was because all stakeholders were not

responsible for fish stocking. In this respect, the FFGs further mentioned that fingerling traders also released fish in their ponds. As a result they could mention the amount stocked as a whole only, they did not know the number of each species stocked per decimal.

They had knowledge on the size of fingerling recommended. But there were other reasons besides inundation of ponds for which they had to stock smaller fingerlings.

1. Larger fingerlings appropriate for farming were not available to their reach.
2. Some of the FFGs get their fingerlings through others. In this case also they had no choice but to accept the fingerlings brought to them, which were usually smaller in size.

The appropriate time of stocking of fingerling in the pond as recommended by OLP-II are early morning and evening. Almost all of the FFGs knew the appropriate time of fingerling stocking. But in the study areas majority of the FFGs stocked fingerling either in the late morning or in the afternoon (Table 3-8). Because the far-fetched fingerlings were available to them in the late morning or in the afternoon. They could not wait a long period for stocking. The releasing of fingerling in the evening would increase their mortality.

Table 3-8. Time Fingerling Stocked in the Oxbow Lake Ponds by FFGs (in percentage)

Time Recommended by OLP-II	Time actually stocked	Oxbow lakes		
		High yield n=16	Low yield n=47	All n=63
Early morning , Evening	Early morning	6.3	49.0	38.1
	Late morning	87.5	12.8	31.7
	Afternoon	6.3	31.9	25.4
	Evening	-	6.3	4.8

3.2.2 Pond Fertilisation and Feeding

The FFGs were trained about the time and quantity of fertilizer and feed needed to be applied in the oxbow lake ponds. There are two types of fertilisers recommended -- organic and

inorganic fertilisers. Organic fertiliser consists of cow-dung, compost and leavings of poultry and duck while inorganic fertiliser consists of urea and triple super phosphate (TSP).

The FFGs applied organic and inorganic fertilisers either daily or weekly in their ponds (Table 3-9). Majority of them applied it weekly. It was observed that on average 2 kg cow-dung, 147 gm urea and 25 gm TSP per decimal had been applied by the FFGs; which were higher than the recommended rate (1 to 1.4 kg cow-dung, 30 gm urea and 15 gm TSP/decimal). However, the application rates per decimal varied from 0.11 kg to 10.0 kg of cow-dung, 15 gm to 1000 gm of urea and 10 gm to 60 gm of TSP.

Table 3-9. Application of Organic and Inorganic Manure in the Lake Ponds by FFG Respondents (in percentage)

Application	Oxbow lake					
	High yield n=16		Low yield n=48		All n=64	
	Organic	Inorganic	Organic	Inorganic	Organic	Inorganic
Daily	-		29.3		21.9	
Weekly	81.2	75.0	54.2	83.3	61.0	81.3
No response	18.8	25.0	16.6	16.7	17.1	18.7

3.2.2.1 Reasons for applying lower doses of fertilizer

1. Less availability of cow-dung. Some FFGs collected cow-dung from the field. These FFGs after meeting their other needs related to cow-dung (e.g. cooking) were left with little of it for to be applied in the pond. Therefore, it was difficult for them to apply recommended doses of cow-dung in the pond.
2. During the preparation of pond for fish culture FFGs had applied huge amount of cow-dung. There was no lack of feed in the pond, so they applied it in less amount. However, some of the FFGs applied the leavings of poultry and duck when they applied cow-dung lesser than the amount recommended.
3. Lack of capital. The stakeholders did not have any capital after stocking of fingerlings, but they had to repay loan instalment regularly immediately after the receipt of loan. They had money in their hand only after they started catching fish. A few (2%) of them reported that the BRAC loan was not re-disbursed to them for fish farming. In this context they had purchased fingerlings on credit. Because of the shortage of capital resulting from these reasons they had no choice but to apply lower doses of urea and TSP.

4. According to some FFGs who applied lower doses of fertilizers did not receive training on *renu pona* (spawn or hatchling) and *dhani pona* (fry) farming. So they had no idea about the fertilizer doses needed to be applied for these *ponas*. They noticed that their fingerlings died after application of higher doses of urea and TSP. Thus they mixed lower doses of urea and TSP with cow-dung and applied in the pond. Further, they followed the instruction of fingerling sellers who advised them to apply lower doses of fertilizers.

3.2.2.2 Reasons for applying higher doses of fertilizer

1. Sandy soil of pond. There was sandy soil and was lack of fish feed in the newly excavated ponds. To form composite muddy soil of the ponds the FFGs applied higher dose of cow-dung.
2. Rapid growth of fish. The FFGs had stocked more fingerlings than was recommended. To provide their feed they applied higher doses of cow-dung, urea and TSP so that the fingerlings grow rapidly.
3. Following the instruction of BRAC staff they applied higher doses of cow-dung, urea and TSP.
4. Further a few of the FFGs had reported that BRAC did not re-disburse loan for fish farming, they had lack of capital. Due to lack of capital they could not apply urea and TSP. Therefore they applied higher dose of cow-dung instead of urea and TSP.

3.2.2.3 Application of feed

The FFGs applied complementary feeds to the fertilisers in the pond. The fish feeds applied in the ponds were rice bran, wheat husk, oil cake, a kind of grass, etc. In the months of Poush and Magh (winter) and in the flood period the FFGs did not apply feed. They learnt from training that the feed requirement of fish was low in winter. The feed stocked in the preceding months was considered enough for fish growth during this time.

3.2.2.3.1 Reasons for applying lower amount of feed

1. A larger portion (36%) of the FFGs who applied lower amount of feed mentioned that they had lack of capital. Even though they have to repay their weekly loan instalment. Therefore, they could not apply fish feed in appropriate amount.
2. Since they (32%) had no training on spawn and/or fry farming they followed the instruction of fish hatchery where from they bought spawn and/or fry. According to the suggestion of fish hatchery they applied lower amount of feed for their spawn and fry. This was also a reason for applying higher amount of feed.

3.2.3 Pond Harvesting by the FFGs

One of the important techniques for increasing fish yield in the pond culture based fisheries is regular fishing starting after three months of fingerling stocking. In the study areas it was observed that the FFGs caught fish for the first time usually in the forth month after fish stocking. The subsequent catch usually depended on their need for money and availability of the buyers. It varied from: 15 days to 4 months. This scenario prevailed in both high and low yield lake areas.

4. USE AND REPAYMENT OF LOAN

There are two types of loan disbursed by BRAC in the study areas: (i) Personal loan and (ii) Joint property loan. Joint property loan is disbursed for fish production under OLP-II while personal loan is disbursed for other different purposes under BRAC's Rural Development Programme (RDP). Some stakeholders of both LFT and FFG have personal loan whereas all the LFTs and FFGs (except a few from FFGs) have joint property loan for fish production. This section discusses about the use of joint property loan by LFT and FFG stakeholders.

4.1 Lake Fishing Team (LFT)

All LFT respondents deposited their loan received from BRAC for fish culture in their joint account. Whenever they needed money to culture fish they withdrew from their joint account. The study found no exception to this practice.

4.1.1 Repayment of Loan

A little less than 50 percent of the LFTs repaid their loan instalment regularly. This tendency was found higher among the LFTs of high yield areas compared to the low yield areas (Table 4-1). The LFTs had mentioned the reasons for their regular repayment. The reasons were :

1. Timely repayment of loan would help in the receipt of loan in future. Which would help them to continue fish cultivation and maintain their family with ease.
2. The OLP-II policy to pay half of the return from fish sale helped the stakeholders in the repayment of loan. According to the policy, half of the return from fish sale was deposited to the joint account of the stakeholders for the repayment of BRAC loan and expenses related to the fish cultivation in oxbow lakes. The other half of the return was distributed among the stakeholders for the maintenance of their family.
3. The tendency to discontinue involvement with BRAC as soon as possible encouraged in regular repayment of loan. It was important to mention here that this tendency was found only among 12.5 per cent (2) of the stakeholders from high yield lake area. This tendency was the off shoot of one of the policies of OLP-II. According to that policy only one member of a household is eligible in participating in OLP-II. This policy had negative impact on the stakeholders' households where fishing was a traditional

family occupation. They were efficient fishermen, therefore did not like to involve themselves in other profession but fishing. As a result a good number of members of the stakeholder belonging to this group were unemployed. For this reason they liked to discontinue involvement with BRAC since they thought that BRAC was the implementer of this policy and responsible for their unemployment.

It was already mentioned that the 50 percent of the return from fish sale was deposited in the stakeholders' joint account. The LFT committee decided and determined the amount to be repaid as loan. Usually the loan repayment started after the completion of grace period¹⁴. After catching fish the stakeholders had money in their hand thus were able to repay loan; although 51 percent of the LFTs were not able to repay regularly. The reasons for the irregular repayment of loan instalment were :

1. Low yield of fish in the oxbow lakes. Due to flood their fish yield was low as well as their income. Besides, the lack of fish was also responsible for their low yield.
2. Repayment of other than BRAC loan. The LFT stakeholders borrowed from money lenders for fish cultivation with exorbitant interest. Therefore they preferred repaying non-institutional loan over BRAC loan. Besides, they spent money on litigation to mitigate their conflict with others in the oxbow lake areas. The other parties in the court procrastinated the case by giving bribe to the related persons in Thana and court. For the procrastination of the cases the LFT stakeholders had to suffer tremendously as they had to spend a lot of their money for the cases which were lingering for long time.

The focus group discussions indicated that if they delayed in repaying non-institutional loans, the non-institutional sources harassed them in various ways. So, they repaid non-institutional loans first. They were able to make BRAC staff

¹⁴ *Grace period refers to the period started from fingerling stocking to catching fish. The duration of grace period is three to six months*

understand their awkward situation. BRAC staff did not harass them for making delay in repaying BRAC loan rather they felt pity for them (stakeholders).

3. LFT committee¹⁵ decided for loan repayment. According to some of the LFTs the LFT committee leaders maintained the accounts. Besides the recruitment of new LFT members made the older stakeholders from the same group also reluctant to repay loans. Since the older stakeholders had cleaned oxbow lakes, stocked fingerlings by getting loan, they were not willing to give their share of profit to the new comers. They felt the new comers were enjoying the profit of their hard work, which discouraged them to repay loans.

In line with this some of the LFTs from low yield lakes were of the opinion that the system of holding election every year to form a new committee was not a good one. The committee always wanted to get return of their work within their tenure, which was in fact not possible. Besides the committee spent a lot of money to get elected, which they also wanted to make up during the same period. For these reasons they filched money for requital of their expenses through different pretexts and pretences. This was one of the reasons for which the LFTs could not repay their loan instalment properly. On the other hand, it deprived general stakeholders in obtaining their equal share.

Table 4-1. Regularity in the Repayment of Loans by LFT Respondents (in percentage)

Loan regularly repaid	Oxbow lakes		
	High yield n=17	Low yield n=48	All n=65
Yes	82.4	37.5	49.2
No	17.6	62.5	50.8

4.1.2 Adequacy of BRAC Loan

Majority of the LFT stakeholders from both high and low yield areas considered the loan disbursed to them was sufficient for fish culture in the lakes (Table 4-2). But some of those who

¹⁵ LFT committee consists of president, secretary, treasurer and members from LFT stakeholders. Members are the small group leaders.

did not consider loan sufficient for fish culture borrowed from non-institutional sources. The LFT stakeholders of high yield lake who did not consider BRAC loan sufficient could bear the expenses for the project from their fish sale as they had a higher yield of fish from the project.

Table 4-2. Respondents Opinion on Loan Size (in percentage)

Opinion on loan size	Baors		
	High yield n=18	Low yield n=50	All n=68
Considered sufficient	88.9	60.0	67.6
Considered not sufficient	11.1	40.0	32.4

4.1.3 Savings from Fish Sale Proceeds

Majority (75%) of the LFTs of both areas could not save money from their fish sale proceeds after meeting their household expenses and repayment of the loan instalment (Table 4-3). They had only the force savings which were deducted from their loan during its disbursement. In this respect, in the focus group discussion the LFTs of high yield lake expressed that they would like to withdraw money from their savings off and on whenever they need. They strongly criticised the prevailing savings policy¹⁶ of BRAC. In contrast to this policy they mentioned that if BRAC allowed them to withdraw the savings whenever they need they would be inspired to keep a larger saving with BRAC.

However, those LFTs who were able to save money from their fish sale proceeds utilised their savings for different purposes like land purchasing, land mortgaging in, pond mortgaging in, fish stocking, shop keeping, fishing net and boat purchasing, household consumption during off-fishing period and children's future well-being. Some of them cultured fish in mortgaged in pond and rented out the fishing net and boat.

In this respect, the stakeholders of high yield lake wanted to know about the policy of BRAC as well as OLP-II for the non-target group¹⁷. Since some of them had more than 0.05 acres of

¹⁶ As of the policy of BRAC the stakeholders cannot withdraw from their savings deposited in BRAC's custody before their withdrawal of membership from BRAC and/or before their death.

¹⁷ Who owns more than 0.05 acres of land and earns more than Tk. 10,000 (ten thousand) per year.

land they were worried that BRAC should exclude them from the project. However, the possession of such a land holding indicated about their economic well-being. In describing the improved economic condition DOF, DTA and BRAC (1997a) showed that fishers accounted for 10 percent of bank accounts in Bahadurpur baor (low yield lake).

Table 4-3. LFT Stakeholders' Savings out of Fish Sale (In percentage)

Status	Oxbow lakes		
	High yield n=17	Low yield n=48	All n=65
Yes	44.4	18.4	25.4
No	55.6	81.6	74.6

The LFT stakeholders who saved from fish sale proceeds were asked whether their saving was sufficient for fish culture in the oxbow lakes. Almost all of them of low yield lake areas considered their savings amount was sufficient for fish cultivation whereas the majority of the high yield area did not consider their saving sufficient for the same. The vast majority and a few of them from high yield and low yield areas respectively liked to borrow from BRAC for fish cultivation although they considered their saving sufficient for fish culture. Because they thought that they were still not self-sufficient and they liked BRAC loan due to its low rate of interest. Besides loan they could enjoy other opportunities from BRAC, for instance training, etc. For this reason they could culture fish properly in the oxbow lakes.

On the other hand according to those LFTs who did not like to borrow from BRAC in future liked to be self-sufficient by utilising their own money in fish culture. They had already decided in a lake management group (LMG) meeting that after the repayment of BRAC loan they would invest their own capital instead of getting a fresh loan from BRAC.

4.2 Fish Farming Group (FFG)

The FFGs also had two types of loan : (1) personal loan and (2) joint property loan. Joint property loan is disbursed for fish culture. The study found that some of the FFG stakeholders had no joint property loan (Table 4-4). Nineteen percent of the FFGs from high yield lake had

no joint property loan but had personal BRAC loan. A few (6%) of them shared loan with their counterparts in the same pond who had joint property loan in their name. They repaid their loan instalments to their counterparts who in turn repaid it to BRAC since they were directly accountable to BRAC for the loan. On the other hand, a few (2%) from low yield lake areas were only depositing their savings which was essential for loan disbursement. They had not yet been given any loan while some others (2%) did not like to borrow from BRAC for higher rate of interest. They liked to be self-sufficient by utilising their own capital even with difficulties. Therefore, they cultured fish through investing their own capital instead of getting any loan from BRAC. However, this study had found that all of the FFG stakeholders who had joint property loan for fish culture in their ponds used that loan exclusively for fish culture.

4.2.1 Repayment of Loan by the FFG

It was worth mentioning that DANIDA exempted loan of the FFGs upto December 1996 just to relieve stakeholders from an economic obligation when they had a great loss due to the inundation of ponds. Since January 1997 BRAC re-disbursed loan as usual and refunded money which the stakeholders deposited for repayment of loan before exemption. In this respect, the FFGs of high yield area reported that they had been refunded half of their deposited money. They wanted to get back other half of their deposited money.

However, it was evident from the findings of Table 4-4 that 65 percent of the FFGs of low yield areas were not given further loan after the exemption of their loan by DANIDA. This tremendously hampered fish cultivation of the FFGs. The FFGs also desired for regular disbursement of BRAC loan in future so that they could operate their fish farming properly. Kolenbrander and Hasan (1995) reported that slow disbursement of BRAC loans as the main obstacles to FFGs activities. According to them no loan meant no fingerling stocking, so no 'table size' (marketable size) fish at harvest time. If loan arrived after the fingerling stocking period, it would be soon too cold for the fish to grow, therefore the fish would not grow to a marketable size at the harvest period. It was clear to the FFG members and the Field Staff that this slow loan disbursement procedure might result in a loss instead of a profit at harvest time. The FFG stakeholders repaid their loan through weekly instalment. However, the study had

found that the FFGs of high yield lake area could afford more to repay their BRAC loan regularly compared to their counterparts of low yield lake areas (Table 4-3).

Table 4-4. Regularity in the Repayment of Loan by FFG Stakeholders (in percentage)

Loan regularly paid	Oxbow lakes		
	High yield n=13*	Low yield n=46*	All n=59
Yes	75.0	15.2	27.6
No	25.0	50.0	44.8
Exemption of loan by DANIDA		34.8	27.6

• Missing three (19%) out of 16 and two (4%) out of 48 from high and low yield lake areas had no joint property loan

4.2.1.1 Reasons for regular repayment of loan instalment

Some (66%) of the FFGs who repaid their loan regularly mentioned the reasons for their regular repayment. They thought timely repayment of loan would help them to receive next loan. They deposited money in the bank after selling fish and from which they repaid time to time. According to some other (34%), the BRAC field staff strongly suggested them to repay somehow otherwise the FFGs would lose their affiliation in the pond. Therefore, they manage their loan instalment with great difficulty by selling poultry eggs, vegetables, cow milk, etc.

4.2.1.2 Reasons for irregular repayment of loan instalment

A larger portion (43%) of the FFGs could not repay loan instalment regularly due to the inundation of their ponds. Some of them claimed that they were not responsible for repayment of loan since the loan amount had not been given directly to them. The BRAC Staff stocked fingerlings in their ponds willingly. But the fingerlings left the ponds during flood period. Therefore, they were reluctant to repay loan instalment.

There were some other reasons for irregular repayment of loan:

1. Expenditure for purchasing fingerling and fish feed. The FFGs purchased fish spawn or hatchling and fish feed on credit. Therefore when they earned money by selling fingerling (little bigger than that of the size stocked) at low price, they used that money to purchase spawn and fish feed. After that they could not afford to repay BRAC loan instalment.

2. Low and irregular income of the household members. Some of the FFGs repaid loan instalment from their husbands' or sons' income. It was quite difficult for them to repay the loan due to the low and irregular income of their husbands and sons. It was further difficult for those FFGs to repay the loan who had no husbands and sons thus earned their livelihood by themselves.

However, as reported by the FFGs the loans were repaid from income by selling fish, poultry egg, vegetable and cow milk and from *kantha* sewing, small trading (rice husking and selling etc.), labour selling in others house for domestic works and household members' income.

4.2.2 Adequacy of BRAC Loan

Almost all of the FFGs of high yield oxbow lake and the vast majority of the low yield oxbow lakes did not consider loan size disbursed by BRAC sufficient for fish cultivation in their oxbow lake ponds (Table 4-5). They preferred a bigger loan size and its regular disbursement.

Table 4-5. FFG Stakeholders' Opinion on Loan Size (in percentage)

Opinion	Oxbow lakes		
	High yield n=16	Low yield n=45	All n=61
Considered sufficient	6.2	15.6	13.1
Considered not sufficient	93.8	84.4	86.9

4.2.3 Savings from Fish Sale Proceeds

The vast majority of the FFGs of both areas especially the low yield areas could not save money from their fish sale proceeds (Table 4-6). They had problem in repaying loan instalment regularly (see section 4.2.1.2). Moreover they had to spend for their household consumption. Therefore they could not save inspite of their willingness to do so. On the other hand a few of the FFGs were able to save from their fish sale proceeds. They wanted to utilize their savings for constructing or repairing their house, land purchasing, etc. They thought that their savings were sufficient for fish cultivation, Even then they liked to receive BRAC loan in future for two reasons.

1. Fish culture needed investment of a large capital. In this context if they invested their own capital they would not maintain their family at all. Therefore, they had to borrow from BRAC in order to avoid investing their own capital.
2. They liked BRAC loan due to its lower rate of interest compared to the interest charged by the money lenders in the locality.

Table 4-6. FFGs' Savings out of Fish Sale (in percentage)

Status	Oxbow lakes		
	High yield n=16	Low yield n=45	All n=61
Yes	31.2	2.2	9.8
No	68.8	97.8	90.2

5. RELATIONSHIP BETWEEN LFT AND FFG

The FFGs (mainly constituted of women) started their activities in the oxbow lake fish ponds side by side with the LFTs (constituted of all male) in the same lakes. In some cases LFTs and FFGs were related to each other. The study investigated the nature of the relationship existing between these two groups.

5.1 Who Get Priority on Oxbow Lake Ponds

The stakeholders had disputed claim on oxbow lake ponds. In this respect most of the stakeholders from both LFT and FFG believed that they had priority in culturing fish in the ponds (Table 5-1). Their arguments in support to their cases were mentioned below.

According to LFT, LFT deserved first priority due to :

1. LFTs were traditional fishermen. According to them, they should get the first priority on pond fish culture since they cultivated fish from the very beginning in the oxbow lakes and the ponds were in fact part of the lakes.
2. Women (FFGs) did not know how to catch fish, could not manage ponds. On the other hand LFTs would have taken care of oxbow lake ponds well if those were handed over to them. At this they would have produced fingerlings in the ponds and would not have to buy fingerlings from others in higher price. They also reported that DANIDA wanted to distribute ponds among them when the ponds were excavated. But DANIDA did not do that.
3. LFTs were giving oxbow lakes lease fee including the ponds. Hence they considered handing over of ponds to FFGs was unfair.

As an exception to majority in the group 9.0 percent of the LFTs considered FFGs should have first preference in the pond fish culture instead of LFTs. According to them, OLP-II had leased out the ponds to the FFGs and oxbow lakes to them for fish culture. Besides FFGs were landless and poor, they deserved first priority in establishing their right on ponds.

However, the study observed that LFTs convinced persons associated with administration to transfer the ponds user right to them instead of FFGs. Thus LFT stakeholders already had possession on some ponds of the FFG. According to FFG, they deserved preference in using pond because :

1. OLP-II had leased out the ponds to the FFGs for 50 years and FFGs paid lease fee regularly. Since they were paying lease fee they had legal right on ponds. On the contrary LFTs had right on oxbow lakes.
2. FFGs were land less and poor. They got the opportunity to improve their household well-being through fish cultivation. They did not like to lose their right on ponds although they were not economically so benefited by fish cultivation due to the wrong construction of ponds but they could minimize their loss to some extent by growing vegetables on the dike of ponds. Fish and vegetable cultivation had great impact on the nutritional well-being of the poor FFG households.
3. As women FFGs found no difficulty with fish cultivation in the ponds as they received training on fish farming from BRAC. The FFGs further mentioned that they could not go to work in the field because of the prevailing custom which discouraged women's participation in work outside home. Therefore they preferred fish farming in the ponds nearer to their homestead. Once they had come out from their homestead through the intervention of OLP-II they did not like to remain confined in their homestead as before and strongly liked to establish their legal right on oxbow lake ponds.

There were some FFGs (9.5%) who considered that LFTs' had first preference in pond fish farming. According to them, LFTs were traditional fishermen and from the very beginning they were involved with the oxbow lakes fishing, therefore they deserved first priority in farming of fish in oxbow lake ponds.

Table 5-1. Opinion of the Stakeholders of OLP-II on Deserving First Priority in Oxbow Lake Ponds for Fish Farming (in percentage)

Who deserve	High yield		Low yield		All		
	LFT n=18	FFG n=16	LFT n=49	FFG n=47	LFT n=67	FFG n=63	Both n=130
FFG	33.3	100	-	87.2	9.0	90.5	48.5
LFT	66.7	-	100	12.8	91.0	9.5	51.5

5.2 Reasons for Conflicting Relationship between LFT and FFG

In this context, a remarkable portion of the LFTs and FFGs had reported about their conflicting relationship (Table 5-2). The reasons for having such a relationship as mentioned by the stakeholders were (Table A5) :

1. Dispute over claim of fish in the inundated oxbow lake ponds. The LFTs claimed that FFGs applied more fish feed in their ponds, as a result the fish from oxbow lakes moved into the over flooded pond. When the flood water receded the FFGs put barrier around the ponds in order to keep fish confined within the pond. On the other hand the FFGs claimed that during flood pond fish escape in the lakes. After flood when water receded the LFTs resisted FFGs in catching fish from their ponds, snatched away their fishing net, and warned them not to catch fish in the pond. According to the FFGs, however, above all LFTs stole fish from their ponds also. All these activities developed a bad relation between these two groups.
2. Disputed claim by LFTs and FFGs on oxbow lake ponds. The LFTs of high yield lake mentioned that they had no disputed claim on ponds (Table A5). This was because they had ponds where they could raise fingerlings and could stock fish under OLP-II. Other groups mentioned that they had the first claim on the oxbow lake ponds.
3. LFT's objection on women's participation in fishing activities.

Table 5-2. Nature of Relationship between LFT and FFG Stakeholders (in percentage)

Relationship	Oxbow lakes						
	High Yield		Low Yield		All		
	LFT n=18	FFG n=16	LFT n=50	FFG n=48	LFT n=68	FFG n=62	Both n=130
Conflicting	22.2	31.3	42.0	60.4	36.8	53.2	44.6
Non conflicting	77.8	68.7	58.0	39.6	63.2	46.8	55.4

It may be mentioned that the LFT and FFG stakeholders in Ujjalpur baor of low yield lakes were in friendly term, in contrast severe conflict was observed in the Bahadurpur baor of low yield lakes.

5.3 Reasons for Non-Conflicting Relationship between LFT and FFG.

The findings indicated that a little more than 50 percent of both LFTs and FFGs claimed that non-conflicting relationship was prevailing in the study lake areas (Table 5-1). According to them (LFTs and FFGs) the reasons for having a friendly relationship were :

1. LFTs and FFGs were busy with their respective works. Nobody interfered into each others activities.
2. LFTs felt pity for the FFGs due to their poverty. They wanted to see that the FFGs raised their economic and nutritional well-being.
3. They were related to each other and did not like to quarrel with the persons of opposite sex.

6. PROBLEMS IN FISH CULTURE

6.1 Problems Faced by the LFTs in Fish Culture

Both LFTs and FFGs faced problem in fish cultivation. They stated these along with the solutions. The problems mentioned by the LFTs were:

1. Oxbow lakes were not sufficiently deep for fish cultivation.
2. Conflict with others in the locality took place due to stealing fish from the oxbow lakes by the villagers, catching fish from agricultural land, eating rice plant by grass carp. It needs mentioning that after intervention of OLP-II the oxbow lake areas have been demarcated. Before demarcation of lake areas both LFTs and villagers caught fish from the agricultural land in monsoon without any conflict between them. But after demarcation of lake areas the villagers hindered LFTs in catching fish from the agricultural field which resulted into a conflict between them. The villagers claimed that the LFTs had no right in catching fish from agricultural land since it was out of lake areas. On the other hand the LFTs claimed that their cultured fish spread over in the agricultural land during monsoon flood. As a result one of the conflicting parties filed case against other.

The OLP-II introduced grass carp culture in the oxbow lakes. The fish particularly grass carp moved into the flood plain for food during monsoon and ate local variety of *aman* rice which was grown at that time (ICL, 1996). The farmers did not like, they generally ask compensation for their rice eaten up from the LFTs. It becomes an issue for conflicts between these two groups. To avoid conflict, the LFTs in most of the lakes pay a large amount to the farmers whose rice get affected by the grass carp.

3. Regular increase of the lease fee for fishing in oxbow lakes. The lease fee was one of the important cost items in fishing in oxbow lakes. The stakeholders reported that lake lease fee was increased by 10 percent every year. It was a severe problem for them especially those from low yield lakes.

4. Unauthorized fishing by muscle man (mastan) in Oxbow lakes.
5. Hindrance in the development of fish food through normal entrance of organic nutrients together with the surface run-off due to embankments (beribundh) developed in lakes.
6. No co-operation and unfair activities by the government officials.
7. Affiliation of non-fisherman in LFT. and
8. Shortage of capital during stocking.

6.2 Suggested Solutions by the LFTs

1. The height of *beribundh* (embankment) should be increased along with sluice gates fixed on those. The LFT stakeholders liked to get the contract for constructing *beribundh* , as they felt they would be sincere in doing that and would build *bundh* according to their felt need. Iron screen should be fixed in the inlets and outlets of the oxbow lakes. This would check the fish from escape out from lake in monsoon. On the other hand the LFTs also suggested for the stronger, higher and appropriate construction of oxbow lake ponds dikes so that the ponds did not get inundated during monsoon.
2. Quick settlement of cases in the court as running cases in the court cost them huge amount of money.
3. The lease fee should be decreased otherwise the LFTs would not be economically benefited especially in the low yield areas.,
4. Needed co-operation and sincerity of the government officials in running the project.
5. Affiliation of genuine fishermen in the LFT.
6. Needed united action of the stakeholders against the muscle men.
7. Prohibiting second time participation of the LFT committee leader as an OLP-II policy in the election for same office.

6.3 Problems Faced by the FFGs In Fish Culture

The problems faced by the FFGs in fish culture in oxbow lake ponds were mentioned below.

1. Irregular and small amount of BRAC loan. Due to this reason the FFGs had no or insufficient money during fingerling stocking, fish feed and fertilizer purchasing, etc. Hence they had to borrow from non-institutional sources with higher rate of interest.
2. Inundation of oxbow lake ponds by flood water. At the inception of pond fish farming under OLP-II the ponds were inundated during monsoon due to their wrong construction. The silty and sandy soil of dikes of the ponds get eroded with flood water. The height of the dikes were becoming gradually lower for the regular inundation and erosion of soil in monsoon. According to them the contractors assigned by the Local Government Engineering Department (LGED) filched money and constructed defective ponds. For this reason FFGs wanted to have new contract for ponds construction and do it by themselves, so that those could be constructed properly.
3. Stealing of fish from the ponds, bathing (men and animals) in the ponds, higher rate of pond lease fee, higher price of fish feed were also mentioned as problems in fish farming by FFGs. Some of the FFGs mentioned that they had no liberty in fish farming. They had to follow the instruction of BRAC field Staff. Even they could not choose fish species for farming by themselves. However, scarcity of water in the pond was another problem mentioned by the FFGs. In the dry season there was no water in some of the ponds at all.

6.4 Suggested Solutions by FFGs

1. The disbursement of regular and higher amount of BRAC loan. This would ensure appropriate time of stocking as well as higher yield.

2. Needs construction of ponds with higher dikes. This would prevent the ponds from inundation in monsoon thus the conflict between LFTs and FFGs could be avoided. Also fish could be grown at a large scale and to a size having best price in the market.
3. Needs guard to prevent stealing of fish . The project should ensure the FFGs may get fish feed at a reasonable price. FFGs wanted to choose fish species of their own choice, they felt that they would benefit more by doing that. The bathing of men and animals in the ponds should be prohibited. The project should reduce the lease fee.

7. IMPLEMENTING AGENCIES'/ORGANIZATIONS' OPINION ON OLP-II

The activities of the implementing agencies/organizations and the stakeholders were complementary to each other for successful operation of the project. Therefore, information were gathered from both of the implementing agencies/organizations and stakeholders of OLP-II. This chapter presents opinion of the implementing agencies/organizations regarding benefits and the problems faced in implementing the project.

7.1 Benefits of OLP-II

Benefits accrued through implementing the project as mentioned by the implementing agencies/organizations were:

- a. Employment generation and social status. Before intervention of OLP-II the stakeholders were mainly wage labourers with relegated social status and were neglected in the society. Moreover, they suffered from job uncertainty. The OLP-II provided them with assured source of income. As a result they did not have to go elsewhere for searching jobs during lean period of the year. The OLP-II also united them through a co-operative of Common Property Regime and helped in increasing social status of the stakeholders.
- b. OLP-II not only included fishermen but also poor non-fishermen in the project from the oxbow lake areas.
- c. Since the stakeholders of OLP-II had some assured source of income they are now thinking about future well-being of their children and their social status.
- d. The acquaintance of the stakeholders with the implementing agencies/organizations broadened their outlook and their self-confidence.
- e. The stakeholders in carrying out the responsibilities of their committees developed leadership within them which they applied in their community. For instance, they participated and won in the local government election held in December 1997.
- f. The stakeholders realised that fish farming became really profitable due to intervention of the project. Thus they had increased fish production remarkably¹⁸.

¹⁸ In FY 1991-92 eleven oxbow lakes produced 129 kg./hectare (ha) while in 1995-96 twenty lakes produced 550 kg/ha (DOF, DTA, BRAC, 1996, p. 7).

- g. OLP-II had broadened the opportunity in getting affiliation of more stakeholders in the project. For instance, during OLP-I one fisherman was enrolled as LFT member for one hectare which rose to 2.5 fishermen under OLP-II.
- h. Infrastructure (road, transport) had been developed in the oxbow lake areas due to the intervention of OLP-II.
- i. The involvement of women in fish farming and in other activities under the auspices of OLP-II brought about changes in the attitude of both men and women in the oxbow lake areas.
- j. Long-term (50 years) tenurial security for fish farming provided by OLP-II encouraged the stakeholders to invest more of their capital and labour which consequently increased the fish production in oxbow lakes.

7.2 Some Problems Encountered

The OLP-II created a lot of opportunities for the disadvantaged stakeholders. However, some problems were encountered in the wake of OLP-II implementation which are as follows :

- a. The document of fisheries use right handed over to the OLP-II stakeholders consisted of wrong *dag* number (plot number) and wrong *Khatian* number (entry number in land record book). This led to the generation of conflicts between the OLP-II stakeholders and the farmers in the lake areas.
- b. Oxbow lake ponds were not excavated appropriately. This was mostly due to lack of proper supervision by the Department of Fisheries, Local Government Engineering Department (LGED) and World Food Programme (WFP).
- c. During rainy season the ponds got submerged in the lake thus the fish cultured in it escaped and got mixed up with the fish in the lake. After monsoon when water in lake receded the fish cultured both in the pond and in lake got trapped in the pond. The LFT stakeholders claimed that they had their fish in the pond, thus they wanted to catch fish from the pond. On the other hand the FFG stakeholders denied the fishing right of LFT in the pond as they claimed that all fish in the pond was cultured by them. Thus conflict developed between these two groups.

- d. Occasionally some local government officials took undue privileges from the stakeholders by misusing their power and authority.
- e. Fish went out from the oxbow lakes during monsoon every year due to the lack of proper protection (iron screen in the outlets of the lakes and *beribundh*). The stakeholders sustained losses for this.
- f. The quantity of indigenous fish (*rani machh*) produced in the lakes decreased.
- g. The decision of excavating pond in the silted part of oxbow lakes was considered wrong as quality of the soil in that part of the lake was not conducive to fish farming.
- h. At the initial stage of OLP-II the rural elite created pressure on the project staff to recruit people from the economically well-off households for the project.
- i. The erstwhile lease holders who were well-off people did not like fish farming by the poor stakeholders of the project. Neither did they like the poor stakeholders getting economically and socially better-off through co-operatives.
- j. At the early stage of fish farming by the women the fundamentalists played a role against them.
- k. The policy of incremental rise of lease fee by 10 percent every year was considered not right as it created pressure on the poor stakeholders. Because, according to implementing agencies, after a certain time, fish production would become stagnant; therefore lease fee should be charged on the basis of local fish market price.
- l. The credit support of BRAC to the stakeholders was appreciable but, according to some of the implementing agencies/organizations, it charged a high rate of interest. For this, the stakeholders could not derive benefit.
- m. It was difficult for the stakeholders to repay the first instalment of loan at the end of three months after loan disbursement. Because the cultured fish usually do not grow to a marketable size within three months. Consequently the stakeholders did not get expected price for their produce.
- n. The local administration did not help the stakeholders against the dishonest and terrorist fishermen in the locality who often stole fish from the lakes.
- o. The training for the stakeholders, particularly for FFGs, included too many participants. Because of such a size the quality of the training could not be ensured.

7.3 Joint Efforts Considered Necessary

The implementing agencies/organizations of OLP-II were asked whether they considered joint efforts fruitful for the implementation of OLP-II. All those interviewed excepting one considered that joint efforts would be fruitful in proper implementation of the project. They stated several reasons in favour of their opinions which are as follows :

- a. Handing over the fisheries use rights of the oxbow lakes to the poor stakeholders involves a complex procedure. The task could be made easier due to joint efforts of the implementing agencies/organizations.
- b. Joint efforts of the implementing agencies/organizations helped in making better decisions.
- c. Local influential people in the oxbow lake areas gave wrong interpretation about the NGO, and the illiterate local people trusted them. Therefore, when the stakeholders noticed the government people moving with BRAC and DANIDA, their negative attitude towards the OLP-II was dispelled.
- d. As a developing country Bangladesh needed financial and technical assistance from donor agencies for many development projects. The inclusion of donor agency like DANIDA in the implementing agencies of OLP-II was fruitful.

7.4 Administrative Problems Faced by the Implementing Agencies/Organizations

The implementing agencies/organizations faced various problems in implementing the project. The encountered and possible ways of their solutions as mentioned by the implementing agencies/organizations, are given below.

Problems	Solutions
<p>1. Absence of BRAC representative in DJMC and TJMC. There was no representative of BRAC in District <i>Jal Mahal</i> Committee (DJMC) and <i>Thana Jal Mahal</i> Committee (TJMC). Prior to the affiliation of the stakeholders in the OLP-II, BRAC listed the names belonging to target group, but DJMC and TJMC finally approved the list by including some persons from the non-target group presumably due to illegal gratification. This unfair activity of DJMC and TJMC hampered the prestige of DOF also.</p>	<p>1. BRAC staff must be represented in the DJMC and TJMC so that the targeted stakeholders may be recruited according to the policy of OLP-II. The participation of BRAC staff in the meeting held in the Ministry of Fisheries should be ensured.</p>

2. Lengthy procedure of member recruitment .

In order to have membership of the stakeholders in the project and its cancellation it was necessary to apply to the Thana Fisheries Officer (TFO) first, then to District Fisheries Officer (DFO) and then to TJMC. This is an undesirably lengthy process.

3. Late transfer of fisheries use right and wrong demarcation of land. Late transfer of fisheries use right to the OLP-II from Land Office with wrong Dag, Ijara and Khatian (plot, lease out and record book) numbers.

The government officials in the administration of OLP-II illegally leased out some portion of oxbow lake areas to the influential well-off people by getting large amount of money from them, which was possible because of the incorrect information in their documents.

4. Delay in fund placement. Donors funded the project through government. But the government delayed transferring fund to the project which created problem in implementation of the project activities on time.

5. The licence or lake fisheries right handed over to the stakeholders was weak in terms of law. As a result their right have not been dully manifested in the licence.

6. Slow administrative activities. The government staff associated with the OLP-II were slow in discharging their responsibilities and were often late in attending the project meetings. For this the decisions that needed to be taken jointly got delayed.

7. Unfair activities. Government staff were indulged in unfair activities in administration of OLP-II.

2. In order to make the process shorter and simpler the responsibility should be given to TFO and BRAC only.

3. The demarcation of oxbow lake areas should be finalized with actual Dag, Ijara and Khatian numbers through Ministry of Land and the elite of lake areas. BRAC should take initiative, in this process.

The representative of Land Ministry should be presented during transfer of fisheries use right and demarcation of oxbow lake areas.

5. To strengthen the fisheries use right of OLP-II, stakeholders' village organisations should be registered so that they could avoid problems like conflict and litigation.

6. The management power should be given to an organisation so that the Staff of that particular organisation could take proper decision in time without waiting for the staff of peer organisations.

The implementing agencies/organizations further suggested that the participation of government staff at the project operation level should be reduced. The staff of NGO and Donors are enough.

8. CONCLUSION AND POLICY IMPLICATIONS

8.1 Conclusion

The OLP-II started in 1988 and ended in December 1997. The project actually came into operation in June 1992. The major objectives of the project were to (a) increase productivity of the lakes under the project and to construct the fish ponds in the silted area of the lakes, (b) provide assistance to the poorest users of the oxbow lakes so that they might attain a higher level of income and social status, and (c) increase fish production and marketing from project water bodies. The project achieved these objectives to a large extent. On the basis of the findings the study made some inferences as mentioned below.

To increase fish production in the lakes and in the lake ponds OLP-II provided training to its stakeholders. The traditional fishermen of the high yield lake were already familiar with many of the fish culture technologies, and by utilizing these technologies they could successfully increase fish production. Therefore, the training could not contribute much knowledge towards fish production to this group.

Although the FFG stakeholders received training on fish farming and retained the knowledge they could not apply it properly. It was hard to maintain recommended number and size of fish per unit area and stocking time by FFGs due to some socio-economic factors. They had little control over the fingerling traders regarding exact number of fingerlings per species released in their ponds. They had to buy whatever fingerlings were available even if these were smaller than the recommended size. Likewise they had to stock in an inappropriate time determined by the availability of fish.

Harmful aquatic weeds were found more in the low yield lakes than in the high yield lake. This was assumed to be one of the reasons for low fish yield in the low yield lakes. There were some other reasons for low yield of fish viz., (a) inadequate fish feed in the lakes, (b) stocking in dry season and the fish escaped out of lakes during flood, etc.

The LFT stakeholders could not maintain the recommended quantity of fish stocking due to the existing circumstances. Seventy two percent of the LFTs knew the appropriate time for

stocking even though a notable portion of them did not stock in time. Factors primarily responsible for this are unfavourable environment and economic condition. However, 74 percent of the LFTs harvested fish in proper time.

The FFGs had been given training for fingerling stocking and rearing. But they cultured spawn and fry due to the regular inundation of their ponds during flood. Moreover as they had no training on spawn farming they followed instructions provided by other sources.

Fish yield was one of the determining factors for the LFT stakeholders to repay loan. The FFGs could not repay their loan regularly mainly due to the inundation in their ponds and low yield of fish.

Around 50 percent of the oxbow lakes stakeholders could not repay the BRAC loan regularly due to two other factors : (a) repayment loan received from non-BRAC sources, and (b) repayment decision made by LFT committee. There were several reasons for low yield in the lakes such as flood, presence of harmful aquatic weeds and low depth of lakes. Some of the stakeholders had to spend a lot of money for litigation for which they could not make adequate investment. Due to these reasons BRAC re-issued loans to them even though they did not repay their earlier loan.

About half of the FFGs did not receive new loans after exemption of their previous loans by DANIDA. The FFGs preferred that they might be forwarded with new loans regularly by BRAC immediately after the repayment of exempting one. The continuous flow of loan was considered necessary for smooth functioning of their project activities. But, the discontinuation of disbursement of loan tremendously hampered their fishing activities. Regarding repaying of the loans they preferred to do it after harvesting of fish instead of making weekly repayments.

Both LFTs and FFGs claimed their rights on oxbow lake fish ponds. LFTs' disliking of women's participation in fish farming in lake ponds deteriorated their relationship with the FFGs.

Proper understanding among all the implementing agencies/organizations about the goal of the project is important. The implementing agencies' sincerity in accomplishing their jobs were felt essential to make the project successful.

In carrying out the project in future, the suggestions given by the implementing agencies/organizations should be taken into proper consideration.

8.2 Policy Implications for Future Action

Combination of indigenous and modern technologies is necessary to increase fish production.

BRAC staff should give more attention to ensure that the FFGs could fully adopt the recommended technologies. This is necessary for improving the productivity of the ponds.

Legal support and capacity development of the stakeholders' organizations are necessary to protect the stakeholders from the harassment of the powerful elite.

Institution building and capacity development of the stakeholders should be an important part of training in future. Insincere and dishonest LFT committee members should be expelled.

There should be timely disbursement of loan for the FFGs. It should be considered if the repayment of loan can be made after fish harvests.

The loan instalments deposited by FFGs before December 1996 should be refunded to them because the loan has been exempted by DANIDA.

The LFTs are not satisfied with RDP's existing savings withdrawal system. The stakeholders expect a more flexible system.

LFTs may be provided separate ponds which would help avoiding conflicts between them and the FFGs.

Raising dikes in lake fish ponds is very important so that fish could not get out of ponds during flood.

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ANNEXURE

Table A1. Perception of LFT Stakeholders on Harmful Weeds of Oxbow Lakes (in percentage)

Harmful weeds	High yield n=18	Low yield n=50	All n=68
Kachuripana (water hayacinths)	77.8	76.0	76.5
Pata shyaola	11.1	66.0	51.5
Chamta (filamentous algae)	27.8	34.0	32.4
Shapla/Padmo (water lily/lotus)	-	34.0	25.0
Lata ghas	-	30.0	22.1
Leirko shyaola	-	26.0	19.1
Kata shyaola	16.7	6.0	8.8
Others	88.9	4.0	26.5

Table A2. Perception of LFT Stakeholders on Useful Weeds of Oxbow Lakes (in percentage)

Useful weeds	High production n=18	Low production n=50	All n=68
Kalmi	5.6	42.0	32.4
Pata shyaola	33.3	26.0	27.9
Chuna/teto/koyla shyaola	44.4	22.0	27.9
Jhajhi dam	-	34.0	25.0
Fulko/Khudipana	-	26.0	19.1
Kachuripana (Water hyacinth)	-	16.0	11.8

Table A3. Size of Fingerling During Stocking in the Oxbow Lake Ponds by Type of Fish (in percentage)

Type of fish	Size recommended by OLP-II	Oxbow lakes		
		High yield n=16	Low yield n=48	All n=64
Silver carp & grass carp	6 Inches	1.82 Inches	2.21 Inches	2.13 Inches
Common carp	3 Inches	1.33 Inches	2.16 Inches	2.03 Inches
Catla, Rohu and Mrigal	4-6 Inches	2.45 Inches	2.86 Inches	2.78 Inches

Table A4. Reasons for Regular Repayment of Loans by LFT Stakeholders (in percentage)

Reasons of regular repayment	Oxbow lakes		
	High yield n=14	Low yield n=13	All n=32
Timely repayment of loan would help in the receipt of loan in future	61.5	88.9	75.0
OLP-II policy to pay half of the return from fish sale helped in repayment	15.4	83.3	53.1
Tendency to discontinue involvement with BRAC as soon as possible encouraged in regular repayment of loan	23.1	-	9.4

Table A5. Reasons for Conflict between LFT and FFG Stakeholders (In percentage)

Reasons	Oxbow lakes						
	High yield		Low yield		All		
	LFT n=4	FFG n=5	LFT n=21	FFG n=29	LFT n=25	FFG n=33	Both n=58
Disputed claim of fish due to inundation of baor ponds by flood water	75.0	-	100	86.2	96.0	75.8	84.5
Disputed claim by LFTs and FFGs on Baor pond	-	40.0	81.0	65.5	68.0	63.6	65.5
LFTs objection on women's participation in fishing activities	25.0	80.0	14.3	37.9	16.0	45.5	32.8

Table A6. Problems in Fish Cultivation According to LFT Respondents (in percentage)

Problems	Oxbow lakes		
	High yield n=18	Low yield n=50	All n=68
Oxbow lakes not sufficiently deep for fish cultivation	50.0	56.0	54.4
Conflict with others in the locality	5.6	32.0	25.0
Regular increase of the lease fee for fishing in oxbow lakes	-	32.0	23.5
Unauthorised fishing by muscle man (mastan) in oxbow lakes	38.9	14.0	20.6
Hindrance in the development of fish food through natural process due to dams (beri bundh) developed in oxbow lakes	-	24.0	17.6
Non co-operation and unfair activities by the government officials	-	16.0	11.8
Others	5.6	12.0	10.3

Table A7. Problems in Fish Cultivation According to FFG Stakeholders (in percentage)

Problems	Oxbow lakes		
	High yield n=16	Low yield n=48	All n=64
Irregular and small amount of BRAC loan disbursement	25.0	52.1	45.3
Inundation of oxbow lake ponds by flood water	18.8	97.9	78.1

2.7.7a

EXECUTIVE SUMMARY

Project-end Evaluation of Oxbow Lakes Small Scale Fishermen Project- II

Oxbow Lakes Small Scale Fishermen Project- II ১৯৮৮ সালে শুরু হয়ে ১৯৯৭ সালের ডিসেম্বরে শেষ হয়েছে। এই প্রকল্পের প্রকৃত কর্ম তৎপরতা শুরু হয় ১৯৯২ সালে। বাওড় এবং বাওড় পুকুরগুলিতে মৎস্য উৎপাদন বৃদ্ধির মাধ্যমে দরিদ্র মৎস্যজীবীদের অর্থনৈতিক এবং পুষ্টিগত মান বৃদ্ধি করাই ছিল এ প্রকল্পের উদ্দেশ্য। প্রকল্প বাস্তবায়ন সংস্থা এবং প্রতিনিধিগণ প্রকল্পের মেয়াদ উত্তীর্ণ হবার পর প্রকল্প মূল্যায়নের প্রয়োজনীয়তা উপলব্ধি করেন। এ জন্য এই গবেষণা কর্মটি হাতে নেয়া হয়।

উদ্দেশ্য

গবেষণার উদ্দেশ্যসমূহঃ

- ক) মৎস্যজীবীগণ তাঁদের প্রাপ্ত প্রশিক্ষণ কতটুকু বাস্তবায়ন করতে পেরেছেন এবং তা করতে গিয়ে কি সমস্যার সম্মুখীন হয়েছেন তা খতিয়ে দেখা;
- খ) মৎস্যজীবীগণ কর্তৃক গৃহীত ঋণের ব্যবহার এবং তা পরিশোধের ধরন সম্পর্কে জানা;
- গ) বাওড় পুকুরে মৎস্য চাষের অধিকার নিয়ে লোক ফিশিং টিম (এলএফটি) এবং ফিশ ফার্মিং গ্রুপ (এফএফজি)-এর মধ্যে বিরাজমান সম্পর্ক বিশ্লেষণ করা; এবং
- ঘ) প্রকল্প বাস্তবায়নে কর্তৃপক্ষে যে সুবিধা এবং সমস্যা হয়েছে তা জানা।

বেশি এবং স্বল্প মৎস্য উৎপাদনশীল বাওড়গুলির চারটি গবেষণার আওতাধীন ছিল। তথ্য সংগৃহীত হয়েছিল ৬৮জন এলএফটি ৬৪ জন এফএফজি এবং প্রকল্প বাস্তবায়ন সংস্থার ১২ জনের কাছে থেকে। এলএফটি সদস্যরা বাওড়ে মৎস্য চাষ

করেন এবং তাঁরা সবাই পুরুষ। অন্যদিকে এফএফজি সদস্যগণ বাওড় পুকুরে মৎস্য চাষ করেন। তাঁদের শতকরা ৯৬ জনই মহিলা।

উৎপাদিত মৎস্য প্রজাতি

মৎস্যজীবীরা রুই, কাতলা, মৃগেল, সিলভার কার্প, গ্র্যাস কার্প এবং কমোন কার্প প্রজাতির মৎস্য চাষ করেন। এ ছাড়াও মৎস্যজীবীরা রুই, কাতলা এবং মৃগেলের চাইতে লাভজনক বলে বিগহেড কার্প, থাই সরপুঁটির চাষ করেন। এরা দ্রুত বর্ধনশীল এবং স্থানীয় বাজারে এদের চাহিদাও রয়েছে বেশ।

মৎস্য উৎপাদনে প্রশিক্ষণের ব্যবহার

এলএফটি সদস্যদের বাওড়ে আগাছা দমন, পোনা মজুদ এবং মাছ ধরা সম্পর্কে অর্জিত জ্ঞান এবং তার প্রয়োগ সম্পর্কে অনুসন্ধান করা হয়েছে। বেশি উৎপাদনশীল বাওড়ের এলএফটি সদস্যরা প্রশিক্ষণ গ্রহণে কম আগ্রহী কারণ তাঁরা মনে করেন তাঁরা বংশানুক্রমে মৎস্যজীবী এবং মৎস্য চাষ সম্পর্কে তাঁদের যথেষ্ট জ্ঞান রয়েছে। স্বল্প উৎপাদনশীল বাওড়ের সদস্যরা প্রশিক্ষণ গ্রহণে বেশ আগ্রহী কারণ মৎস্য চাষ সম্পর্কিত জ্ঞান তাঁদের কম এবং তাঁরা মৎস্যের উৎপাদন বৃদ্ধি করতে চান। যাহোক, বেশি এবং স্বল্প উৎপাদনশীল বাওড়ের শতকরা ৯৬ জন সদস্য তাদের গৃহীত প্রশিক্ষণকে কার্যকর বা উপযোগী মনে করেন। অর্জিত জ্ঞানের প্রয়োগে দেখা গেছে:

ক) শতকরা ৬৩ জন সদস্য যথা সময়ে বাওড় আগাছামুক্ত করেন।

খ) শতকরা ৮৫ জন সদস্য পোনা মজুদের ঘনত্ব নির্ধারনে *** ডিস্কের ব্যবহার করেন। বেশি উৎপাদনশীল বাওড়ের মৎস্যজীবীরা কম সেটী গভীরতায় নির্দেশিত পরিমাণের চেয়ে কম পরিমাণে পোনা মজুদ করেন এবং বেশি সেটী গভীরতায় নির্দেশিত পরিমাণের চেয়ে বেশি পোনা মজুদ করেন। এর বিপরীত দৃশ্য পরিলক্ষিত হয় স্বল্প উৎপাদনশীল বাওড় এলাকায়।

গ) শতকরা ৩৪ জন মৎস্যজীবী বছরের যে কোন সময় তাঁদের ইচ্ছা মাফিক পোনা মজুদ করেন, এমন কি তা যদি পোনা মজুদের জন্য যোগ্য সময় না-ও

হয়। এই প্রবণতা স্বল্প উৎপাদনশীল বাওড়ের তুলনায়। উৎপাদনশীল বাওড়ে বেশি পরিলক্ষিত হয়

ঘ) বেশিরভাগ এলএফটি সদস্য ৫ ইঞ্চি সমান মাছের পোনা মজুদ করেন এবং এই দৃশ্য স্বল্প বেশি উৎপাদনশীল বাওড়ের তুলনায়। উৎপাদনশীল বাওড় এলাকায় বেশি পরিলক্ষিত হয়

ঙ) মাছ ধরার ক্ষেত্রে বেশি উৎপাদনশীল বাওড়ের শতকরা ৬৭ জন উত্তর দাতা মাছ ধরার উপযুক্ত সময় নির্বিশেষে বছরের যে কোন সময়ই মাছ ধরে অথচ স্বল্প উৎপাদনশীল বাওড়ের শতকরা ৯২ জন উত্তরদাতাই বছরের নির্দেশিত সময়ে মাছ ধরে।

গবেষণা কর্মটি এফএফজি সদস্যদের বাওড় পুকুরে পোনা মজুদ, পুকুরে সার ও খাবার প্রয়োগ এবং মাছ ধরা সম্পর্কে অর্জিত জ্ঞানের প্রয়োগ মাত্রাও লক্ষ্য করেছে।

বন্যায় পুকুর ডুবে যায় বলে এফএফজি সদস্যরা ধানী পোনা মজুদ করে যাতে করে তারা বন্যার আগেই **** পোনা হিসেবে তা বিক্রি করতে পারেন। এ জন্য বেশিরভাগ এফএফজি সদস্যই নির্দেশিত পরিমাণে পোনা মজুদ করতে পারেন না। তা ছাড়া অন্যান্য কারণেও তাঁরা যথা সময়ে পোনা মজুদ করতে পারেন না।

প্রায় শতকরা ৬১ জন এফএফজি সদস্য জৈব সার এবং শতকরা ৮১ জন সদস্য প্রতি সপ্তাহে অজৈব সার প্রয়োগ করেন। কখনো তাঁরা নির্দেশিত পরিমাণের বেশি আবার কখনো নির্দেশিত পরিমাণের চেয়ে কম সার প্রয়োগ করে থাকেন।

ঋণ ব্যবহার এবং পরিশোধ

ব্র্যাক প্রদত্ত ঋণ বাওড় এবং বাওড় পুকুরে মৎস্য চাষের জন্য যথেষ্ট বলে মনে করেন যথাক্রমে শতকরা ৬৮ জন এলএফটি এন্ড ১৩ জন এফএফজি সদস্য। সদস্যরা ব্র্যাক থেকে ঋণ গ্রহণের পর তা তাদের যৌথ একাউন্টে জমা করেন। প্রয়োজনানুসারে এই টাকা তারা তাদের একাউন্ট থেকে তোলেন।

কয়েকজন (৮%) এফএফজি সদস্য এখনও পর্যন্ত মাহ চাষের ঋণ তোলেন নি। এর অন্যতম একটি কারণ হল, ব্র্যাক থেকে ঋণ তোলার জন্য যে ন্যূনতম পরিমাণ টাকা সঞ্চয় করার দরকার হয় তা তারা করতে পারেন নি।

প্রায় শতকরা ৪৯ জন এলএফটি নিয়মিতভাবে ঋণ পরিশোধ করতে সমর্থ। এই প্রবণতা কম মৎস্য উৎপাদনশীল বাওড়ের চেয়ে বেশি উৎপাদনশীল বাওড়েই বেশি। ঋণ পরিশোধের ব্যাপারে এফএফজি সদস্যরা অনেক পিছিয়ে আছে। মাত্র শতকরা ২২ জন এফএফজি সদস্য নিয়মিত ঋণ পরিশোধ করেন। যাহোক, এ ব্যাপারে বেশি মৎস্য উৎপাদনশীল বাওড় এলাকার সদস্যরা কম উৎপাদনশীল বাওড় এলাকার চেয়ে ভাল অবস্থানে রয়েছেন। এলএফটি সদস্যরা যে কারণে নিয়মিত ঋণ পরিশোধে অপরগ তা হলঃ

- ক) বাওড়ে মৎস্যের স্বল্প উৎপাদন;
- খ) ব্র্যাক ঋণের বাইরে অন্যান্য ঋণ পরিশোধ; এবং
- গ) এলএফটি কমিটি কর্তৃক ঋণ পরিশোধের সিদ্ধান্ত গ্রহণ।

উভয় এলাকার বেশির ভাগ সদস্য মৎস্য বিক্রিত অর্থ থেকে তাঁদের পারিবারিক খরচাদি মিটিয়ে টাকা সঞ্চয় করতে পারেন না। অল্প সংখ্যক যাঁরা সঞ্চয় করতে সমর্থ তাঁরা নিজেদের তেমন আত্ম-নির্ভরশীল মনে করেন না তাই তাঁরা মৎস্য চাষের জন্য ব্র্যাক থেকে ঋণ গ্রহণ অব্যাহত রাখবেন।

এলএফটি এবং এফএফজি দের মধ্যে সম্পর্ক

প্রায় শতকরা ৪৫ জন এলএফটি এবং এফএফজি উত্তরদাতা তাদের মধ্যে বিবাদময় সম্পর্ক আছে বলে জানান।

বিবাদময় সম্পর্কের কারণগুলো হলঃ ক) এলএফটি এবং এফএফজি উভয় দলই বাওড় পুকুরের দাবীদার, খ) বন্যায় ডুবে যাওয়া পুকুরের মাছ নিয়ে ঝগড়া-বিবাদ, এবং গ) মৎস্য চাষে মহিলাদের অংশগ্রহণে এলএফটিদের আপত্তি।

এলএফটি এবং এফএফজিদের মৎস্য চাষে সমস্যা

এলএফটি এবং এফএফজি উভয় দলই মৎস্য চাষে সমস্যার মুখোমুখী হয়েছেন।

এলএফটি সদস্য কর্তৃক উল্লিখিত সমস্যাগুলিঃ

ক) বাওড়গুলি মৎস্য চাষের জন্য যথেষ্ট গভীর নয়;

খ) এলএফটি সদস্যদের সাথে বাওড়ে মৎস্য চাষ নিয়ে স্থানীয় অন্যান্য লোকের বিরোধ; এবং

গ) বাওড়ে মৎস্য চাষের জন্য নির্ধারিত লিজ ফি-য়ের বৃদ্ধি।

বাওড় পুকুরে মৎস্য চাষে এফএফজি সদস্যদের সমস্যা

ক) অনিয়মিতভাবে ঋণ প্রদান এবং ব্র্যাক ঋণের স্বল্প পরিমাণ;

খ) বন্যার পানিতে পুকুর ডুবে যাওয়া।

নীতি নির্ধারণ

১) মৎস্য উৎপাদন বৃদ্ধির জন্য প্রদত্ত প্রশিক্ষণ বংশানুক্রমিক মৎস্যজীবীদের আকৃষ্ট করেছে না। যদিও এফএফজি সদস্যরা প্রশিক্ষণ গ্রহণ করছেন এবং তা থেকে অর্জিত জ্ঞান তারা মনেও রাখছেন কিন্তু তারা তা কাজে ব্যবহার করছেন না। প্রশিক্ষণের জ্ঞান ব্যবহারের প্রতিবন্ধকতাসমূহ দূর করা দরকার।

২) এলএফটি এবং এফএফজি উভয় দলই বাওড় পুকুরের ওপর তাদের মালিকানা দাবী করছেন। মহিলাদের মৎস্য চাষে অংশগ্রহণে এলএফটিদের আপত্তি দুদলের সম্পর্কের অবনতি ঘটিয়েছে। এর কারণ যতটা না অর্থনৈতিক তার চেয়েও বেশি হচ্ছে সাংস্কৃতিক এবং দৃষ্টিভঙ্গীগত। দু'দলের মধ্যে সুসম্পর্ক বজায় রাখতে পদক্ষেপ নেয়া দরকার।

৩) বাওড়ের সীমা নির্ধারণে ভূমি মন্ত্রণালয়ের মাধ্যমে দাগ, ইজারা এবং খতিয়ান নম্বরের সঠিক প্রয়োগ হওয়া দরকার।

৪) এল এফটি এবং এফএফজি দের মধ্যে বিরাজমান বিরোধ মেটাতে এলএফটি দের আলাদা পুকুর দেয়া দেয়া দরকার।

৫) মৎস্য উৎপাদন বৃদ্ধির লক্ষ্যে দেশীয় এবং আধুনিক প্রযুক্তির সমন্বয় করা দরকার।

৬) মৎস্য উৎপাদন বৃদ্ধিতে যে সমস্যাসমূহ রয়েছে তার প্রতিকারমূলক ব্যবস্থা নেয়া দরকার। এ ক্ষেত্রে সম্মিলিতভাবে কয়েকটি পদক্ষেপ নেয়া বাঞ্ছনীয়, যেমন বাওড় গভীরকরণ, বাওড় বন্যায় ডুবে যাওয়া থেকে রোধ করা এবং পর্যাপ্ত পরিমাণ ঋণ প্রদান। বেশি উৎপাদনের ফলে বেশি আয় হবে যা সদস্যদের নিয়মিত ঋণ পরিশোধে উৎসাহিত করবে।

৭) জেলা এবং থানা জল মহাল কমিটিতে প্রকল্প বাস্তবায়ন সংস্থার মতানুসারে ব্র্যাকের প্রতিনিধিত্ব নিশ্চিত করা দরকার,

৮) এলএফটি সদস্যরা তাঁদের সম্বিষ্ট অর্থ তোলার ব্যাপারে একটি নমনীয় নীতির প্রত্যাশা করে। ব্র্যাকের আরডিপি এ ব্যাপারে বিশেষ ভাবে নজর দিতে পারে।